

**ADDIS ABABA UNIVERSITY
FACULTY OF MEDICINE
DEPARTMENT OF COMMUNITY HEALTH**

**ASSESSMENT OF KNOWLEDGE, ATTITUDES AND PRACTICES OF
COMMUNITY AND HEALTH PROFESSIONALS TOWARDS
PODOCONIOSIS IN WOLAITA ZONE, SOUTHERN ETHIOPIA**

BY

BEREKET YAKOB (BSc. in Public Health)

JULY 2007

ADDIS ABABA, ETHIOPIA

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ADDIS ABABA, ETHIOPIA

Declaration

I the undersigned, declare that this is my original work, has not been presented for a degree in this or any other university, and that all the resource materials used for this have been fully acknowledged.

Name_____

Signature_____

Date_____

This thesis has been submitted for examination with my approval as a university advisor.

Name_____

Signature_____

Date_____

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List of abbreviations

AOR:	Adjusted odds ratio
CI:	Confidence interval
DEC:	Diethyl carbamazine
HPs:	Health professionals
IEC:	Information, education and communication
LF:	Lymphatic filariasis
MFTPA:	Mossy Foot Treatment and Prevention Association
NGO:	Non-governmental organization
NRL:	Not reaching leg
OR:	Odds ratio
P-value:	Probability value
RL:	Reaching leg
SD:	Standard deviation
SPSS:	Statistical Package for Social Sciences

Abstract

Introduction: podoconiosis is a, non-infective, chronic disease characterized by the development of persistent swelling of plantar foot which progresses to the dorsum of the foot and encompasses lower leg slowly. Wolaita Zone is highly exposed to crystalline substances and the prevalence of podoconiosis exceeds 5.0%. People with podoconiosis and their families bear a range of negative social impacts as a consequence of having podoconiosis.

Objectives: to assess knowledge, attitudes and practices of community and health professionals towards podoconiosis in Wolaita Zone.

Methods: a quantitative cross-sectional study was conducted in January 2007. Community participants were selected by multistage probability sampling while health professionals were selected purposively. Structured, piloted and scrutinized questionnaires were used for data collection. Data were then entered into EPI/INFO V6.04 and exported to SPSS V11.5 for analysis.

Results: most (91.6%) of community respondents knew about podoconiosis. Misconceptions about causation ranged from 9.3-62.9% and about prevention methods ranged from 52.0%-64.9%. Only 21.4% and 11.4% knew that matting floors and cementing floors could prevent podoconiosis, respectively. Nearly 46.0% of community respondents had low knowledge about podoconiosis. About 37.1-55.7% showed stigmatizing and discriminating attitudes towards social interactions with podoconiosis patients, and 63.8% had unfavorable attitude towards podoconiosis. Around 86.1% had ever worn shoes and 54.2% were wearing shoes during interview.

Only 58.2% of health professionals (HPs) knew that podoconiosis is caused by soil particles. HPs misconceptions about causes of podoconiosis ranged from 37.1%-61.3%. Majority (54.3%) had low knowledge score about podoconiosis. Working in a private health facility was negatively associated with the general knowledge score of HPs ($P < 0.05$). Most (86.4%) HPs did not feel that they had adequate knowledge and skills to provide care and treatment for podoconiosis patients. Forty-eight percent of HPs had unfavorable attitude and those with

high knowledge were more likely to have favorable attitude ($P < 0.05$). Thirty-six percent of health professionals had ever treated pododermatitis patients and 71.0% of them prescribed DEC.

Conclusions: both community and health professionals had misconceptions about causation, care, treatment and preventions of pododermatitis. Based on findings, awareness raising and behavioral change interventions, hygiene promotion, cementing floors, matting floors, training health professionals on care and treatment of pododermatitis, and further researches on relative importance of various causes of pododermatitis were recommended.

1. Introduction and Problem statement

Podoconiosis (endemic non-filarial elephantiasis) is a chronic disease characterized by the development of persistent swelling of plantar foot which progresses to the dorsum of the foot and encompasses lower leg slowly. It is non-infective disease, usually results from crystalline blockage of the lymphatic system of the limb, and almost always affects the lower limbs, especially the feet and rarely extends above knee. Most of the time when the disease advances it is accompanied by a number of acute episodes. Finally the disease may end up in a permanent feature of elephantiasis of varying degree ^(1,2,3).

In Ethiopia the clay soil derived from volcanic rocks covers more than 200,000 km² where more than 20.5 million people live and farm the fertile soil. These people are exposed for geochemical substances that cause the disease. In Wolaita Zone the prevalence of podoconiosis exceeds 5.0% and both people in urban and rural areas are affected by the disease. Podoconiosis is widely distributed and known so long in Wolaita Zone ^(4,5).

As any community has knowledge, beliefs, perceptions, values and practices for its common problems, the Wolaita society had certain knowledge attitudes and practices towards podoconiosis. A qualitative study conducted by Ewenat (2005) revealed that the Wolaita society had misconceptions on causation, care, treatment, prevention and control of podoconiosis. Health professionals too had no different beliefs and knowledge of the disease. At advanced level the disease forbids people from movement and weakens their ability to contribute to family's earnings. Fasil (2005) showed that people with podoconiosis and their families expend their limited resources seeking medical care and support. They face physical and social isolation from family, friends, and community; gossip, name-calling and voyeurism; and a loss of rights, decision-making power and access to resources and livelihoods. Misconceptions were not only the problem of the general community but also of health professionals. Thus, there is little option left for people affected by podoconiosis. The social problems faced were similar to those observed in filarial elephantiasis ^(6,7,8).

Although the disease is widely distributed in the Ethiopia and other countries, and has grave impacts on socio-economic development in addition to the patients' right to have access to medical care and treatment, it is surprising that podoconiosis has got very little interest and is almost neglected in Ethiopia and other countries. The problem is less researched and less recognized by governmental and non-governmental organizations. Few resources have been made available for podoconiosis prevention and control, or research activities. After twenty years of neglect, some researchers have shown interest in the disease.

Information is one of the important tools to protect oneself from contracting disease and also in breaking the barriers of stigma and discrimination. Quantitative data on community and health professionals' knowledge, attitudes and practices towards podoconiosis are necessary to give priority to its control, care, treatment and prevention, and to inform choices in resource allocation by estimating the relative consequences of health problems ^(4,8,9). Hence, the objective of this study is to provide quantitative information on knowledge, attitudes and practices of community and health professionals that it can be used as baseline information for interventions on podoconiosis.

2. LITERATURE REVIEW

2.1. Podoconiosis (definitions and naming)

Since elephantiasis refers only to late stage of the disease while it takes several months to years to develop elephantiasis, the term podoconiosis is more appropriate than elephantiasis and includes all stages from early stage to advanced level. The name podoconiosis is derived from two Greek words: “podos” refers to leg and “konos” to dust ⁽¹⁰⁾. In Rwanda and Burundi the disease is recognized by the people as an entity, and given the name of ‘imisasi’ (“mountains”) through out both countries; this referring to the resemblance between the folds of the “soft” type of the disease and the rounded tops of the weathered collines on which they live ⁽¹¹⁾. In Wolaita the disease is named as ‘kita’ meaning swollen ⁽⁸⁾.

2.2. Etiology and pathophysiology of podoconiosis

The etiology, pathology and clinical features of podoconiosis have been elucidated by several studies. The studies have clearly shown that soil borne minerals are the primary causes of the disease. The minerals involved are silica and alumino-silicates, and they are always to be found in the volcanic clays of areas where podoconiosis is endemic. The pathogenic soils are characterized by a high proportion of abrasive quartz crystals in the fine silts and of colloidal-size particles in clays. The combination of soil particles facilitates their penetration through the skin of the foot. Micro-particles entered through the skin accumulate in the femoral lymph nodes, accompanied by nests of epithelial cells and numerous plasma cells in the cortex, in those segments of the nodes, in to which the lymphatics of the foot and the lower leg drain ^(4,12).

Soil particles causing the obstructive lymphopathy have been found in biopsy specimens from the dermis, lymphatic vessels and lymph glands ⁽¹³⁾. All studies conducted in Wolaita Zone failed to identify filarial elephantiasis and also no antigen indicating filarial was determined ⁽¹²⁾. Earlier study claimed that the disease was not hereditary or contagious but

studies conducted later suggested that there exists familial tendency resulting from some genetic defect in the family of podoconiosis patient ^(8,9,14). Similarly communities where the disease is prevalent perceive the disease to have familial origin. This is found to be the leading cause of discriminating and stigmatizing families affected by podoconiosis justifying fear of intergenerational transmission. The disease is rarely seen in youngest ages and prevalent in later ages. This may also indicate the assumption that podoconiosis is not simply a condition of congenital alymphogenesis and substantial environmental exposure is necessary for manifestation of the disease. The distribution of cases by age reflects a chronic condition that disables but hardly kills ^(2,5).

2.3. Distribution of podoconiosis

Podoconiosis is widely distributed in Ethiopia, Kenya, Uganda, Tanzania, Cameroon, Central and South America, North India, Indonesia, Colombia, Ecuador, Brazil and Sri Lanka ⁽⁴⁾. In Ethiopia the clay soil derived from volcanic rocks covers more than 200,000 km² where more than 20.5 million people live and farm the fertile soil. These people are exposed for geochemical substances that cause the disease. Hence, Ethiopia is one of the countries in which podoconiosis is an important public health problem in endemic areas of red clay soil like Wolaita zone, where the prevalence of the condition exceeds 5% ⁽⁵⁾.

It is mostly a disease of agrarian people who work bare foot, particularly on red clay soils of volcanic areas. Studies have shown that it is related to the distribution of red clay soil derived from volcanic rocks, particularly basalt. The distribution of the disease is higher in the most fertile areas of Ethiopia (high altitude over 1200 meters). The association between tropical red-clay soil and the occurrence of non-filarial elephantiasis has been tested in East African regions of Kenya, North-western Tanzania and Ethiopia, and in volcanic areas of Rwanda ^(4,5,15,16,17).

According to the elephantiasis survey in 2001, there were at least 81,000 podoconiosis patients in Wolaita Zone. Earlier studies indicated a higher prevalence of the problem in Soddo, Wolaita Zone, than elsewhere (up to 69/1000). The mean Zonal prevalence weighted

for the Woreda size was 5.46%. Sixty-four percent (64%) of cases occurred in the economically productive age groups. Male to female ratio was 1:0.98, reflecting nearly equal distribution in both sexes ^(5,18).

2.4. Treatment seeking behavior of podoconiosis cases

Studies have shown that the proportion of podoconiosis patients accessing treatment facilities in each Woreda, in Wolaita Zone ranges from 1%-30%. And almost all patients seek care at advanced disease level. Initially they try to conceal themselves so others do not recognize them and no stigma and discrimination will occur to them ^(5,8).

In Wolaita Zone there is a local NGO, named Mossy Foot Treatment and Prevention Association (MFTPA), delivering treatment and prevention services on podoconiosis to the community. It is financially and technically supported by different voluntary funding agencies worldwide. MFTPA has been continuously expanding its service since its establishment in May 1998. It has now 15 outreach service sites in the Zone. More than 30000 patients in the zone use the services, as it is available for a nominal fee or for free. Most people prefer to visit modern medical care than traditional medicine as the service provided by MFTPA is modern and mostly for free. Podoconiosis patients seem not to have range of options for the treatment of their condition ^(5,7,8).

2.5. Community knowledge, beliefs, perceptions and practice toward podoconiosis

A review of sociocultural impact of filariasis showed that chronic manifestations of filariasis can have significant, and often very negative, social impacts. The chronic disabling manifestations of this disease, including lymphoedema of the limbs, breasts and external genitalia, have a profoundly detrimental effect on the quality of life of affected individuals. The degree of social disability varies between cultural settings, but the degree of stigmatization appears to be directly correlated with the severity of visible disease. In

conservative contexts, affected individuals avoid seeking treatment for fear of drawing attention to their condition. Failure to treat the disease results in recurrent acute febrile attacks and progressive damage to the lymphatic system. Without access to simple hygiene advice, sufferers are unable to prevent further progression of the outwardly visible complications of lymphatic filariasis ⁽¹⁹⁾. Similarly, people with podoconiosis bear social problems as discussed earlier and almost all people with podoconiosis seek treatment at advanced level. This in turn decreases the chance of controlling or reversing the disease at early stage. At late stage podoconiosis is almost irreversible and incurable ^(5,7,8,19,20). The importance of early treatment and control of podoconiosis is discussed in later sections.

In Thailand and in West Africa there is a general perception that children born to a woman affected by lymphatic filariasis (LF) will be similarly affected. Shame and anxiety related to difficulties in conceiving children are common for LF patients around the world. Young females with LF are considered poor marriage prospects because the disease's recurrent debilitating acute episodes limit their ability to perform paid and unpaid work. The costs associated with long-term health care as the disease progresses result in perceptions of these women as financial burdens. Although women may have concerns about marrying men with the physical stigmata of LF, their gender roles and prevailing power structures often leave them in a relatively powerless position. In Haiti, Coreil et al. found that the risk of dysfunction and unhappiness was greater in marriages where the wife had physical manifestations of filariasis. This is also supported by data from coastal Ghana ^(6,19).

Clinical manifestations of filariasis and podoconiosis mimic that community and health professionals participated in qualitative study conducted in Wolaita Zone had mistaken one for the other. The name given for the disease is one of the worst insults in the locality. The community perceives that the causes of the disease are multiple including supernatural, evil eyes, spiritual, biological and physical factors. The most common cause identified was hereditary ⁽⁸⁾. As it was reported in the case of filariasis, podoconiosis patients bear social burden associated with the disease ^(6,19).

Similar to the findings from filariasis study, the strong belief of the cause of the podoconiosis to be genetic is reflected during marriage arrangements and social disagreements, which result in exchange of hot words in Wolaita Zone. The second most frequent reason believed to be the cause of the disease is walking on dead snakes and other small animals like frog. It is believed that snakes have poison that makes the foot swell even if they are dead. Most of the respondents who gave dead snakes as a reason for podoconiosis associate the events with going out in to the forest. Others believed that direct contact with the patients such as sleeping together and sharing footwear, and indirect contacts such as having accident with sharps like needle that have been used by patients and fly transmits the disease ^(6,8,19).

Since the Wolaita society believes that the disease is hereditary, they avoid marriage into podoconiosis family ⁽⁸⁾. This belief was also reported by a study conducted in Rwanda and Burundi ⁽¹¹⁾. The isolation is not at the onset of the disease. At the onset the patient will hide himself as much as possible, same as in case of filariasis. The differential treatment of patients is strongly associated with the stage of disease the patient has. Those with early stage and mild disease are more comfortable as compared to those with severe and advanced disease. This is because those with the early stage can conceal their condition ⁽⁸⁾.

The Wolaita community stigmatizes people with podoconiosis and avoids direct as well as indirect physical contacts with podoconiosis patients and families assuming that it would prevent the disease. In any social event they are given a separate seat and they are served food in isolation. Their plates will be taken care of separately so that the disease is not going to be transmitted to others. Only few people believe protective footwear can prevent the disease. Some mention shoes to be useful to prevent frequent attacks and accidents that may aggravate the disease ⁽⁸⁾. This was also similar to social burden experienced by people suffering from filariasis in Haiti, Ghana and Thailand ^(6,19)

Several researchers indicated that there exists stigma associated with podoconiosis at work places, in school and during marriage arrangements. The other held belief about preventing the disease is to avoid events that may predispose to acquiring the disease. Some of these are going in to the forest, stepping on evil spirited items and direct and indirect contact with

patients. The dismorphic and unattractive physical appearance of elephantiasis patients has caused social stigma and painful remarks to the sufferers and their families in Haiti and India (6,8,19)

2.6. Impacts of podoconiosis in health and life

2.6.1. At individual level

Podoconiosis cases suffer from impaired health status. The disease does not directly cause death but complications arising when the disease advances are debilitating. Swollen legs and other parts frequently get infected and lymphatic obstruction limits movement. The public health and socioeconomic importance of podoconiosis in rural areas is indicated by its debilitating effects, which prevents more severely affected persons from pursuing farming and other activities and most patients become beggars. The gross deformity, swelling, repeated ulceration and secondary infection make the swelling severe and decrease quality of life. Besides people with podoconiosis, when the disease advances, become less productive and pass working time at home or in bed. This predisposes them for psychological problems like sense of incapability and others (5,7,8)

2.6.2. At community and national levels

The magnitude of podoconiosis indicates that podoconiosis is a major public health and economic problem in Ethiopia. The presence of so many disabled adults in a largely subsistence economy represents a considerable drain on limited resources to provide food and shelter. At advanced level the disease forces patients to become highly dependent on others. They have little options left as they can not involve in routine agricultural and other activities. The high prevalence of the disease calls for investment and intervention. Developing countries like Ethiopia will be tempted to allocate limited resources to podoconiosis. But it is true that the incapacitating and debilitating effect of the disease could have detrimental role on development of the country (8,18,20)

2.7. Health professionals' knowledge, beliefs, perceptions and practices toward podoconiosis

Although the disease is widespread and well known in Wolaita society, health professionals from different health facilities that render service to the community have misconceptions about the cause, prevention and treatment of podoconiosis. This reflects lack of awareness about the disease. All the health professionals who participated in a qualitative study believed that the disease is infectious and is transmitted by a vector like that of filariasis. The word 'elephantiasis' was the name used by health professionals to indicate the disease. They were found to have mistaken the disease for filariasis, onchocerciasis, and schistosomiasis. They also believed that there is medical treatment for 'elephantiasis' which was not accessible in the Wolaita Zone. They also suggested that to prevent the disease, monitoring and controlling the breeding site for the vector, i.e. mosquito, is essential. According to them vector control mechanisms that can be applied at the stage of larva or adult could avert the spread of the disease ^(5,7,8,18,20).

2.8. Treatment and control of podoconiosis

The treatment of elephantiasis is viewed with pessimism both by the health worker and by the patient; treatment of presumed cause (podoconiosis, filariasis) is rarely followed by much clinical improvement, and symptomatic treatment appears to offer little help. Modern treatment has included the use of corticosteroids, of fluid dispersants such as hyaluronidase, of diuretics, and of surgery ⁽¹⁸⁾. As the limitations of treatment are there, much can be done to alleviate symptoms and arrest the progress of the disease. The prognosis of treatment depends on recognition of the clinical type of the disease, early or late stage ⁽²⁰⁾.

Currently, the Mossy Foot Treatment and Prevention Association (MFTPA) provide some care in Wolaita Zone. Some of their preventive activities include health education, shoe and sock distribution and training of patients in making 'cost-effective' shoes. In addition MFTPA provides limited numbers of surgical operations in collaboration with Wolaita Soddo

Hospital. Most of the time, the services are targeted at the cases and their families. Integration with other public and private health sector is lacking or very weak ^(5,7,8).

Health facilities are located in every Woreda, but plans and interventions on podoconiosis are not yet organized and they may be little used by people with podoconiosis. The reasons used for this were suggested to be lack of expertise in managing podoconiosis, attitude of health professionals to people with podoconiosis and high cost of treatment prescribed ⁽⁵⁾.

2.9. Prevention and control of podoconiosis

Rhazes stated that podoconiosis could easily be prevented, remedied and treated at early stage but remains incurable at advanced level. Knowing early symptoms and signs is very important in prevention and control activities ⁽⁴⁾. The early symptoms are “burning sensation” on plantar surface of the foot, persistent localized unexplained itching in one or other fore foot and “knocking” big toes (knocking together with each step as they walk). Early signs of podoconiosis development are splayed fore foot (widening of the fore foot which gives the foot spatula-like appearance), plantar oedema when at rest, pachydermic fore foot, increased skin markings, the “block toes” and the large second toe ^(20,21,22).

With the knowledge of early signs and symptoms, persistent and correct utilization of some low cost preventive measures will prevent progression of the disease to dismorphic and non-curable stage. The use of foot wear, improving and use of animal-drawn plough to reduce close contact of clay soil, daily and thorough care of foot after contact with soil, use of mechanized agriculture in place of traditional farming and change of residential place are recommended by some authors as preventive activities. The last two seem impractical solutions in the Ethiopian context ⁽²⁾.

Podoconiosis could be completely prevented if those at risk wore shoes. The use of footwear which protects the foot from contamination with soil; the “open” type of sandals do not save this purpose, the foot should be completely covered up to the ankle. To prevent podoconiosis footwear should be worn at all times, even at home. It must be recognized, however, that the

economic position of the patient may make the regular purchase and shoe wear impractical, and, in such cases, the use of locally made shoes may be acceptable as it may prevent injuries to feet and leg ^(5,20).

Once the "wooden" stage has developed, the only treatment is surgical. Elevation, elastic stockings, and long leather boots help in the earlier stages. Some studies have also indicated that there are several barriers to use of preventive shoes: bad smells from shoes, most people are bare footed (to avoid surprises), economical reasons and so on ^(5,20). However, there are no studies conducted on determinants of prevention activities on podoconiosis or are unavailable.

Desta K et al (2003) showed that the proportion of patients using foot wearing in Wolaita Zone ranged from 1-26%. The percentage of patients accessing treatments and using footwear estimated that the mean for Woredas with outreach sites (MFTPA) was 17.2% and without outreach site to be 8.2%. Patient treatment access ranged from 1.3-30.1% ⁽⁵⁾.

3. OBJECTIVES

General Objective:

To assess knowledge, attitudes and practices of community and health professionals towards podoconiosis in Wolaita zone, Southern Ethiopia

Specific objectives:

- To assess knowledge, attitudes and practices of the community towards podoconiosis etiology, treatment and prevention.
- To assess knowledge, attitudes and practices of health professionals towards podoconiosis etiology, treatment, and prevention.

4. METHODS

4.1. Study design

A cross-sectional quantitative study was performed to assess knowledge, attitudes and practices of community and health professionals towards podoconiosis in Wolaita zone, Southern Ethiopia

4.2. Study area

The study was conducted in Wolaita Zone, SNNPR, Ethiopia. The Zone is located 390km SE from Addis Ababa, capital city of Ethiopia. Wolaita zone has a total area of 4541 square kilometer. The zone is divided into seven administrative woredas and has a total of 274 peasant associations and 20 urban dwellers associations. The altitude is approximately 2000 meters above sea level. Ninety percent (90.0%) of the population lives at the altitude of 1500 and above. The climate ranges from “Kola” to “Dega”, mainly (75.7%) 'Woinadega' (midland 1500- 2500 meters) followed by 'Dega' (highland > 2500 meters) (13.85%).

A total of 1.6 million people lived in Wolaita Zone during the time of study. Out of these, 124,480 (7.78%) live in urban areas and the rest 1,475,520 (92.22%) live in rural areas. Wolaita is one of the most densely populated areas in the country with a density of 500-800 people/km². The average family size was 7 persons. The dominant soil geology is basalt and the majority of the population earn their livelihood from crop production (61.31%) followed by livestock rearing (22.32%). Only some of urban houses have cemented floors. This makes soil contact frequent. Wolaita zone is known for endemicity of podoconiosis.

The health coverage of the Zone was 55.0%. There were 310 health posts (69 currently constructed), 24 health centers (including 9 being upgraded) and one public hospital. There were

98 private health facilities i.e. two hospitals, two health centers and others were mostly clinics and diagnostic laboratories. The number of health professionals in private clinics and diagnostic laboratories was not clearly known.

4.3. Study population: The study populations for this study were all permanent residents of Wolaita Zone and health workers in public and private health sectors.

4.4. Sample size:

Community

The sample size was determined using a single population proportion formula assuming a 9.2% prevalence of foot wearing in woredas without outreach sites of MFTPA in Wolaita Zone., a 95% confidence level, a 4.0% margin of error, a 10.0% non-response rate and a design effect of 2.

$$n = \frac{Z_{\alpha/2}^2 P (1-p)}{(d)^2}$$
$$= \frac{(1.96)^2 \times 0.092 \times (1-0.082)}{(0.04)^2} = 201$$

Adding the non-response rate and the design effect, the sample size required for the study was 442. The prevalence of footwear in Wolaita Zone was used for sample size determination since there were no previously conducted prevalence studies on knowledge and attitudes or was unobtainable on podoconiosis.

Health professionals

The health profile of Wolaita Zone showed there were a total of 460 health professionals in the Zone in 2006. Of these, 102 were in training in various institutions and were not eligible for this study. More than 35 of the remaining health professionals were not delivering

services but were involved in administrative and managerial roles and only 11 of them participated in study. A total of 293 (81.8%) of 358 eligible health professionals in 21 health facilities participated in this study. For feasibility and practicability reasons, health professionals from all governmental health facilities and from Dubbo St. Mary and St Luke's private hospitals were selected purposively and involved in this study. These hospitals were assumed to contain most health professionals in private sectors and were the only private hospitals available in the Zone.

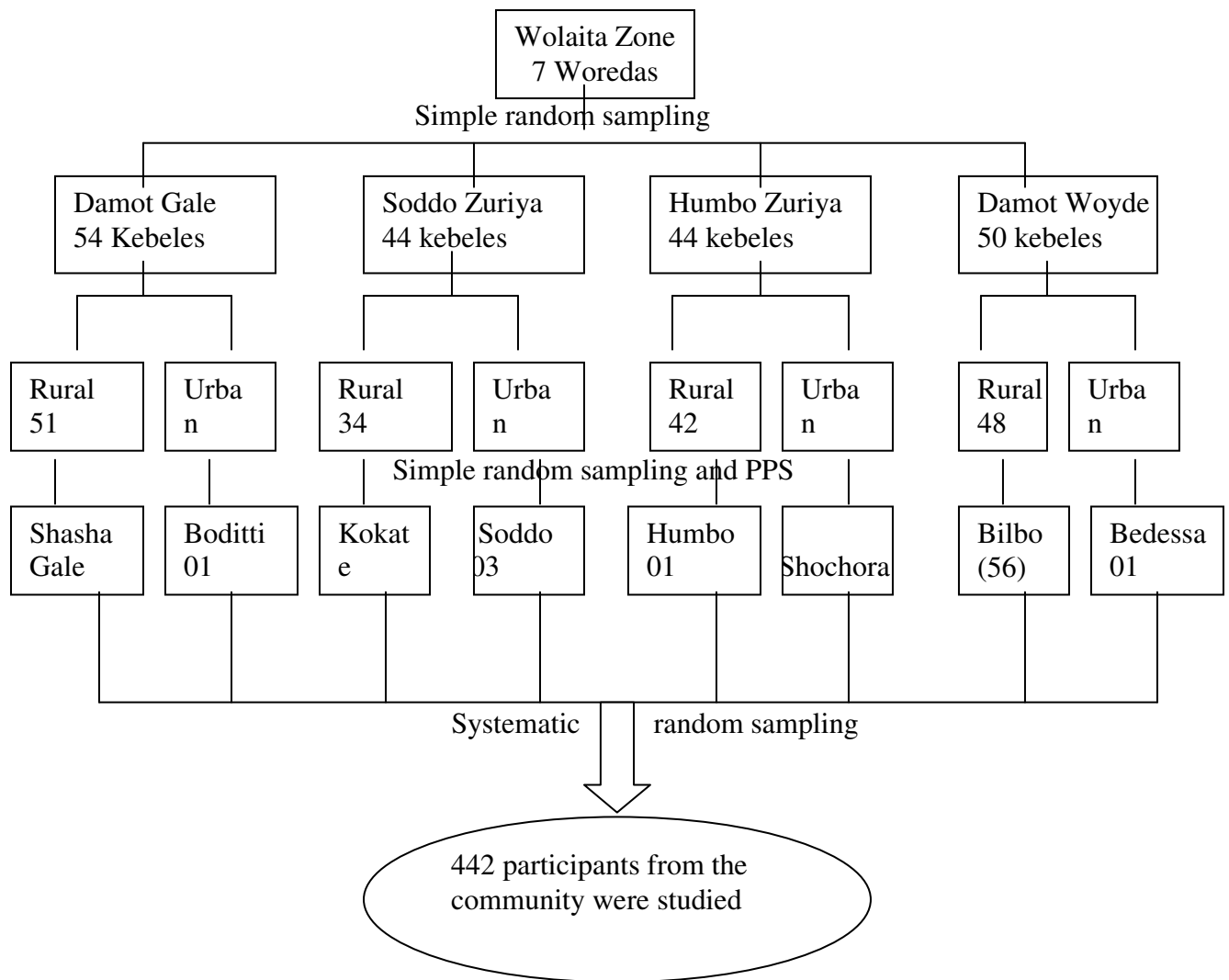
4.5. Sampling procedures

4.5.1. Community

From seven Woredas in Wolaita Zone, four were selected randomly. Next, selected Woredas (Damot Gale, Soddo Zuria, Humbo Zuriya and Damot Woyde) were stratified into urban and rural strata. From each stratum, one kebele was selected by simple random sampling. The kebeles studied were Boditti 01, Shasha Gale, Soddo 03, Kokate Mara Chare, Humbo 01, Shochora Ogodama, Bedessa and Bilbo Bitena. The first (starting) study participants from each selected Kebele were selected by pin spinning in respective Kebele Offices. Then household were selected by systematic random sampling. The average number of households in the zone was 5 and this was used in proportion to total population in kebeles to undertake systematic random sampling. Household heads (husband or wife) were interviewed alternatively in subsequent samples. The lottery method was employed to select a starting participant (male or female) for each kebele, to reduce the effect of gender bias in the study. The participants include people with and without podoconiosis without differentiation. (See schematic presentation below)

4.5.2. Health professionals

A total of 293 health professionals in public and private sectors participated in the study. Eighteen health professionals responded inappropriately, or omitted important socio-demographic variables and so were excluded from further analysis leaving 275 for analysis. Health professionals in 18 public Health Centers, one public hospital and 2 private hospitals were studied. In the current Health Care Delivery System, previously existing public Clinics were either upgraded to Health Centers or downgraded to Health Posts. In this study, health stations being upgraded (nine) were considered as Health Centers. Health Posts were not included for reason of time and financial constraints.



Schematic presentation of sampling procedure of community

4.6. Inclusion/eligibility criteria

Community

Permanent residents of Wolaita Zone aged 18 years and above were considered for this study. This criterion was established to ease conversation with participants and with assumption that their age to equal or exceed 18 years as they were heads of household. Permanent residents (who had lived for 6months or more in the area) were selected to avoid misrepresentation and generalization of study results to people outside the Zone.

Health professionals

All health professionals in public and private facilities reasonably accessible to the investigator were included in the sample.

4.7.Exclusion Criteria

For the community study, those coming from outside Wolaita Zone or staying temporarily, those aged below 18 years and others who refuse and did not want to participate in the study were excluded. So the findings of this study will not represent those who aged below 18 years.

4.8.Data collection and tools

4.8.1. Data collection tools

Structured questionnaires were developed separately for community and health professionals. The method of administration of questionnaires was by interview for the community and self-administered for health professionals. Both questionnaires were translated to Amharic and back translated to English to check for consistency. Color pictures of early and late stages of podoconiosis were provided to interviewers to show respondents to make communication easier and for ethical reasons as calling the local name is one of the worst insults in the community.

One week before carrying out data collection, the community questionnaire was piloted in Ade Sibaye Kebele, Damot Gale Woreda (which was later not included in the study) on 22 individuals (5.0% of the sample). The purpose of piloting in this study was to check for any missing options, to check wording for ambiguity, to check for re-routing and to look at the variability of questions. Corrections to the questionnaire were made as indicated. Some questions were modified and some were removed to avoid confusion and ambiguity. Similarly the questionnaire prepared for health professionals was piloted by involving 15 health professionals of different categories in Shone Health Center (Hadiya Zone), which is located 21km from Boditti (Damot Gale Woreda) with assumption of similar conditions to those existing for health professionals in Wolaita zone. The questionnaires were further evaluated and scrutinized by public health professionals who had experience in research for completeness and appropriateness.

4.8.2. Data collection and supervision

Eight data collectors who had completed 10th Grade education were employed for data collection and two nurses were employed to supervise and assist during data collection. Training was given for all data collectors and supervisors for one day and practiced in kebeles not included in the study. Supervisors and the principal investigator paid close attention and follow up during data collection.

4.9.Operational definitions

Knowledge is information stored in memory. Knowledge is assessed in terms of what the person knows about podocniosis and whether this knowledge is true or false.

Attitude is the predisposition to respond in a favorable or unfavorable manner towards a target (podoconiosis).

Practice is the overt behavior, habit, or customs of an individual. The practice refers to health behaviors with respect to podoconiosis.

Behavior is the way in which a person acts or reacts under a set of imposed conditions for podoconiosis.

Community refers to a group of people in social interaction in a geographical area and sharing a common social and cultural life.

Health professionals refer to people who had formal professional training in health discipline, and have been accredited and given legal permit to practice either in public or private facilities.

4.10. Methods of measuring variables

Variables included in this study were *knowledge, attitude, practice*, and socio-demographic variables including age, sex, educational status, residence, monthly income, religion, marital status and family size.

Knowledge was assessed by scoring the responses 0 (zero) for wrong answers and 1 (one) for correct answers. After checking for the distribution of the responses, median scores were used. In all cases, knowledge score distributions were found to be normal and there were no differences observed by using either mean or median as cut-off points for categorizing knowledge score as *High or Low*. Specific conditions are shown in respective tables for knowledge scores (Annex 1&3).

Attitude was assessed similarly. The questionnaires were prepared with a Likert scale such that the responses were balanced and the respondents were able to respond freely in favorable or unfavorable ways. Attitude scores were assessed by scoring unfavorable responses as 0 (zero) favorable responses as 1 (one). Finally, scores for individual participants were

computed and cut-off points for categorizing attitude scores as *Favorable* and *Unfavorable* were determined by considering median scores. Like for knowledge score, attitude score distributions were found to be normal and there were no differences observed by using either mean or median. (Annex 2&4)

4.11. Data Analysis

Data were coded and entered into EPI/INFO version 6.04 and cleaned and checked for outliers and completeness. For advanced analysis, data were exported to SPSS Version 11.5. Data were checked for missing values and in most cases, missing values did not exceed 5%. Stratified analysis was conducted for variables having missing values and if there were no patterns observed they were not considered for further analysis. Variables were analyzed with appropriate statistical tests for their type. Data were initially analyzed by incorporating descriptive statistics. Bivariate and multivariate analyses were conducted sequentially. Statistical methods included frequency distribution, normality tests, Chi square test, logistic regression, odds ratio, p-values, and 95% confidence intervals. In all multivariate analyses an Enter model was used. Statistical significance was considered at $P \leq 0.05$. Tables and charts were used for data presentation.

4.12. Data quality control

Data were first coded and entered to EPI/INFO Vs 6.04. Questionnaire templates were prepared and customized to avoid entry of illegal values and skip patterns. A data entry clerk was hired and facilitated data entry. Each questionnaire was given identification number and validated by duplicate entry by taking 5.0% of all participants.

4.13. Ethical considerations

Before commencing the study ethical approval was obtained from Ethical Review Committee of Addis Ababa University, Department of Community Health. Letter from AAU-DCH introducing the objectives, rationale and expected outcome was written to Mossy Foot

Treatment and Prevention Association, Zonal Health Department, and respective woredas. During data collection, basic and key information about objectives of the study was provided to respondents. Verbal consent was obtained from every study participant to protect his or her anonymity. During data collection and interpretation much effort was made to incorporate cultural values and practices.

4.14. Dissemination of results

The findings of the study will be released to all public and private health sectors that are working in Wolaita Zone following thesis defense in Department of Community Health, Addis Ababa University. Zonal Health department will officially be informed about the results and recommended to facilitate implementation of preventive measures.

5. RESULTS

5.1. Community

5.1.1. Socio-demographic characteristics

A total of 438 (225 males and 213 female) participants were interviewed making the response rate 99.1%. The respondents' age ranged from 18-71years. The family size ranged from 1-9 people (Details Table 1).

Table 1 Basic socio-demographic characteristic of respondents, community, Wolaita Zone, Ethiopia, January 2007

Socio-demographic variables	Categories	Frequency (%)
Age N= 438 Mean=32.8 SD=8.2	18-24	52(11.9%)
	25-34	215(49.1)
	35-44	128(29.3)
	45-54	35(8.0)
	55+	8(1.8)
Sex	Male	225(51.4)
	Female	213(48.6)
Address (438)	Urban	215(49.1)

	Rural	223(50.9)
Employment (438)	Employed	109(24.9)
	Unemployed	329(75.1)
Religion (438)	Christian	408(93.2)
	Muslim	28(5.4)
	Others*	2(0.5)
Marital status (438)	Single	111(25.3)
	Married	327(76.6)
Family size, N=432 Mean=4.33, SD=1.80	1-4	232(53.2)
	5+	204(46.8)
Education	Can't read & write	103(23.5)
	Basic education	79(18.0)
	Grades 1-12	204(46.6)
	Vocational education	27(6.2)
	University education	25(5.7)
Monthly income	<100 Birr	286(65.3)
	101-300	73(16.7)
	301-600	33(7.6)
	601-1000	28(6.4)
	>1000	5(1.1)
	Others**	13(3.0)

* Not affiliated to any religion ** didn't want to mention

5.1.2. Knowledge of community about podoconiosis

A total of 401(91.6%) of respondents knew or heard of podoconiosis in the local language 'kita' or 'inchricha' and 375(93.5%) of them after prompting using photographs reported that they saw a podoconiosis patient at least once in their life. A range of reported causes for podoconiosis were mentioned (Table 2).

Table 2 knowledge about causes of podoconiosis by community, Wolaita Zone, Ethiopia, January 2007

Cause/s of podoconiosis	Frequency (%)*
Heredity/familial	262(64.3)
Stepping on dead animals	259(62.9)
Stepping on snake	256(62.2)
Contact with podoconiosis cases	226(54.8)
Contact with soil	220(53.4)
By flies and mosquitoes	135(32.7)

Caused by curse	124(20.1)
Occurs for unknown cause	38(9.3)

* Sum of percentages was above 100 since there were multiple responses

In the questionnaire, respondents were asked how to prevent podoconiosis. Misconceptions about prevention methods ranged from 52.0%-64.9% i.e. avoiding stepping on dead animals and snakes, and avoiding contact with podoconiosis patients. Only 66(21.4%) and 35(11.4%) knew that matting floors and cementing floors could prevent podoconiosis, respectively. Most, 71.7% and 56.4% respectively knew that good personal hygiene and wearing shoes could prevent the disease.

The general knowledge score of the community ranged from 6-18(out of 22) with median score of 12.0 and mean score 11.8 and SD=2.43. Kolmogorov-Smirnov Z test showed general knowledge score to be normally distributed. The cut-off point for categorizing the scores was determined using the median (the result was not changing by using mean as there were no scores between 11 and 12 and the distribution was normal). Those who scored below 12.0 were categorized as having low knowledge while scored 12.0 and above were considered to have high knowledge. Nearly forty-six percent of all respondents had low knowledge and rest had high knowledge about podoconiosis (See Annex 1).

As shown in Table 3 multivariate analysis (bivariate logistic regression) indicated that sex was the only independent predicting factor for community knowledge of podoconiosis. Females had approximately half the knowledge score of males (AOR=0.43, 95%CI=0.34-0.84 and P<0.01).

5.1.3. Attitudes of community towards podoconiosis

Around 214(51.9%) felt that they might acquire podoconiosis. Most respondents tended to show stigmatizing and discriminating attitudes towards eating, living and working with podoconiosis patients (37.1%-55.7%). With respect to productivity, 196(47.7%) believed that podoconiosis patients were less productive than people without the disease (Details shown on Annex 2).

A community attitude score was computed from responses for 11 attitude questions and statements. Favorable responses were scored 1 and unfavorable responses were scored 0. Attitude score was normally distributed and mean and median scores were 6.1 and 6.0 respectively. Attitude score was categorized as favorable or unfavorable by considering the median as the cut-off. Attitude scores 6.0 and below were categorized unfavorable and above 6.0 as favorable. Most (63.8%) of respondents had unfavorable attitude score towards podoconiosis (Annex 2).

When the community attitude score was adjusted for confounding variables as shown in Table 3, knowledge score was the only independent predictor. Those with a high knowledge score were more than twice as likely to have a favorable attitude score as those with low knowledge score (P<0.001).

5.1.4. Practices of community towards podoconiosis

In terms of shoe wearing practice, 377(86.1%) replied that they had worn shoes at least once in their life and 208(54.2%) were wearing shoes during interview, 56.4% of males and 51.9% of females. When logistic regression was done (Table 3), employment status and knowledge score were independent predictors of wearing shoes during interview. Unemployed people were less likely to wear shoes than employed people (AOR=0.40, 95% CI 0.21-0.96 and P<0.05), and respondents who had high knowledge score were twice more likely to wear shoes than those with low knowledge score (AOR=2.05, 95% CI 1.36-4.32 and P<0.01).

Table 3 Multivariate analysis for the dependent variables knowledge score, attitude score and wearing of shoes, Wolaita Zone, Ethiopia, January 2007

Variables	Responses	Knowledge score		Crude OR	Adjusted* OR
		Low (%)	High (%)		
Sex	Male	59(38.1)	96(61.9)	1.00	1.00
	Female	80(53.7)	69(46.3)	0.53(0.34-0.84)**	0.46(0.28-0.76)**

Attitude Score					
		Unfavorable	Favorable		
Sex	Male	75(36.9)	128(63.1)	1.00	1.00
	Female	94(47.7)	103(52.3)	0.64(0.43-0.96)*	0.93(0.53-1.62)
Knowledge score	Low	70(51.5)	66(48.5)	1.00	1.00
	High	51(32.3)	107(67.7)	2.29(1.39-3.57)**	2.23(1.32-3.98)**
Wearing shoes during interview					
		No	Yes		
Employment	Employed♦	30(29.7)	71(70.3)	1.00	1.00
	Unemployed	146(51.6)	137(48.4)	0.45(0.24-0.65)**	0.40(0.21-0.96)*
Monthly income Birr/month	<100	128(50.6)	125(49.4)	1.00	1.00
	100-300	26(41.3)	37(58.7)	1.46(0.83-2.55)	1.26(0.51-3.12)
	>301	18(31.6)	39(68.4)	2.19(1.21-4.09)**	1.45(0.56-3.76)
Knowledge score	Low	67(51.1)	64(48.9)	1.00	1.00
	High	51(33.8)	100(66.2)	2.43(1.27-3.32)**	2.05(1.36-4.32)**

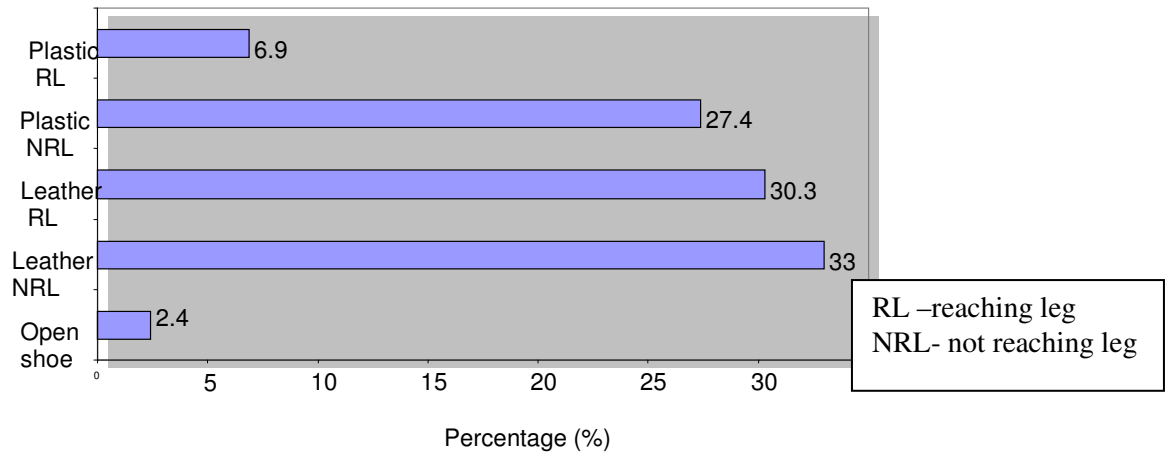
* Adjusted for age group, sex, address, income level, marital status, literacy, employment, monthly income, family size, knowledge score and attitude score

* Significant at $P < 0.05$,

** Significant at $P < 0.01$ ♦ Employed – Gov't employee, NGO employee, trader, business man and all others were categorized unemployed

As it can be seen on Fig.1 most shoes were not reaching legs and were made from leather. Around 26(2.4%) wore open locally made shoe named 'berbaso'. Only 35(11.4%) and 66(21.4%) of all respondents lived in houses which had floors cemented and matted respectively.

Figure 1 Type of shoe being worn during interview by community respondents, Wolaita Zone, Ethiopia, January 2007



Most of the respondents, 96.4%, were willing to wear shoes if they were provided with them. Most (61.7%) of respondents reported that they had one or more problems prohibiting them from wearing shoes. The most common reasons for not wearing shoes were: unable to afford shoe prices, uncomfortable to walk and work in, difficult to find correct size, unpleasant smell from shoes, wishing not to surprise community by wearing shoes (not to violate community norm) and do not have shoes, with respective frequencies 69.3%, 64.8%, 50.0%, 43.5%, 30.6%, and 19.2%.

5.2. Health professionals (HPs)

5.2.1. Socio-demographic characteristics

A total of 275 health professionals responded to questionnaires at 21 health facilities. Three hospitals and eighteen (18) health centers¹ were involved in the study. Most (68.4%) health professionals were nurses and the rest were health assistants, lab technicians, pharmacy technicians, physicians and health officers in profession (Table 4).

Table 4 Basic characteristic of health professionals, Wolaita Zone, Ethiopia, January 2007

Variables		Frequency (%)
Sex	Male	151(54.9)
	Female	124(45.1)
	Total	275(100.0)
Age (275)	18-24yrs	94(32.7)
	25-34yrs	135(49.1)
	35-44yrs	41(14.9)
	45-54yrs	9(3.3)
	Total	275(100.0)
Address of health facilities (275)	Rural	142(51.6)
	Urban	133(48.4)
	Total	275(100.00)
Type of profession (272)	Nurses	186(68.4)
	Health Assistants	42(15.4)
	Lab technician	19(7.0)
	Pharmacy technician	18(6.6)
	Others*	7(2.6)
Total	272(100.0)	
Service year (274)	0-4 years	140(51.1)
	Above 4 years	134(48.9)
	Total	274(100.0)
Level of health facility (271)	Hospital	93(34.3)
	Health Center**	178(65.7)
	Total	271(100.0)
Type of health facility (275)	Public	198(72.0)
	Private	77(28.0)
	Total	275(100.0)

* Others: Specialists, General practitioners and Health officers

** Health center--Health Stations being upgraded were considered as Health Centers

5.2.2. Knowledge of health professionals

Out of 275 health professionals 260(94.5%) had heard about podoconiosis and 231(88.7%) saw podoconiosis patients. Around half (53.9%) misunderstood podoconiosis to be an infectious disease. Only 160(58.2%) knew that podoconiosis is caused by soil particles. And 195(71.3%) said it was a familial disease. Misconceptions about causes of podoconiosis ranged from 37.1%-61.3%. In relation to knowledge of risk factors, 176(64.3%) and 163(59.5%) knew that not wearing shoes and poor personal hygiene were risk factors for

acquiring podocniosis. In the above results, multiple answers were possible and the percentages were not exclusive.

With respect to knowledge of signs and symptoms of podocniosis, 272 health professionals responded to all questions and 40.2% scored below half. The scores ranged from 0-9(out of 9) and normally distributed with mean score 5 and SD=1.99. The mode and the median scores were both 5.0. Five (1.8%) knew none and 6% of health professionals knew all general signs and symptoms of podocniosis. At least, 31.9-46.9% of health professionals responded incorrectly to one or more of the questions regarding sign and symptoms of podocniosis.

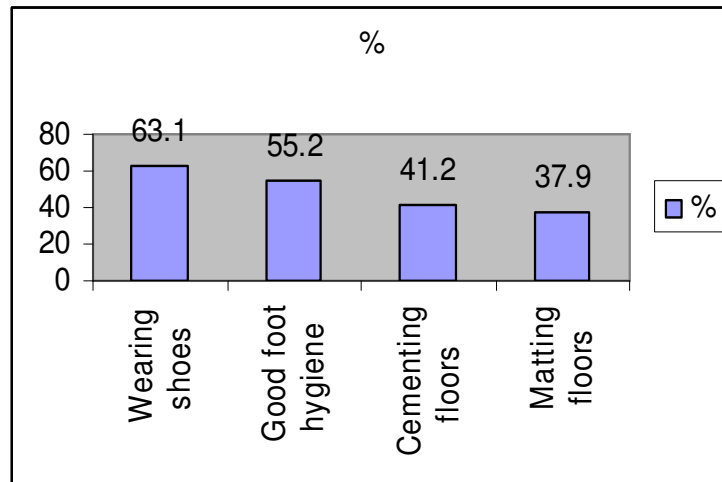
Out of 268 health professionals who responded to all questions regarding knowledge of the early signs and symptoms of podocniosis, 35.1% scored below half of the nine questions. The scores ranged from 0-9 (out of 9) with mean score of 4.9 and SD of 1.86. The median score was 5.0. The scores were normally distributed and the median was used as cut-off for categorizing the score. Incorrect responses for each question ranged from 28.0-52.5%. Eight (3%) knew none and 1.9% knew all of early signs and symptoms of podocniosis, respectively.

In terms of knowledge of prevention methods, 275 of health professionals responded to all questions. Six (2.2%) knew none and 2.6% knew all prevention methods. Nearly 40.0% scored below half of the questions correctly. The mean score and SD were respectively 3.70 and 1.10 (for 7 questions).

Regarding the general knowledge score (Annex 3) of health professionals towards podocniosis, a total of 265 health professionals responded to all knowledge questions, 1.1% responded none of the questions correctly and 5.4% responded to above 30 questions correctly (out of 39). The median score was 22.0 and used as cut-off for categorizing general knowledge score as high or low. Scores equal to or above 22.0 (median) were categorized as high knowledge while scores below 22.0 were categorized as low knowledge. The mean

score of correct responses was 22.2 and SD of 4.20. The scores were normally distributed with skewness of 0.16 and SE of 0.10 and Kolmogorov-Smirnov Z test ($p>0.05$). The percentage of scores below half of total questions was 26.8 and above half were 76.8(Annex 3). Majority (54.3%) had low knowledge score about pododermatitis.

Figure 2 Pododermatitis prevention methods as responded by health professionals, Wolaita Zone, January 2007



In bivariate analysis for general knowledge score and socio-demographic variables, it appeared that only type of health facility was significantly associated with knowledge score (OR=0.56, 95% CI 0.32-0.96 $P<0.05$). When adjusted for various socio-demographic variables, type of health facility remained independently associated with general knowledge score. Working in a private health facility was found to be negatively associated and working in a public health facility was positively associated with general knowledge score. The crude odds ratio (0.56) reduced to 0.33(95% CI =0.12-0.95 $P<0.05$) after adjustment (Table 5).

Table 5 Multivariate analysis of health professionals' knowledge score, attitude score and experience of treating pododermatitis patients, Wolaita Zone, Ethiopia, January 2007

Variables	Knowledge score		Crude OR	Adjusted OR*
	Low	High		
Type of health facility				
Public	95(50.3)	94(49.7)	1.00	1.00
Private	49(64.5)	27(35.5)	0.56(0.32-0.96)*	0.33(0.12-0.95)*
	Attitude score			
	Unfavorable	Favorable		
Type of health facility(N=275)				
Public	78(39.4)	120(60.6)	1.00	1.00
Private	95(31.4)	21(48.9)	0.24(0.14-0.41)**	1.27(0.41-3.90)
Health assistants	14(33.3)	28(66.7)	2.09(1.03-4.22)*	2.05(1.04-6.27)*
Others [‡]	24(54.5)	20(45.5)	0.87(0.45-1.68)	0.81(0.36-1.80)
Knowledge score(N=265)				
Low	81(56.3)	63(43.8)	1.00	1.00

Age group (N=275)				
18-24yrs	69(78.4)	19(21.6)	1.00	1.00
25-34yrs	87(64.4)	48(35.6)	2.00(1.08-3.72)*	1.93(0.90-4.17)
35 and above years	17(63.3)	32(36.4)	6.84(3.14-14.87)**	5.19(1.72-15.63)**
Sex(N=275)				
Male	87(54.8)	62(41.6)	1.00	1.00
Female	86(69.9)	37(30.1)	0.60(0.36-0.98)*	0.76(0.43-1.35)
Types of profession(N=272)				
Nurses	125(67.9)	59(32.1)	1.00	1.00
Health assistants	21(50.0)	21(50.0)	2.12(1.07-4.18)*	1.28(0.56-2.92)
Others [‡]	26(60.5)	17(39.5)	1.39(0.70-2.75)	2.01(0.94-4.30)
Work experience(N=274)				
0-4yrs	100(73.0)	37(27.0)	1.00	1.00
Above 4yrs	72(53.7)	62(43.6)	2.33(1.40-3.87)**	1.1.6(0.57-2.37)

♣ Adjusted for age group, sex, address, service year, type of profession, level of HF, type of HF, knowledge score and attitude score

* Significant at P-value <0.05,

** Significant at P-value <0.01

[‡] Others: specialists, physicians, health officers, pharmacy and lab technicians

5.2.3. Attitudes of health professionals

The majority (58.8%) of health professionals did not blame podoconiosis patients for acquiring the disease and only 108(39.4%) agreed that podoconiosis patients could be competitively productive. Above half (52.2%) felt that the community cared for and supported people affected by podoconiosis poorly. One hundred and seventy-five (63.4%) believed that people with podoconiosis deserved love, care and support (Annex 4). Most (86.4%) did not feel that they had adequate knowledge and skills to treat podoconiosis (Table 6).

Table 6 Health professionals perceived self-efficacy and barriers towards podoconiosis, Wolaita Zone, Ethiopia, January 2007

Attitude statements	Frequency of Agree responses (%)
I feel I have adequate knowledge and skill to give care and treatment for podoconiosis patients	37(13.6)
I had adequate education and training on podoconiosis care and treatment	31(11.4)
There are adequate facilities and reference materials for podoconiosis in my health facility	17(6.3)

In a health facility I am working, there are adequate medical supplies and drugs for podoconiosis	14(5.1)
Lack of medical supplies and reference materials prohibits me from giving medical care and support to podoconiosis patients	165(60.7)

The majority (50.9%) of health professionals said podoconiosis was infectious and 106(38.8%) were afraid of acquiring podoconiosis while providing care. Health professionals also showed a tendency to stigmatize people with podoconiosis. With respect to this, 131(48.2%) and 186(68.7%) did not like to buy food or an item from someone with podoconiosis and would not feel happy to eat with a podoconiosis patient if served together, respectively. Most (72.4%) had a favorable attitude towards providing care for podoconiosis patients.

Attitude scores (Annex 4) for 275 health professionals were computed after responses to 27 questions provided in questionnaire were recoded. Favorable responses ranged from 0-22(out of 27) and the mean score 12.9 with SD=3.60 and the median score of 13.0. The median score was used as a cut-off and scores below 13.0 were categorized as unfavorable while 13.0 and above were categorized as favorable. Forty-eight percent (48.4%) of respondents had unfavorable attitude score and 71.3% had a score 14 or below (out of 27). Kolmogorov-Smirnov test was conducted and showed that attitude scores were normally distributed.

Bivariate and multivariate analyses to find independent predictors of attitude scores were done (Table 5). When attitude scores were adjusted for different socio-demographic variables and knowledge score, being a health assistant (OR=2.05, 95% CI 1.04-6.27 and $p < 0.05$) and knowledge score (OR=1.51 95% CI 1.08-2.52 and $P < 0.05$) were found to be independent predictors for health professionals attitude score.

5.2.4 Practices of health professionals

With respect to practices of health professionals towards podoconiosis, 99(36.4%) had ever treated and 173(63.6%) had never treated podoconiosis patients. Those who had ever treated had prescribed antibiotics (69.0%), diethyl carbamazine (71.0%), surgical treatment (19.0%), topical ointments (63.6%), laboratory investigations (46.0%) and referred to another facility.

Health professionals were asked if they faced problems in providing care to podoconiosis patients. Forty-two (43.3%), 70(71.4%), 50(51.5%), and 17(17.5%) replied that patients were not willing to accept care, there were inadequate drugs and supplies, that unpleasant smells from some patients' feet, and that low numbers of patients visited the health facility, respectively.

One hundred sixty-seven (167) health professionals provided reasons for not giving care for podoconiosis patients and the reasons were lack of knowledge and skills (62.3%), being afraid of acquiring podoconiosis (53.3%), inadequate drugs and supplies (65.5%), no interest in treating podoconiosis patients (37.7%) and fear of stigma and discrimination (39.5%). Multivariate analysis of factors affecting ever treating podoconiosis patients showed only age group above 35 years to be an independent predicting variable.

6. DISCUSSION

6.1. Community

Most (91.6%) of community participants replied they knew about podoconiosis, and when prompted using photographs, 93.5% of them believed they had seen some one with podoconiosis. This suggests that the awareness of the community about the existence of the problem was very high. When further analysis was conducted on causation, care, treatment and prevention of podoconiosis, community members held a range of misconceptions about podoconiosis i.e. walking on cold, stepping on dead animals, stepping on snakes, curses and others. This was similar to the findings on sociocultural literature conducted to assess the community impacts of lymphatic filariasis. The study showed that most people had misconceptions on causations of filariasis (Wynd S et al 2007) ⁽⁶⁾. The findings from this study also revealed that the Wolaita society had misconceptions on podoconiosis as described above.

Price EW (1972) and G/Hanna E (2005) suggested the possibility of existence of familial tendency of the disease but later Price EW and Bailey D (1984) further indicated that familial tendency alone is not sufficient for occurrence of the disease ^(8,13,14). In this study the most commonly held belief about causation was that podoconiosis is hereditary. More than half

(53.4%) of community respondents replied that the disease could be caused by soil substances, but many misconceptions were held making their knowledge on causation questionable. Further research is needed to clarify the relative importance of the different causes and their possible interactions.

Supporting the findings from qualitative study by G/Hanna E (2005), the results in this study showed misconceptions about prevention of podoconiosis (52.0-64.9%). Here it is difficult to classify avoiding marriage into podoconiosis family as a prevention method or not since yet it is not clearly known as discussed above. There is a lot to be done to raise awareness on matting and cementing floors depending on their ability to afford which could reduce the risk. Most importantly 71.7% and 56.4% knew that personal hygiene and wearing shoes could prevent podoconiosis. But knowledge alone may not reduce the risk of acquiring the disease if people can not afford shoes or water to wash in ^(2,5,20).

When general knowledge score about podoconiosis was analyzed and adjusted for socio-demographic characteristics, sex was found to be the only independent predictor (Table 3). Males had 2.3 times more likely to have high knowledge score than females ($P < 0.05$). This might be the result of low socio-economic status of women. Earlier, Desta K et al (2003) had shown the prevalence of podoconiosis to be nearly equal in both sexes but their low knowledge might have predisposed them to the disease or with higher knowledge they could have lower prevalence of podoconiosis than observed ⁽⁵⁾. With higher knowledge females could contribute much to intervention activities on podoconiosis. This suggests a need to consider gender differences in planning interventions for podoconiosis and give emphasis for females.

Wynd S et al (2007) described that as filarial elephantiasis progresses, the individual's capacity to labor, both productively and reproductively, are increasingly hampered. The affected individuals become too severely disabled to contribute to household labor and further burden the household economy ^(6,19). Similarly people with podoconiosis, when the disease advances, become bed ridden or superimposing infections limit their contribution in livelihood activities. Besides they can not conceal themselves and are exposed for stigma and

social burdens ^(5,7,8). Most (63.8%) of the community respondents had unfavorable attitudes towards podoconiosis. This was revealed when they showed stigmatizing and discriminating attitude towards podoconiosis cases. They tended to respond unfavorably (37.1% -55.7%) when they were asked what they would feel if they were made to buy food or an item from, or work or live with a person with podoconiosis (Annex 2). This result is supported with findings from previous qualitative study (G/Hanna E 2005).

A study conducted in Ghana on filariasis also showed similar conditions. The clinical manifestations of both diseases are very close and known as chronic or endemic elephantiasis. A socio-cultural literature conducted on filariasis in various developing countries i.e. Africa and Asia showed the existence of very negative, social impacts. The chronic disabling manifestations of this disease, including lymphoedema of the limbs (possibly podoconiosis), breasts and external genitalia, have a profoundly detrimental effect on the quality of life of affected individuals ⁽¹⁹⁾. Similarly, social burdens and economic problems in podoconiosis patients become severe as the disease advances and limit patients from engaging in various activities ^(5,7,8).

People with podoconiosis were believed and regarded as incapable of taking leadership role in Ghana. This was because it was believed that podoconiosis patients need extra care and their physical appearance was not attractive ^(8,19). As 47.7% did not believe that podoconiosis patients could be productive, patients lose self-efficacy and forced to be dependants and facing economic problems ^(7,8). Therefore, there should be attempts and interventions to change attitudes of the community positively.

When multivariate analysis (bivariate logistic regression) was conducted for community attitude score (Table 3), knowledge score was the only independent predictor. Respondents who had a high knowledge score were twice more likely to have a favorable attitude as those with low knowledge. This is again important, indicating likely effectiveness of awareness raising interventions on positively changing attitudes of the community towards podoconiosis.

As to practices on podoconiosis 86.0% said they had ever worn shoes, which may be meaningless as continuous and consistent wearing of shoes is important to prevent podoconiosis ^(5,20,22). During interview respondents were observed and 54.2% were wearing shoes of some kind, made from a range of materials (Fig.1). Earlier study (Desta K et al 2003) indicated shoe wearing prevalence to range from 1-30.0% in Wolaita Zone in Woredas with outreach sites of MFTPA. Similarly, this study was conducted on Woredas with outreach sites of MFTPA but shoe wearing prevalence was higher than previous studies. This might be explained by possible changes in shoe wearing practices with time and/or increased awareness on benefits of shoe wearing. In addition, study populations were selected in different method.

Shoe wearing alone may not indicate reduced risk since hygiene of legs and feet is essential. Some shoes had low potential to prevent contact with soil (open shoes and shoes not reaching ankle or leg). Plastic boots/shoes create bad smell and are not durable that they are less likely to be worn consistently ^(5,20). As it is common practice in the community, people wash their leg when they go to market places and when they are at home, they mostly remain bare footed (observation by principal investigator) and most of respondents had no cemented or matted floors (88.6% Vs 78.6%) increasing risk of exposure to soil particles. So the practices of the community were not sufficient, appropriate and consistent to prevent podoconiosis.

Knowledge score and employment were independent predictors of wearing shoes during interview (Table 3). Employed respondents were 2.5 times more likely to wear shoes than unemployed ones ($P < 0.05$). This could be explained by high expectation of the community to wear shoes from them, their ability to buy shoes, their knowledge on various benefits of shoe wearing including or excluding prevention of podoconiosis and so on. Similarly those who had a high knowledge score were twice as likely to wear shoes as those who had a low knowledge on podoconiosis. This again might indicate that with higher knowledge on podoconiosis, community could wear shoes consistently and reduce the risk of podoconiosis.

More positively, 94.6% of all respondents were willing to wear shoes. But 61.7% mentioned problems prohibiting them from wearing shoes. The reasons were mentioned in the result

part and here the importance of solving these problems is underlined. Community should be enabled to buy shoes and solve other problems. This might indicate to control and prevent podoconiosis, improvement of the overall living condition of the community is essential as cementing floors, raising awareness of the community on podoconiosis and fulfilling necessary facilities like water supply which require investment on the problem. But there are still affordable measures like matting of floors, wise use of available water, improving practices like not walking on soil after washing feet or legs and so on, which would reduce risk of acquiring podoconiosis. Interventions initiated by MFTPA, provision of shoes with affordable prices or for free, IEC, etc seem plausible. Further expansion and incorporation of prevention and control services by MFTPA is recommendable.

6.2. Health professionals

Most health professionals knew of podoconiosis (94.5%) and had seen (88.7%) someone with podoconiosis. More than half (58.2%) knew that podoconiosis is caused by soil particles and had a range of misconceptions about causes of podoconiosis. G/Hanna E (2005), in a qualitative study conducted in Wolaita Zone revealed that health professionals mistook podoconiosis for filariasis, onchocerciasis, shistosomiasis and others ⁽⁷⁾. Similarly, in this study, they believed podoconiosis to be infectious (50.9%) and transmitted by flies and mosquitoes (55.6%). Their response on causes of podoconiosis was multiple and contained at least one misconception. This may indicate their knowledge was insufficient and there was confusion on causation of podoconiosis.

Successful control of podoconiosis depends on the recognition of the early signs and symptoms of the disease and this has been described in earlier studies ^(20,22). With the knowledge of these signs and symptoms, the progress of the disease could be arrested ⁽²⁾. Only 6.0% of HPs knew all signs and symptoms of podoconiosis while 40.2% knew less than half of signs and symptoms presented in the questionnaire. In this study, large numbers of HPs (40.0%) had low knowledge score about early signs and symptoms of podoconiosis (Annex 3). As described above this knowledge might be attributable to diseases mistaken for podoconiosis i.e. filariasis, onchocerciasis, etc and might not indicate true knowledge on

podoconiosis. Thus the genuine knowledge score on podoconiosis signs and symptoms might be lower.

Health professionals knowledge on prevention methods, ranged from 37.9%-63.1% for the various options provided. This shows that their ability to provide, medical care, health information and education were low. When general knowledge score is considered, 54.3% had low knowledge score, suggesting that much must be done to raise their awareness of and participation in intervention activities. In multivariate analysis, type of health facility (public versus private) was found to be an independent predictor of knowledge score of HPs. Those working in private health facilities had lower score than in public health facilities. This could be explained by integration of services of MFTPA with public health facilities and little or no integration with private facilities.

Earlier studies indicated that podoconiosis patients and their families face several social burdens in their lives from community and health professionals (G/Hanna E 2005) ^(5,7,8): stigma and discrimination, avoiding direct as well as indirect physical contacts with podoconiosis cases and families. In this study, most (50.9%) HPs believed the disease to be infectious and were afraid of acquiring the disease. For these reasons or others, 48.2%-68.7% had some stigmatizing attitude towards podoconiosis patients (Annex 4). These attitudes might be the consequences of prevalent misconceptions on causes of podoconiosis.

When HPs were asked about their perceived self-competency in care, treatment and control activities, only 13.6% felt themselves competent (Table 6). This might be because of an absence of formal education and training in either the pre-service or the in-service period, lack of reference materials on the subject matter and shortage of medical supplies. The attitude score of HPs showed that 48.4% had an unfavorable score, possibly for the above reasons. With this scale of unfavorable attitudes it would be impractical to think health professionals might provide appropriate and comprehensive care to podoconiosis patients. One important finding in this study is that most (72.4%) HPs were interested to provide care and treatment to podoconiosis patients if they had the knowledge and skills.

In multivariate analysis, type of profession and knowledge score were found to be independent predictors of attitude score. Health assistants were at least twice as likely to a favorable attitude score as other health professionals ($P < 0.05$). This might be the result of their experience in treating podoconiosis as discussed later on. HPs having a high knowledge score were 1.5 times more likely to have a favorable attitude score than those who had a low knowledge score ($P < 0.05$). This suggesting awareness raising interventions might improve or change attitudes of HPs towards podoconiosis patients.

When practices of HPs are considered, rates of poor practice ranged from 69.0%-71.0%. In previous studies, health professionals believed that a cure for podoconiosis existed but was not available in the Wolaita area (G/Hanna E 2005). The most common treatments mentioned by health professionals were prescribing Diethyl Carbamazine (DEC) which was not available in the local market (information obtained from Zonal Health Department) and prescribing antibiotics (69.0%) as treatment option. As the number of HPs ever treated podoconiosis was low, 99(36.4%), it would be inappropriate to generalize these poor practices to HPs in the Zone as a whole. Prescribing DEC indicates misdiagnosis of podoconiosis as filariasis. Use of antibiotics may be appropriate given superinfection in an affected leg, but otherwise is questionable. As HPs had little or no education and training on podoconiosis, misconceptions and malpractices are not surprising and indicate that pre-service and in-service training on podoconiosis management is vital.

When confounding variables were adjusted for various socio-demographic characteristics, age group was found to be the only independent predictor of treating podoconiosis patients by HPs. Trend analysis for age group suggested that with increasing age, HPs were more likely to treat podoconiosis patients. This might be explained by more frequent exposure to podoconiosis patients and observing others treat podoconiosis patients through time gave them courage to practice. As described earlier, health assistants were relatively older and had more favorable attitudes, and were more (50.0%) likely to treat podoconiosis patients than other types of health professionals (32.1-39.5%).

7. STRENGTHS AND LIMITATIONS OF THE STUDY

7.1. Strengths of the study

- The study has provided baseline information for interventions aiming at care, prevention and control of podoconiosis
- Structured, pre-tested and corrected questionnaires were used to collect data
- Ethical issues were considered and respondents were provided with pictures of podoconiosis and name of the disease was not mentioned while collecting information from community since calling the name of the disease was insult in the community.
- Multivariate analyses were conducted to control for confounding variables
- Two populations: the general community and health professionals were used for study
- Data collectors were recruited based on their ability to translate questions into the local language

7.2. Limitations of the study

- Social desirability bias could not be ruled out in responses to questions
- The questionnaire was not prepared in Wolaita language

8. CONCLUSIONS

8.1. Community findings

- Misconceptions on causation, prevention and control of podoconiosis were prevalent in the community. A considerable proportion (45.7%) of respondents had low knowledge on podoconiosis
- Females were found to have significantly lower knowledge on podoconiosis than males. This might indicate the need to consider gender differences when planning to undertake interventions on podoconiosis
- Most (63.8%) respondents had unfavorable attitudes towards podoconiosis and tended to stigmatize and exclude people with podoconiosis from social activities and interactions
- Raising knowledge (high knowledge) on podoconiosis might be a key intervention to change attitudes of community more favorably as it was independently associated with favorable attitudes ($P < 0.05$)
- The majority (54.2%) were wearing shoes during interview, but most of shoes were inadequate to prevent exposure to soil, and materials from which these shoes were made from could not promote consistent use of shoes

- Only a few respondents (11.4% and 21.4%) were living in cemented or matted floors. This makes contact with soil frequent and making other hygienic practices less effective in preventing podoconiosis
- Employment and high knowledge about podoconiosis were found to be key factors positively affecting shoe wearing practices of the community

8.2. Health professionals

- Similar to the community, HPs had misconceptions on causation, care, prevention and control of podoconiosis
- The successful control of podoconiosis depends on the recognition of early signs and symptoms of the disease, but many HPs had low knowledge on signs and symptoms of podoconiosis
- More than half of HPs had low knowledge on podoconiosis which urges for training and education on podoconiosis
- Health professionals working in private health facilities were found to have lower knowledge than those working in public health facilities, which indicates the need to initiate integrated service with MFTPA and conduct training on podoconiosis
- Health professionals showed stigmatizing attitudes towards podoconiosis patients, mainly for fear of acquiring the disease. This might be the result of misconceptions on causation of podoconiosis
- Most (86.4%) HPs felt that they had low knowledge and skills in relation to caring and treating podoconiosis patients meaning that they were unable to provide appropriate services. They also felt there were inadequate facilities and materials to treat podoconiosis

- Nearly half (48.4%) of HPs had unfavorable attitudes towards podoconiosis
- High knowledge score was found to be the only predictor of favorable attitude. Awareness raising interventions might yield more favorable attitudes on podoconiosis.
- Most of HPs were found to treat podoconiosis inappropriately as their knowledge on podoconiosis care, treatment and prevention was low

9. RECOMMENDATIONS

The following recommendations are forwarded.

Based on findings from study on community

- Awareness raising and behavioral change interventions should be initiated to improve community knowledge and attitudes towards causation, prevention and control of podoconiosis
- Interventions aiming at raising knowledge on podoconiosis should give emphasis to women and encourage their participation
- Interventions to improve living conditions of the community (i.e. hygiene promotion, cementing floors, matting floors), to provide shoes, employment, and treatment of podoconiosis patients, should be expanded and adequately resourced

Based on findings from study on health professionals

- Training should be given to all health professionals in public and private health facilities to raise awareness, reduce misconceptions, change attitudes, and improve prevention, care and control activities

- The disease should be included in pre-service training curricula in academic institutions
- Resources: trained personnel, materials for outpatient treatment (shoes, soap, ointment, bandages, etc), drugs and supplies for inpatient treatment, and reference materials should be made available
- Further research is needed to clarify the relative importance of the different causes of podoconiosis and their possible interactions.

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