Indian J Med Res 137, January 2013, pp 1-3

Editorial

Leprosy: making good progress but hidden challenges remain

Leprosy results from infection with *Mycobacterium leprae* and is characterized by skin lesions with sensory changes and injury to peripheral nerves, particularly in the hands, feet and eyes. The infection readily responds to antimicrobial treatment, however, lack of knowledge and community attitudes can delay detection and treatment, and can restrict social participation of those affected. Nonetheless, awareness and knowledge are improving, attitudes are changing, and significant progress is being made.

There has been a dramatic reduction globally in the number of patients registered for treatment for leprosy over the last 20 years, from 3.1 million in 1991 to 0.18 million in 2011. In India, the number of new cases detected has fallen from 517,000 in 1991 to 127,295 in 2011[1]. This dramatic fall in registered patients has been achieved through the global application of multidrug therapy (MDT) following the 1991 resolution of the World Health Assembly targeting 'elimination of leprosy as a public health problem' by the year 2000[2]. Since 2000, the prevalence of registered cases has continued to fall as has the number of new cases detected but these have been less dramatic and they have levelled off in the last five years. Why has the leprosy programme been so successful and what hidden challenges remain?

Why has the leprosy programme been so successful?

It is worth reflecting on why the leprosy programme has achieved such success and the lessons to be learned by other health programmes. The MDT approach uses three drugs, and a shortened length of treatment compared to dapsone monotherapy. This has resulted in very few relapses after completion of treatment - patients are cured. It was noted that the shorter duration of treatment began to reduce the numbers of patients on treatment at any one time. The World Health Assembly 1991 resolution capitalised on this trend with strong leadership by the World Health Organization through Dr S.K. Noordeen, support from governments and non-governmental organisations such as ILEP (Federation of Anti-leprosy Associations), and provision of free MDT funded by the Nippon Foundation and then Novartis. This concerted effort achieved high MDT coverage globally in the treatment of leprosy. The setting of the controversial target of less than 1 in 10,000 registered patients globally by the year 2000 further enhanced commitment to the objective. There were many other factors that facilitated the achievement of high coverage with MDT such as delivery of MDT in blister packs, further shortening of the treatment duration, and simplification of classification of leprosy into PB (paucibacillary) and MB (multibacillary) leprosy based on counting of the number of skin lesions. Patients with 1 to 5 lesions are classified as PB and those with more the 5 skins lesion as MB, this classification is important as it relates directly to the MDT treatment regime required. PB patients are treated with dapsone (100 mg daily) and rifampicin (600 mg monthly) for 6 months, whereas MB patients received dapsone (100 mg) and clofazimine (50 mg daily) with rifampicin (600 mg) and clofazimine (300 mg) monthly for 12 months. Diagnosis of leprosy was based on the presence of at least one of three cardinal signs: definite loss of sensation in a skin patch, thickening or enlargement of a peripheral nerve with loss of sensation and/or weakness of the muscles supplied by that nerve, and the presence of acid-fast bacilli in a slit-skin smear[3].

The increased participation of people affected by leprosy helped to improve treatment compliance and

This editorial is published on the occasion of World Leprosy Day - January27, 2013.

reduce stigma towards people affected. The successful cure of leprosy also increased the confidence of health care workers and the community in the leprosy programme. The sustained high coverage with BCG vaccine in leprosy endemic countries was also important as it has been shown in a meta-analysis of trials to provide 43 per cent (95% CI 27-55%) protection against leprosy[4]. The research community was also very active in this period by completing the sequencing of the *M. leprae* genome[5] leading to new research work on novel diagnostic tests and possible vaccines. Studies in reducing disability and management of reactions have also contributed to reducing disability associated with leprosy[6]. Recently the effectiveness of rifampicin chemoprophylaxis in contacts has been demonstrated in a large randomised controlled trial[7].

What hidden challenges remain for leprosy?

The major challenge has been in sustaining leprosy control activities after achieving the year 2000 target of reduced registered prevalence of leprosy. The objective has now moved from prevalence of registered cases to reduction in new case detection and more recently to reducing disability in new cases in the Enhanced Global Strategy 2011-2015[8]. Each year around 250,000 new cases are detected, almost 60 per cent of whom are in India[1], so health care workers need to remain aware of the possible diagnosis of leprosy in patient presenting with skin lesions or sensory change. It is no longer cost-effective to run specialized leprosy programmes so the diagnosis and treatment of leprosy and its complications must be undertaken by general health services. In particular those in primary health care, as well as specialist services such as dermatology, ophthalmology, neurology and orthopaedics need to be aware and trained in the diagnosis and management of leprosy. Awareness in the community is essential to promote early case detection, and approaches to reducing stigma are important to prevent patients hiding the diagnosis. Prevention of disability in those with nerve function impairment and rehabilitation within the community are important challenges. Leprosy control activities are challenging in urban settings and in hard to reach communities such as nomadic people and ethnic minorities. The Neglected Tropical Diseases initiative offers new opportunities for leprosy control to be more integrated with the control of other infections that experience similar challenges[9].

Research is now focused on interventions to reduce transmission and disability. Trials have demonstrated that single-dose rifampicin chemoprophylaxis can reduce incidence in contacts by over 50 per cent but this needs now to be implemented globally[7]. Pilot studies are underway to explore the ethical and logistic aspects of implementing chemoprophylaxis as an integral part of national programmes as recommended by the Enhanced Global Strategy[8].

Ongoing research is also working on the development of diagnostic tests[10] and new vaccines[11,12]. Relapse remains low and most relapses are sensitive to MDT, nonetheless the WHO has established a surveillance network for drug resistance based on molecular methods, and to date drug resistance to rifampicin remains rare[13]. Improving adherence with MDT and its acceptability to patients is important and a trial is ongoing looking at assessing a uniform drug regimen for both PB and MB leprosy[14]. Research is also being done to develop methods for early detection and treat reactions and new nerve injury. Detailed neurological testing using temperature, vibration and nerve conduction studies has demonstrated that nerve injury occurs earlier and is more widespread that had been originally appreciated[15].

Social challenges remain for leprosy but the United Nations has now passed a resolution on discrimination against people affected by leprosy and efforts are being made to repeal laws that prevent people affected by leprosy, a curable disease, participating in society[16].

The future

The latest WHO Expert Committee has set the challenge to reduce the rate of new patients with disability due to leprosy to 1 in a million by 2020 - a challenge that needs sustained early case detection and prevention of disability[2]. Efforts to sustain detection and treatment of leprosy including prevention of disability and rehabilitation are essential otherwise all that has been achieved will be undermined. Specialist services for leprosy are no longer sustainable or cost-effective. The responsibility now lies with all aspects of the general health care system to be vigilant to diagnose and treat leprosy early and to be inclusive so that people affected by leprosy receive care within the general health services. Useful sources of information on leprosy are the WHO Global Leprosy Programme (*http://www.searo.who.int*), ILEP (*www.ilep.org.uk*) and Infolep (*www.infolep.org*) websites. An e-mail discussion list is also being increasingly used as an interactive source of advice on the diagnosis and treatment of leprosy and its complications (*http://www.aifo.it/english/resources/online/lml-archives/index.htm*).

The last International Leprosy Congress was held in Hyderabad, India, in 2008, the next Congress will be held in Brussels, Belgium in 2013 and will explore the hidden challenges of leprosy (*www.ilc2013brussels.org*).

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