



Case study: Elimination within reach: Lymphatic Filariasis persists in rural Ghana due to sub-optimal intervention coverage and adherence

Lymphatic filariasis is a leading cause of disability and chronic morbidity worldwide with 1.38 billion people living in endemic areas globally. It usually manifests in adulthood with lymphedema, elephantiasis and hydrocele creating a considerable physical, socio psychological and economic burden to the affected individuals and communities. Despite the tremendous progress achieved by the Global Programme to Eliminate Lymphatic Filariasis over 10 years of community treatment in the scale-up with mass drug administration, areas with persistent lymphatic filariasis still exist in endemic countries. Assessing the epidemiological, sociodemographic and behavioural factors related to the participation to mass drug administration and bed nets use which may explain disease persistence, is pivotal to assess the success of elimination and to allow refinement of mass drug administration and vector control interventions tailored to the regional needs and characteristics.

To understand the reasons for persistence, COUNTDOWN conducted a study to assess the status of disease elimination and to understand the adherence to interventions including mass drug administration and insecticide treated bed nets. A better understanding of the variation in entomological factors (such as local vector diversity, abundance, biting rates and vector competence) at regional, community and individual-level (including by gender), is pivotal to assess both the success and the prospective timing of elimination in different settings. Characterizing the variations between regions and communities can shed important light on the current programme pitfalls and would allow for the refinement of mass drug administration and vector control interventions, or enhanced surveillance tailored to the regional or local needs and characteristics. This study aimed to understand the factors associated with lymphatic filariasis infection in such “hotspot” areas, and to assess whether the observed lymphatic filariasis prevalence is higher than would be predicted given the available coverage data.



Study Design and Findings

- Parasitological and epidemiological surveys with people aged 16 years and above
- Questionnaires used to collect information on knowledge of lymphatic filariasis programme, mass drug administration adherence, bed nets owned and their usage
- 8 study villages still under mass drug administration in the Northern (Dugli, Sekyerekura, Jidanzana, Nasoyiri, Seyiri) savannah region and Western coastal region (Agyan, Ankobra, Ampain)
- Stochastic model (TRANSFIL) used to assess the expected microfilaria prevalence under different mass drug administration coverage scenarios

Lymphatic Filariasis Programme Knowledge and Mass Drug Administration Participation

Of participants that were administered the study questionnaire, 86.2% knew about the lymphatic filariasis elimination programme but the level of knowledge varied between communities with overall knowledge of the programme higher in the Northern Region communities than in the Western Region. Of the participants who knew about the lymphatic filariasis programme and were asked about mass drug administration adherence, 83% of responders reported taking the drugs for lymphatic filariasis mass drug administration at least once. Overall, and consistently across communities, the most frequently reported reason for not taking the drugs by the non-adherent participants was not being present while drugs were distributed followed by not liking taking pills or tablets or fear of side effects or being pregnant during distribution.

Bed Net Ownership and Usage

Of the participants questioned, 82% reported owning a long-lasting insecticidal net and ownership was higher in the Northern Region versus in the Western Region and lower in males versus in females. The most frequently reported reasons for not owning a net were related to the mass distribution: people reporting not having been given a net, not being present during distribution or either not being able to find one or afford it. Other reasons included the net being damaged and preferring not to sleep under the net. Of the people owning a net, only 42% reported sleeping under it the night before the study interview. The use of bed nets was low in both regions but was also lower in males than in females.

Many logistical issues may interfere in ensuring an adequate reach of all community members receiving bed nets. These most commonly include difficulties in getting physical access to communities, particularly in rural settings, or inability of reaching community members within the allocated time. In particular, in the Nzema East district in the Western Region, due to the major economic activities being mining, farming and fishing, most households cannot be reached during the day. Bed net distribution during early morning or evening may not give enough time to reach all households, and distribution at night is not feasible in many communities which are not connected to the national electricity grid.



Antigen Prevalence and Gender

The prevalence of *W. bancrofti* antigen was determined by filariasis test strip and antigen prevalence varied between the two regions and communities, but the prevalence of microfilaria was above 1% in most locations. Overall, both the antigen and microfilaria prevalence was higher in the Northern Region communities. Prevalence peaked in males in their 30s and 40s in the Western Region while it was at its highest in those over 40 in the Northern Region. For females, it appeared to be more evenly distributed across age groups.

These findings may confirm an increased risk of infection and lymphatic filariasis persistence in males due to a lower mass drug administration participation and exposure to outdoor biting during the night while fishing or performing other activities, particularly on the Western Region coastal villages, or when indoors, due to a lower or different use of bed nets compared to females. Overall, the findings indicate that a large portion of the community members are not reached by mass drug administration and bed net distribution systematically, and that males may represent a consistent part of this group of people. Lymphatic filariasis infection was associated with men and not taking the drugs, and men were also less likely to take treatment or use mosquito nets. In the study, being a male was also significantly and negatively associated with mass drug administration participation and bed net ownership and use.

Mathematical Modelling

COUNTDOWN's mathematical modelling confirmed that men were more likely to be positive for the filarial antigen than women, and the probability of being antigen-positive increased as a function of age. Furthermore, individuals who took mass drug administration in the previous distribution round were less likely to test positive for the antigen than those that did not.

Regarding the factors associated with mass drug administration participation, men were also less likely to have been part of mass drug administration in the previous distribution round than women, whereas people who slept under a bed net the night before were more likely to have been taking mass drug administration than those that did not, and people in the Western Region were significantly less likely to have participated in mass drug administration than those in the Northern Region.

Models also indicated that there was a significant difference in bed net ownership by sex, with men were less likely to own a bed net than women, and region, with people in the Western Region less likely to own a bed net than those in the Northern Region. There was a significant positive effect of age on the probability of bed net ownership with the probability of owning a bed net increasing with age.

Regarding the factors associated with bed nets use, the model confirmed that men were less likely to use a bed net the night before than women. There was a significant positive effect of both age and mass drug administration participation in the previous round, indicating that the probability of using a bed net increased with age and is correlated with taking part in mass drug administration.



Impact

This research allowed the assessment of the current status of lymphatic filariasis elimination in communities and a better understanding of the potential gaps and pitfalls in current elimination programmes. Understanding these gaps is crucial to ensure and sustain lymphatic filariasis elimination, making sure nobody is left behind in access to drugs and bed nets, and in ensuring the 2020 roadmap for lymphatic filariasis and other neglected tropical disease elimination, whilst being faithful to the current Sustainable Development Goals. The results of this research have been presented during a stakeholders meeting in Ghana in March 2018 and will help the Ghana national lymphatic filariasis elimination program to refine the mass drug administration strategy. For example, changing the schedule of drug distribution to make sure all members of community are reached effectively, and integrating mass drug administration with bed net distribution and use via enhanced synergies and co-planning with the National Malaria Control initiatives. In perspective, such strategies can be applicable to other African countries as well. Other than the scientific community and experts on NTDs, these findings are directed to national elimination programmes and all stakeholders involved in public health and mass drug administration and bed net distribution programmes.

Key Recommendations

- ✓ The filariasis programme needs to reliably assess whether transmission has been stopped and which portions of the community are still potentially affected.
- ✓ Integrated quantitative and qualitative research is required to identify the variations in prevalence, associated risk factors and intervention coverage and use levels between and within regions and districts.
- ✓ Drug treatment distribution and mosquito control interventions require refining and tailoring to individuals and communities.
- ✓ Distinguish between “hotspots for prevalence” (communities with a high infection burden pre- mass drug administration) and “hotspots for persistence” (communities with persistent infection due to factors other than the starting infection).
- ✓ Need to better understand the regional and district variations in logistics and data reporting which can affect the mass drug administration effectiveness
- ✓ Need to better understand the gender-specific behaviours and attitudes towards bed nets and mass drug administration, with attention to the potential geographic variability
- ✓ Further investigation is needed on the factors influencing poor adherence, including training and motivation of community drug distributors in engaging with the community members and individuals - such knowledge will help target resources and enhance surveillance to the communities most at risk and to reach the 2020 lymphatic filariasis elimination goals in Ghana

References and Further Reading



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