

Podoconiosis: observations from clinical field work in Ethiopia

Jill Brooks^{1*}, Steven J. Ersser² and Alemayehu Bekele Kassahun³

¹Visiting Research Fellow, Bournemouth University, Bournemouth, UK.

²Department of Nursing Science, Faculty of Health & Social Sciences, Bournemouth University, Bournemouth, UK.

³National Collaborative Research and Training Center for Neglected Tropical Diseases, Arba Minch University, Ethiopia.

*Corresponding author: Jb284@btinternet.com

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Abstract

Background: Podoconiosis is an incurable, but preventable and treatable, neglected tropical disease (NTD). Mineral particles and pathogens found in alkaline, volcanic soil enter plantar skin via breaches causing an inflammatory reaction, skin oedema and damage to superficial lymphatics. It has a severe impact on quality of life. Following inclusion in the World Health Organization (WHO) list of NTDs in 2011, podoconiosis became a health priority for the Ethiopian Government. The Second Morbidity Management and Disability Prevention Programme 2016 for filariasis and podoconiosis targeted 100 *woredas* (districts) with a high prevalence of podoconiosis to try to eliminate or reduce the impact of the disease by 2020. The Ministry of Health's subsequent Third National Neglected Tropical Disease Strategic Plan 2021–2025 set further targets for podoconiosis.

Objectives: To visit Ethiopian health centres in areas with a high prevalence of podoconiosis and capture the experiences of health centre staff and patients and compare observations with Government guidelines.

Methods: Observational visits were made by a clinician with a nursing background to four Ethiopian health centres over 2 days in a high prevalence region of the Boreda District. Informal interviews with staff and patients were held at the two health centres with the highest registered numbers of patients with podoconiosis.

Results: The two health centres with the most patients with podoconiosis were caring for 300 and 163 patients, respectively. Five healthcare staff were interviewed (one health officer who covered all four of the centres; three health officers from one of the two centres and one from

the other). They identified issues accessing treatment materials that limited their ability to educate patients to undertake the correct podoconiosis treatment. Twelve patients with podoconiosis with an age range of 24–87 years were interviewed over the 2 days. Patients were mainly subsistence farmers ($n=10$) who reported that they could not afford to purchase treatment materials and they struggled to travel the long distances needed to access clean water for limb washing. These factors adversely had an impact on attainment of Government targets.

Conclusions: The Ethiopian Government guidelines on podoconiosis are very challenging as all the patients seen in the study were unable to afford, or easily access, the products required to prevent and treat the disease. Health centres require a consistent stock of all the materials required to teach and demonstrate podoconiosis prevention and treatment. Supplying free soap, disinfectant and emollients to individuals with the disease would be helpful. Lack of affordability of protective shoes was also an issue.

Key learning points

- The Ethiopian Third National Neglected Tropical Disease Strategic Plan 2021–2025 contains challenging targets for the prevention and treatment of podoconiosis.
- Poverty affects patients' ability to access the materials required to prevent and treat the disease.
- Walking long distances to access clean water and health centres is a further disincentive for patients.
- Consistent supplies to health centres of the materials required to demonstrate treatment and educate patients are essential.

Introduction

Podoconiosis affects some of the poorest people in the world resulting in bilateral leg oedema and leg pain with loss of workdays and income. Mineral particles and pathogens found in alkaline, volcanic soil enter plantar skin via breaches causing an inflammatory reaction, skin oedema and damage to superficial lymphatics. It has a severe impact on quality of life.

An estimated 1.5 million individuals (1% of the population) are affected by podoconiosis in Ethiopia, with 35 million people at risk of the disease. A five-stage disease severity assessment system is used for assessing patients with podoconiosis.¹

Government guidelines for care of podoconiosis recommend: (1) washing both limbs twice daily with clean water at room temperature using ordinary soap; (2) soaking the limbs

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for 15–20 min in a basin with cool clean water and dilute antiseptic; (3) drying well with a clean towel; and (4) applying emollients.

The Second Morbidity Management and Disability Prevention Programme 2016 (MMDP) for filariasis and podoconiosis targeted 100 *woredas* (districts) with a high prevalence of podoconiosis to try to eliminate or reduce the impact of the disease by 2020. The Ministry of Health's Third National Neglected Tropical Disease Strategic Plan 2021–2025² set out new priorities for podoconiosis, increasing: (1) the number of endemic *woredas* providing management and disability prevention services from 100 to 345; (2) the number of individuals regularly wearing proper shoes from 50% to 100%; (3) individuals with proper, regular foot hygiene practice in endemic *woredas* from 50% to 100%; and (4) the proportion of endemic *woredas* with at least one podoconiosis patients' association from 25% to 100%.

Materials and methods

In 2022 clinical observational visits were arranged by the Ethiopian Collaborative Research and Training Center for Neglected Tropical Diseases, Arba Minch University (CRTC NTDs AMU) to visit four health centres (HCs) in the highland areas of the Boreda District, Gamo Gofa Zone. Informal discussions with staff and patients focused on two of the HCs that cared for the highest number of patients registered with podoconiosis ($n=300$ and $n=163$ patients, respectively). The clinical observer also examined patients' legs and feet.

Results

Staff interviews: A total of five health officers (nurses with BSc degree qualifications) were interviewed (the health officer who covered all four centres, plus three health officers at one centre and one at the other). Each HC had at least one trained nurse who had undertaken a 3-day training course at CRTC NTDs on the diagnosis and treatment of podoconiosis, as advised in the Third National Neglected Tropical Disease Strategic Plan 2021–2025.³ Following the initial patient assessment, staff reported that patients either attended the HC or were visited at their home by a health extension worker monthly for the first 3 months, then every 12 months to address any issues and reinforce the self-care regimen. If patients had an acute attack of leg pain (acute dermatolymphangio-adenitis, ADLA) for more than 24 h, HC nurses gave injections of procaine penicillin for 7–10 days to prevent septicaemia. All nursing staff reported problems accessing the medication and materials required to demonstrate the required skin care regimen and meet the guidelines. One of the centres visited had a chart on the wall (Figure 1) in English entitled 'Control and prevention of podoconiosis'.

Patient interviews: A total of 12 patients with podoconiosis (9 female, 3 male) attended one or other of the two centres on one of the two study days and were interviewed. Their

ages ranged from 24 to 87 years; three of the women were in their 20s but the remainder were all aged > 65 years. Most patients ($n=10$) were subsistence farmers. Most ($n=11$) had Government health insurance that provided healthcare to them and their families at a cost of 300 birr (USD \$5.6) a year.

All patients said they undertook long walks to access water from standpipes and to reach the HC. One woman and her daughter, both with podoconiosis, had walked 10 km to reach the centre over unmade roads.

On examination, all patients had podoconiosis stages 1 to 3. A typical diseased foot and damaged footwear is captured in Figure 2. No wounds or fungal infections were present in any of the patients.



Fig 2. Feet of a patient with podoconiosis and their unprotective broken sandals.

All patients stated they understood the importance of washing their feet and legs (to reduce the bacterial load and remove soil particles from their legs and feet), helping to restore their skin function. All washed their feet and legs with water every evening. The water was obtained from standpipes a long distance from home, carried in containers (Figure 3).



Fig 3. Water containers waiting to be filled at a standpipe early morning.

No patients used a towel, soap, disinfectants or emollients as they said they were unaffordable. The approximate monthly cost of skin treatment obtained from local shops in the Boreda area was as follows:

- soap bar: 110 birr (USD \$2.02);

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- ❖ Proper and regular use of foot wear
- ❖ Daily foot washing
- ❖ Replacing earth floor with concrete or cover floor

Fig 1. Wall poster used in a Government health centre about podoconiosis care.

- bleach: (5% NaOCl) for disinfecting water = 15 mL daily added to 6 L water (90 birr [USD \$1.66], 450 ml);
- petrolatum/Vaseline emollient: (30 birr [USD \$0.55] 150 g jar);
- Whitfield's ointment (for fungal infections) (100 birr [USD \$1.84] per tube);
- the total cost of 1 month's treatment = 330 birr (USD \$6.07). This was unaffordable for the patients seen.

All patients wore shoes but none were protective against exposure to the soil. Most wore broken plastic sandals (Figure 2), risking soil ingress to the foot. No patients were able visit the centre after the first visit unless they required a course of antibiotic injections for ADLA, which typically occurred about once a month. No podoconiosis patients' associations in their vicinity were reported by patients or staff.

Discussion

Inaccessibility to healthcare and unaffordable costs:

Accessing healthcare in the mountainous regions of Ethiopia, the terrain where podoconiosis mainly occurs, is difficult because of poor road systems and long distances and is costly both in time and money. Health facilities may charge for treatment unless patients are covered by Government health insurance or are extremely poor. Therefore, patients only attended the centre initially and when they required antibiotic injections for ADLA. The total cost of 1 month's treatment of regular skin care was 330 birr (USD \$6.07), which was unaffordable for the patients seen.

The importance of the daily use of soap for washing legs was reported in a central Ethiopian community-based cross-sectional study of 638 individuals that reported 582 (91.2%) of people washed their legs with soap and water and 410 (64.3%) twice daily.³ A total of 40 (6.3%) of people had podoconiosis, which was reported as four times higher in those who washed their feet in water only compared with those who used soap and water ($P=0.005$). Although soap is important for skin cleaning, disinfected water and emollients are also necessary for improving skin condition and reducing ADLA.

Our previous trial ($n=193$), sought to improve podoconiosis treatment in Ethiopia through skin care and education.⁴ Three months of daily washing with soap, soaking the feet and legs in disinfected water and emollient application resulted in a very positive impact on quality of life, reduced skin breaches and a reduction from a baseline of 4.44 days a month of number of days participants were unable to work owing to ADLA to nil.⁴

The HC poster (Figure 1) would have been more useful for patients if it was a pictorial depiction of the correct procedure for washing and drying the feet and legs and

applying emollients as patients could not read English. Also, concreting the earth floors in patients' homes was unaffordable for most patients.

Knowledge of health staff: Not all of the HC staff had received training on the prevention and treatment of podoconiosis although they had the disease guideline. The importance of training was noted in the Churko 2019 study,⁵ which was undertaken following the 2016 MMDP podoconiosis guideline in the Gamo zone. This reported on the knowledge of 320 health professionals, half of whom were diploma nurses. Seventy nurses (21.9%) thought podoconiosis was an infectious disease, 38 (11.9%) thought it was caused by a parasite and 71 (22.2%) believed it was caused by a curse or evil eye. Only 37 (11.6%) had treated a patient with podoconiosis and 191 (59.7%) felt they had inadequate knowledge and skill to provide treatment. Most of the nurses, 311 (97.2%) had no guideline for managing the disease in their health facility.⁵

Lack of access to clean water: Water access is a major challenge in sub-Saharan Africa, where 187 million people access water from unprotected wells, rivers, lakes and ponds. Water accessed from 'protected' sources, such as standpipes, is often contaminated with harmful bacteria. All the patients we spoke with obtained water from standpipes. No one used bleach to disinfect the water. Although no one in the present study said that accessing sufficient water for washing was a problem, other studies have reported issues. A filled 25-L water container weighs 25 kg (Figure 3) and is very difficult to carry. Consequently, using water for washing legs and feet is a low household priority, resulting in poor foot hygiene and poorly managed disease.⁶ A study in the Boreda area of 280 patients with lymphoedema reported that 89 (31.8%) of respondents walked 30 min each way to collect water, more than 75% fetched < 50 L a day and those carrying 50 L daily or less were 38% less likely to have good foot care practice.⁷

Conclusion

Two years after the publication of the Third National Neglected Tropical Disease Strategic Plan 2021–2025, further work is still required by the Ethiopian health service if podoconiosis is to be effectively managed. Adequate stocks of materials in HCs are essential. While soap, bleach, emollients and protective shoes remain unaffordable, podoconiosis will remain an issue and continue to adversely impact on the individual's quality of life and economic situation, their families and the country.

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