Journal of Infectious Diseases: Prevention and Control

Extended Abstract
Vol. 2, Iss. 1
2019

Tropical Diseases Conference 2019: Eliminating leprosy: A marathon rather than a sprint? - Karl Philipp Puchner- German Leprosy and TB Relief Association, Germany

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Leprosy is a long-term infection of the bacteria Mycobacterium leprae or Mycobacterium lepromatosis, also known as the Hansen 's disease (HD). Infection can cause nerve, respiratory tract , skin, and eye damage. This nerve damage can result in a lack of ability to feel pain, which can lead to the loss of sections of a person's extremities due to repetitive injuries or infection due to infected wounds. Symptoms of leprosy may start within one year but symptoms may take 20 years or more for some people to occur. Leprosy is spread among people, though about 95 per cent of people who contract M need extensive contact. Leprae do not develop a disease. Spread is thought to be caused by cough or contact with the nose fluid of a person infected with leprosy. Genetic factors and immune function play an important role in how easily a person can catch the illness. Leprosy does not spread to unborn children during pregnancy, or through sexual contact. Leprosy occurs more commonly among people living in poverty. The two main types of disease-paucibacillary and multibacillary-differ in the number of bacteria present. A person with paucibacillary disease has five or fewer patches of numb skin that are poorly pigmented, while a person with multibacillary disease has more than five patches of skin. The diagnosis is confirmed by having acid-fast bacilli found in a skin biopsy. Leprosy is curable through multidrug treatment. Paucibacillary leprosy treatment lasts for six months with the drugs dapsone, rifampicin, and clofazimine. Multibacillary leprosy treatment uses 12 months of the same medication. We can also use a variety of other antibiotics. Common symptoms present in various types of leprosy include a runny nose; dry scalp; eye problems; skin lesions; muscle weakness; reddish skin; smooth, shiny, diffuse thickening of facial skin, ear, and hand; loss of sensation in fingers and toes; thickening of peripheral nerves; a flat nose caused by nasal cartilage destruction; phoning and sound resonation during speech. Leprosy may have various effects on men. The normal incubation period is 5 years. In the first year or up to 20 years after the infection, people may begin to experience symptoms. The first noticeable sign of leprosy is often the development of skin patches of pale or pink color that may be insensitive to temperature or pain. Patches of discolored skin are sometimes accompanied or preceded by nerve problems in the hands or feet including numbness or tenderness. Approximately 30 per cent of people with leprosy have nerve damage. The sustained nerve damage is reversible when treated early, but is permanent after a period of several months until adequate care is resumed. Nerve damage can cause loss of muscle control, resulting in paralysis. It can also cause irregularities or numbness in the sensation, which can lead to additional infections.

The greatest risk factor for leper development is interaction with another person diagnosed with leprosy. People who are exposed to a leper are 5-8 times more likely than members of the general population to develop leprosy. Leprosy is also a more common occurrence among those living in poverty. Not everybody who gets diagnosed with M. Symptoms arise in leprosy. Conditions which reduce immune function, such as malnutrition, other diseases, or genetic mutations, may increase the risk of developing leprosy. HIV infection does not appear to increase the risk of developing leprosy. Some genetic factors have been associated with developing lepromatous or tuberculoid leprosy in the exposed person. Leprosy transmission occurs during close contact with those who are infected Leprosy transmission is not well understood, but the upper respiratory tract is thought to be the most likely route of entry. Older research suggested skin as the main transmission route, but more recent research has favored the respiratory route. Leprosy is not transmitted sexually and is not spread to the unborn child through pregnancy The majority (95 per cent) of people exposed to M. Leprosy does not develop; casual interaction like shaking hands and sitting next to someone with leprosy does not result in transmission. People are considered 72 hours after starting appropriate multidrug therapy to

This work is partly presented at 6th International Conference on Tropical Medicine and Infectious Diseases during January 28-29, 2019 held at Barcelona, Spain

be non-infectious. Not all persons infected with or exposed to M. Leprosy develops and genetic factors are suspected to play a role in infectious susceptibility. Cases of leprosy have often been identified in families and several genetic variants. The immune system can eliminate the leprosy bacteria in many exposed persons during the early stage of infection before severe symptoms develop. Following exposure to the bacteria, a genetic defect in the cell-mediated immunity can cause a person to develop symptoms of leprosy. Parkinson's disease also affects the DNA region responsible for this variation, giving rise to current theories that the two diseases could be related at the biochemical level. Early diagnosis of the disease is crucial, because even if healed, physical and neurological damage can be permanent. Medicines can reduce the risk of people living with leprosy from getting the disease and likely those with whom people with leprosy come into contact outside their homes. There are a number of leprostatic agents for the treatment. For all people with leprosy a 3-drug regimen of rifampicin, dapsone and clofazimine is recommended, for 6 months for paucibacillary leprosy and 12 months for multibacillary leprosy. Multidrug therapy (MDT) remains highly effective, and after the first monthly dose, people no longer become infectious. Because of its presentation in calendar blister packages it is safe and easy to use under field conditions. Relapse rates remain low post-treatment. Resistance in several countries has been reported although the number of cases is limited. People with rifampicin-resistant leprosy can be treated with second line medications such as fluoroquinolones, minocycline, or clarithromycin, but their lower bactericidal activity makes the treatment lasting 24 months. There is still no evidence on the potential benefits and harms of alternative drug-resistant leprosy regimens. It is difficult to estimate and track the number of new cases of leprosy due to the long incubation period of leprosy, delays in diagnosis after the onset of the disease and lack of medical treatment in affected areas. The disease 's registered prevalence is used to determine the burden of illness. Registered prevalence is a useful proxy indicator of the burden of disease, as it reflects the number of active cases of leprosy diagnosed with the disease and receiving MDT treatment at a given time.

Statement of the Problem: After introduction of the groundbreaking Multi-Drug Therapy (MDT) in the early 1980s, WHO pushed for the elimination of leprosy by 2000. However, despite intensive efforts over 3 decades and undisputable progress, elimination of leprosy as a public health problem (PHP) at global level is still beyond reach. In this paper we review the epidemiological dynamics of leprosy, the control strategies applied in the past as well as their evolution and adjustment to the new state of evidence. Furthermore, inherent challenges and remaining obstacles in the undertaking of leprosy as a PHP are analyzed. Finally, taking the gradual shift towards integrative health policies and practices into account, we reflect on the meaningfulness and timeliness of the set elimination targets for leprosy and other Neglected Tropical Diseases (NTDs).

Methodoly: Critical review of articles both on related operational research and basic science, opinion papers and epidemiological data on leprosy and other NTDs.

Findings: While trends in detection of new cases exhibit a plateau in the last decade, there is evidence of ongoing leprosy transmission in endemic settings. MDT has made enormous progress possible, yet seems to be insufficient for achieving the final push. Other recent innovations, though contributing further to the control of leprosy, are unlikely to lead alone or combined to elimination, as lack of basic biomedical tools and critical knowledge gaps remain. Emerging evidence about animal reservoirs, regional re-emergence and MDT resistance complicate further the feasibility of near-term elimination of leprosy. Universal health coverage and integrative medicine undoubtedly strengthen NTDs control ultimately, yet may jeopardize near-term disease specific elimination milestones.

Conclusions: Despite undeniable progress, near-term achievement of leprosy elimination as a PHP remains unlikely. In face of the pursuit of horizontal approaches in global health, meaningfulness of individual NTDs elimination targets might need critical reevaluation.

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