Maps can help in the fight against neglected tropical diseases

Numerous diseases affect the populations of Africa. Some diseases receive a lot of attention and others do not. The World Health Organization has grouped seventeen of these latter diseases into what is now known as Neglected Tropical Diseases (NTD). One of the reasons why these diseases are neglected is because the distribution and thereby the number of people affected, is not well known. The two major NTD *Taenia solium* taeniosis/cysticercosis and schistosomiasis, both caused by parasites, are presumed to be widely distributed in Africa, but currently the level of co-distribution is unclear at best. Schistosomiasis is commonly known as snail fever or bilharzia, and is transmitted between people and certain types of aquatic snails.

The life cycle of *T. solium* taeniosis/cysticercosis is much more complicated. *Taenia solium* is a tapeworm that lives in the intestines of humans, causing a disease called taeniosis which is not associated with serve symptoms and morbidity, thus, difficult to diagnose.The adult tapeworm produces millions of eggs that are excreted in the stool and into the environment from where pigs can eat the eggs. Once in the pig, the eggs develop into cysts in the muscle tissue, a disease called porcine cysticercosis. People eating infected pork risk ingesting these cysts, that will if ingested, migrate down through the stomach and to the intestines where usually one cyst develop into an adult tapeworm, thus, completing the life cycle of the parasite. However, severe morbidity can occur in people if they accidentally ingest the tapeworm eggs, which is more likely to occur in areas with poor sanitation and hygiene. The tapeworm eggs if ingested by a human can migrate to the central nervous system, where they develop into cysts, for example in the brain, leading to severe neurological complications such as epileptic seizures and migraine.

New research has tried to map the co-distribution of *T. solium* taeniosis/cysticercosis and schistosomiasis on a national level in Africa based on previous published literature and disease reports from Africa (Fig. 1). In addition, by extracting data that contains studies with geo-references from the published literature it was possible to make a distribution map of *T. solium* taeniosis/cysticercosis on a district level in Africa. This resulted in *T. solium* taeniosis/cysticercosis being identified in 31 countries on a national level and in 476 districts, spread out over the African continent (Fig. 2).

The co-distribution of both parasites is important because the same drug can be used in treatment of these parasites. This means that if you can identify areas where both parasites exist, there might be an added value in treating people in those particular areas. However, this added value is often overseen as treatment campaigns focus only on schistosomiasis. There is a need for more focus on evaluating integrated intervention approaches, whereby both of these parasites are taken into account. Unfortunately research also shows that the diseases and in particular *T. solium* taeniosis/cysticercosis are grossly underreported and likely present in far more districts than it has been shown so far. If we are to fulfil the Sustainable Development Goals by 2030 and alleviate the poor and their pigs from disease, then more epidemiological surveys are need now.

Publication

Taenia solium taeniosis/cysticercosis and the co-distribution with schistosomiasis in Africa.
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