Exposure to volcanic soils may cause elephantiasis - study

A new study has shown that exposure of the skin to minerals contained in volcanic soils is one of the lead causes of new strain of elephantiasis.

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Edith Twamusiima, a middle aged woman from Kyakatooma Village in Kamwenge District says she lost her marriage due to podoconiosis, a non-infectious type of elephantiasis.

Also known as nonfilarial elephantiasis, the debilitating disease is characterised by severe swelling in the limbs and has afflicted people in the district for more than 30 years.

Twamusiima says after developing the disease, her husband asked her to leave their matrimonial home since she could no longer do any work.

"My husband told me to go back to my parents since I could no longer do anything on my own," Twamusiima recalls.

She says she has since moved back to her mother's home for care after trying many hospitals and herbs with no success.



The feet of one of the Elephatiasis patients. PHOTO BY FEDNAND TUHAME

52

THE NUMBER OF PEOPLE IDENTIFIED TO BE LIVING WITH ELEPHANTIASIS IN KAMWENGE

Assessment

According to the Kamwenge district health officer, Dr William Mucunguzi, the disease has forced children to drop out of school due to stigma from the disease. "It impoverishes the already poor families and leaves patients helpless," Dr Mucunguzi says.

However, results of a new study conducted by Ugandan scientists in Kamwenge District recommend that "wearing of protective shoes" could stop people from suffering from this type of elephantiasis.

The study, whose findings were published in the *American Journal of Tropical Medicine and Hygiene*, has discovered that the disabling neglected tropical disease is associated with prolonged foot exposure to volcanic soil.

Dr Christine Kihembo, the lead investigator in the study who works with epidemiology department of the ministry of Health, says they had to move to the district to establish what led to an increase of reported cases.

She says together a team of experts from the ministry of Health, the World Health Organisation (WHO), were prompted by what appeared to be the intense outbreak of elephantiasis in 2014 and 2015 in Kamwenge District.

Variations

Dr Kihembo says unlike, the most common type of elephantiasis caused by microfilaria worms, this type is caused prolonged exposure to volcanic soils. "There are two types of elephantiasis, one caused by microfilaria which is worms spread by mosquitoes that worms block lymph vessels," she says.

However, the study conducted between August-September 2015, in two sub-counties of Busimba and Kamwenge did not find the worms in the 52 cases of elephantiasis investigated.

Dr Kihembo explains that mosquito-driven type of elephantiasis manifests with swellings starts from the hips down to the lower limbs whereas the podoconiosis presents with swellings that start below the knees going upwards.

The study revealed that the disease has been stable but had been around the areas since 1980s. However, Dr Kihembo says the Kamwenge type was due to exposure of the skin to minerals contained in volcanic soils.

All the 52 case that were investigated and the clinical manifestations presented swellings that started from below the knees.

"All the 52 were farmers involved in farming," she observes, adding the disease has been reported in Ethiopia and also areas around Mount Elgon.

Recommendations

Dubbed: "Risk Factors for Podoconiosis: Kamwenge District, Western Uganda, September 2015," the study recommends foot hygiene and universal use of protective shoes to combat the disease.

"Soil samples were characterised as rich black-red volcanic clays. In conclusion, this reported elephantiasis is podoconiosis associated with prolonged foot exposure to volcanic soil," the research findings indicate.

Dr Kihembo says: "The investigation demonstrated that simple and inexpensive interventions to prevent foot exposure to irritant soils, such as improving basic foot hygiene and ensuring universal use of protective foot wear, can go a long way in preventing this debilitating disease,".

Symptoms

Skin itching, burning sensation, plantar edema, lymph ooze, prominent skin markings, rigid toes," the report adds.

Dr Kihembo, who by the time of the research was a fellow with Centres for Disease Control and Prevention, says the disease is caused by an abnormal inflammatory reaction due to persistent contact with irritant volcanic soils derived from volcanic rocks.

"During foot contact with volcanic soils, irritant mineral particles penetrate the skin of the foot into lymphatic vessels where they are taken up by macrophages and induce inflammation with subsequent fibrosis," she says.

She believes the epidemic was aided by stigma and isolation of people with severe symptoms, as well as a lack of awareness among local health workers.

Coping mechanisms

Although, the disease has no cure, Dr Kihembo says the disease can be managed once an affected person observes the foot hygiene and stops continued exposure to volcanic soils by putting on shoes.

She also notes that the affected people were not reporting to health facilities due to various traditional beliefs.

She says the Ministry of Health is working with local health workers to improve their knowledge and ability to manage the disease which has no treatment.

Spreading like wild fire

In August 2015, the World Health Organisation's country office in Uganda received a report from a local organisation of a perceived increase in the number of elephantiasis cases.

The team identified 52 people living with elephantiasis who, most intriguingly, had probably developed it between 1980 and 2015.

Investigation revealed that 93 per cent of those affected never wore shoes at work typically farming and 80% did not wear shoes at home.

Another factor investigated was whether people washed their feet immediately after work or waited until the end of the day.

The study was aimed at identifying the disease's nature and risk factors.

People living around volcanic mountains like Kabale and Kisoro where there is Mount Muhabura are also at risk of contracting the neglected tropical disease, closely associated with a mineral known as silicon.

The minerals cause itching and burning sensations followed by skin markings, rigid toes and swelling.

"The disease makes people to get disfigured thus becoming nonproductive and mostly affects people who are old in their late 40s but it has been registered in children as young as 13 years," Dr Kihembo says.

"The disease has five stages but during the pre-stage, no swelling is seen," she says, adding that the disease dries its name from elephant foot which are very big and rough.

Can it be prevented?

She adds that if exposure to soils is stopped in the first two stages, the disease can be reversed.

"This disease is totally preventable with protective shoes and foot hygiene. People who are in volcanic soils should get concerned and we think areas surrounding Kamwenge are at risk," Dr Kihembo observes.

In Kamwenge, women are the more at risk of getting the disease. Researchers suspect it could be due to the fact that they are more likely than men to be engaged in agriculture activities and spend longer periods in the fields exposed to irritant soils. Also in rural settings, men are more likely to own shoes than women.

"We know the ministry of Health cannot provide shoes but this should empower communities to use shoes or gum boots while in their gardens," she says.

Dr Mucunguzi says they are currently empowering the communities with necessary information on both prevention and management.

Mucunguzi explains that to treat the disease requires daily foot-washing with soap, water and antiseptic, use of a simple soothing balm, bandaging in selected patients, elevation of the leg, controlled exercises and use of socks and shoes.

The programme manager in charge of neglected diseases at the Vector Control Division of the health ministry, Dr Edridah Tukamuheki says podoconiosis has no vector to eliminate but soil to deal with.

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