Mass treatment with azithromycin for trachoma control: participation clusters in households

Elizabeth N. Ssemanda et al. *PLoS Neglected Tropical Diseases* 2010, 4(10):e838

Introduction

Trachoma is the leading infectious cause of blindness. Active trachoma is estimated to affect 40.6 million people worldwide, and another 8.2 million experience visual impairment or blindness. Africa contains more than two thirds of all active trachoma cases and approximately 47% of the trichiasis cases. Mass treatment with azithromycin to trachoma endemic communities is a critical part of the World Health Organization SAFE (surgery, antibiotics, face-washing and environmental change) strategy, with a treatment coverage goal of at least 80%. Treatment coverage surveys often assume that missing treatment occurs at random, however, there are no data to support this assumption. Data show that trachoma clusters in families and neighborhoods and that transmission within and across households does occur. If treatment tends to cluster, and is differential by infection status, then the effect of high coverage may be compromised. The authors examined the clustering of treatment at the household level as part of the PRET (Partnership for Rapid Elimination of Trachoma) project.

Methods

The study was conducted in 32 communities in Tanzania, and 48 communities in The Gambia. Prior to mass treatment with azithromycin, a detailed census was taken by trained research staff, including name, age, and gender of all persons residing in the household. Community treatment assistants observed treatment and recorded compliance, thus coverage at the community, household, and individual level could be determined. Within each community, the researchers determined the actual proportions of households where all, some, or none of the children were treated. Assuming the coverage in children <10 years of the community was as observed and non-participation was at random, 500 simulations were conducted to derive expected proportions of households where all, some, or none of the children were treated. Clustering of household treatment was detected comparing greater-than-expected proportions of households where none or all of children were treated, and the intraclass correlation (ICC) was calculated.

Results

Tanzanian and Gambian mass treatment coverage for children < 10 years of age ranged from 82–100% and 62–99%, respectively. Clustering of households where all children were treated or no children were treated was greater than expected. Compared to model simulations, all Tanzanian communities and 44 of 48 (91.7%) Gambian communities had significantly higher proportions of households where all children were treated. Furthermore, 30 of 32 (93.8%) Tanzanian communities and 34 of 48 (70.8%) Gambian communities had a significantly elevated proportion of households compared to the expected proportion where no children were treated. The ICC for Tanzania was 0.77 (95% CI 0.74–0.81) and for The Gambia was 0.55 (95% CI 0.51–0.59).

Discussion

The study in two different settings showed that in communities that carry out azithromycin mass treatment with high coverage, significant levels of clustering of non-treatment (as well as treatment) of children occurred within households. There was strong evidence that these did not occur at random. There is a need to investigate further the household factors related to clustering of non-treatment of children, which may help the control program to improve familial mass treatment participation. The national control program should develop strategies to identify and treat households that do not participate.

Editor's comments

As the authors described, trachoma is the leading infectious cause of blindness. The objective of trachoma control is global elimination of trachoma as a blinding disease by year 2020, using the SAFE strategy mentioned above. Antibiotic treatment in the affected communities to reduce active trachoma is one of the components and achieving high coverage is key for a success. The current study showed that in communities with high coverage, those who did not participate in treatment were clustered in certain households. Although the authors did not find that households opting out of treatment were more likely to be infected and thus represented a threat to re-emergence within the community, as they rightly discussed, if infection had been associated with households with no treatment, it would have provided a real challenge to maintain any reduction in trachoma prevalence in the community. This study provided important information to national control programs on trachoma and other neglected tropical diseases in planning their treatment delivery strategies. The national programs should identify major factors affecting household participation in treatment in different community settings, and design specific strategies to target those households.

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