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Epidemiology of Soil-Transmitted Helminth Infections among Primary School Children in the States of Chhattisgarh, Telangana, and Tripura, India, 2015–2016

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Abstract. Soil-transmitted helminth (STH) infections are highly prevalent in many developing countries, affecting the poorest and most deprived communities. We conducted school-based surveys among children studying in first to fifth standard in government schools in the Indian States of Chhattisgarh, Telangana, and Tripura to estimate the prevalence and intensity of STH infections during November 2015 and January 2016. We adopted a two-stage cluster sampling design, with a random selection of districts within each agro-climatic zone in the first stage. In the second stage, government primary schools were selected by probability proportional to size method from the selected districts. We collected information about demographic details, water, sanitation, and hygiene (WASH) characteristics and stool samples from the school children. Stool samples were tested using Kato-Katz method. Stool samples from 3,313 school children (Chhattisgarh: 1,442, Telangana: 1,443, and Tripura: 428) were examined. The overall prevalence of any STH infection was 80.2% (95% confidence interval [CI]: 73.3–85.7) in Chhattisgarh, 60.7% (95% CI: 53.8–67.2) in Telangana, and 59.8% (95% CI: 49.0–69.7) in Tripura. *Ascaris lumbricoides* was the most prevalent STH infection in all three states. Most of the STH infections were of light intensity. Our study findings indicate that STH infections were highly prevalent among the school children in Chhattisgarh, Telangana, and Tripura, indicating the need for strengthening STH control program in these states. The prevalence estimates from the survey would serve as a baseline for documenting the impact of the National Deworming Day programs in these states.

INTRODUCTION

Ascaris lumbricoides, *Trichuris trichiura*, and hookworms *Necator americanus* and *Ancylostoma duodenale* are the commonest soil-transmitted helminths (STHs), accounting for loss of nearly two million disability-adjusted life years.[1] STH are some of the most common infections contributing heavily to intestinal damage, anemia, and impaired physical growth and cognitive performance in children.[2] Periodic anthelminthic treatment reduces the number of individuals with heavy infections; reduces environmental contamination and risk of infection for other people; reduces micronutrient loss (e.g., iron loss through intestinal bleeding in hookworm infection); and improves nutritional status, cognitive function, and learning ability.[3] School-based deworming programs are considered as simple, safe, cost-effective, and scalable interventions to reach high-risk populations.[4,5]

In 2014, the WHO estimated that by number, India has the highest burden of STH infections in the world, with 223 million children aged 1–14 years at risk.[6] Although the published studies indicate heterogenous burden of STH in the country, with prevalence ranging from 0.6% to 91%, with *A. lumbricoides* as the predominant species,[7] large-scale surveys estimating the prevalence at the state level are limited. Such estimates are required to determine the frequency of preventive chemotherapy.[8] Results of two multi-site statewide surveys in Bihar ($N = 1,279$, conducted in 2011) and Uttar Pradesh ($N = 6,421$, conducted in 2015) indicated high STH prevalence, ranging between 68% and 76%.[3,9] Besides these two studies, information about STH prevalence and intensity data were not available from other Indian states.

Ad hoc deworming had been conducted in some states in India, often as part of other initiatives, particularly annual mass drug administration (MDA) using a single dose of 400 mg of albendazole in districts where lymphatic filariasis (LF) was endemic, and provision of deworming tablets within the Weekly Iron and Folic Acid Supplementation (WIFS) Program in some areas.[10] Although the reported coverage of MDA was generally higher (more than 80%),[11] there is no information about validated coverage of LF-MDA, and more importantly compliance. In 2014, the Government of India made concerted efforts to scale up STH control activities to meet the WHO global commitment to overcome the impact of neglected tropical diseases.[12] As a key step toward this, cross-sectional, cluster-sampled, school-based surveys were conducted in several States, including Chhattisgarh and Telangana (late 2015), and Tripura (early 2016)—totalling a geographic area of 314,568 km and population of over 67.5 million people.[13] The objective of these surveys was to estimate the prevalence and intensity of STH infections among school-aged children studying in first to fifth standard in these states. The secondary objectives were to estimate the prevalence according to age group, sex, and by agro-climatic zone and to develop geospatial predictive maps of STH prevalence, encompassing the environmental diversity of each state.

MATERIALS AND METHODS

Ethics, consent, and permission. The Institutional Ethics Committee of the Indian Council of Medical Research—National Institute of Epidemiology, Chennai, approved study protocols for each state. Written informed consent from parents of all students assenting to participate in the study

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