Scratching the itch: is scabies a truly neglected disease?

Human scabies is a parasitic skin disease that affects people worldwide. To improve public-health decision making, measurement of the global burden of scabies is key. In this issue of *The Lancet Infectious Diseases*, Chante Karimkhani and colleagues[1] report a cross-sectional analysis of the Global Burden of Disease (GBD) 2015 big data to show a robust estimate of the extent and impact of this ubiquitous mite on human health.[1] The GBD project is an international collaboration of experts from 30 countries. Using an elegant Bayesian meta-regression tool, data retrieved from incidence and prevalence studies as well as global health insurance repositories generate an estimate of scabies prevalence mapped globally, stratified for sex, age group, and world region, including 196 countries and territories.

The female mite *Sarcoptes scabiei* burrows into the epidermis of human beings after mating, and lays eggs that hatch into larvae, which reach adulthood in 10–14 days. The symptoms and signs of an infestation, typically intensely itchy, urticated papules, nodules, and vesicles, result from a hypersensitivity reaction to the mites, their saliva, and other products, as well as the direct effect of the mite invasion. The number of mites colonising a host varies from ten to 15 in classic scabies to hundreds and even millions in profuse or crusted scabies. Transmission occurs mainly through direct skin-to-skin contact although contaminated fomites can transmit the mite too.[2]

In the analysis by Karimkhani and colleagues,[1] disease burden was expressed by the metric of disability-adjusted life-years (DALYs), which was considered equivalent to the years lived with disability, because, in this work, scabies is assumed to have a null mortality. The authors show that scabies was responsible for 0·21% of DALYs from all of the 315 conditions studied by GBD 2015 worldwide. The greatest burden was in countries within east Asia, southeast Asia, Oceania, and tropical Latin America. Of 246 conditions comparatively ranked by GBD 2015, scabies is ranked at 101 in terms of age-standardised global DALYs, following just after adverse effects of medical treatment (ranked at 98) and before atrial fibrillation or flutter (ranked at 102). Karimkhani and colleagues[1] acknowledge that this method might underestimate the true burden in areas where no data is obtained, such as sub-Saharan Africa.

What else does scabies do? Scratching of the skin infested by scabies can cause impetigo, especially in the tropics and low-resource settings.[3] Infection is further encouraged by a direct interaction between the mite and the immune system. In-vitro research has shown a scabies mite complement inhibitor can promote the survival of *Streptococcus pyogenes* (group A streptococcus).[4] Scabies-related impetigo is the main cause of post-streptococcal haematuria, glomerulonephritis, acute rheumatic fever, and rheumatic heart disease in children from low-resource regions.[5] Karimkhani and colleagues[1] acknowledge that the effect of this common complication of scabies infestation, namely streptococcal (or staphyloccocal) superinfection, is not included in their burden calculation.

How can the situation for scabies be improved? Some aids are already available, including the anti-parasitic drug ivermectin (its discovery lead to Nobel prizes in 2015), which has been available for years.[6] Mass drug administration with oral ivermectin has been shown to reduce both impetigo and scabies more effectively than topical permethrin and the standard approach to care.[7] Additionally, WHO has just added scabies to the list of neglected tropical diseases, which will encourage health ministries to consider scabies in their national health policies; and the WHO list of essential medicines already includes antibiotics useful in impetigo (and scabicides).

Future research should focus on improvement of the diagnostics available for scabies in low-resource countries. Dose optimisation studies for ivermectin in scabies are underway, such as the comparison of 400 µg/kg with 200 µg/kg ivermectin in crusted scabies (RCT in process; NCT02841215). Also, studies should assess new drugs, such as a single dose of moxidectin.[8]

The control of scabies in low-resource settings needs a drug donation programme similar to that provided for onchocerciasis and lymphatic filariasis. Funds to support specific scabies intervention research programmes are also required to improve the management strategies for scabies, which might need to vary from region to region.

The International Alliance for Scabies (IACS) is working hard to achieve all these objectives, with the overall aim of better control of scabies and decreased global burden in the future.

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For the **WHO list of neglected tropical diseases** see http://www.who.int/neglected_diseases/diseases/en/

For more on the **IACS** see http:// www.controlscabies.org

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