Epidemiology: Open Access

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Infections with Intestinal Parasites: Epidemiology

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Abstract

Numerous millions of individuals are infected with intestinal protozoa and helminths, especially youngsters in low- and middle-income nations. The primary method for managing helminthiases is preventative chemotherapy. However, in environments with poor access to clean water, sanitation, and hygiene, re-infection happens quickly. We carried out a cross-sectional epidemiological study in 56 communities across three departments in south-central Côte d'Ivoire in the months of August and September 2014. Urine and stool samples were requested from study participants. Using the Kato-Katz technique and a formalin-ether concentration approach, stool samples were checked for helminth and intestinal protozoa infections. Schistosoma haematobium was diagnosed using a filtering procedure on urine samples. Information about sociodemographic traits, knowledge, attitude, habits, and beliefs related to sanitation, intestinal health, and hygiene. A questionnaire given to household heads was used to gather information on parasite illnesses. In order to examine the relationships between risk factors and parasite infections, multivariable logistic regression models were used. 4,305 subjects in total had comprehensive parasitological and survey results. The most common helminth species was hookworm (21.2%), with prevalences of Ascaris lumbricoides, Trichuris trichiura, Schistosoma mansoni, and S. haematobium all falling below 10%. Infections with harmful intestinal protozoa, such as Giardia intestinalis and Entamoeba histolytica/E. dispar, were common in all three departments. Participant age and sex as well as open defecation were linked to hookworm infection. Use of tap water at home was connected adversely with entamoeba coli infection. Garbage disposal adjacent to residences was positively correlated with G. intestinalis.

Keywords: Integrated control; Intestinal protozoa; Sanitation and hygiene; Schistosomiasis

Introduction

In tropical and subtropical areas, where climatic, ecological, socioeconomic and hygienic conditions favour their transmission, intestinal parasitic diseases caused by infections with helminths (such as soil-transmitted helminthiases (STH) and schistosomiasis) and intestinal protozoa (such as amoebiasis and giardiasis) are common [1]. STH, schistosomiasis, and intestinal protozoa infections harm more than a billion people, resulting in an estimated 26.1 million disability-adjusted life years. Children in low- and middle-income nations are more at risk for contracting an infection and, as a result, acquiring morbidity. The World Health Organization (WHO) recommends preventive chemotherapy [2] which is the periodic administration of albendazole or mebendazole against STH and praziquantel against schistosomiasis, mostly to school-aged children, for the control of STH and schistosomiasis (WHO, 2006). The primary goal of preventive chemotherapy is to reduce worm burdens, and hence the related the morbid. Preventive chemotherapy does not, however, offer protection against reinfection. Complementing preventative chemotherapy with additional measures, such as those that enhance water, sanitation, and hygiene (WASH) and information, education, and communication, is required to maintain control and advance toward elimination [3].

Rural populations have a limited coverage of improved water and sanitation. Open defecation is also frequent. A pilot study was carried out in 2011 and 2012 to see how well an intervention package reduced helminth and intestinal protozoa re-infection and started improvements in defecation and hygiene practises. A research project was started in August 2013 as a cluster-randomized experiment to be carried out in 56 communities across three departments in south-central Côte d'Ivoire since the results were encouraging. The objective was to document the impact of an integrated control strategy, which included preventative chemotherapy, community-led total sanitation (CLTS), and health education, on the recurrence of intestinal protozoa and helminth infections as well as the incidence of diarrhoea. Here, we concentrate on the initial scenario before using the aforementioned cluster-randomized trial and outline the epidemiology of intestinal protozoa infections and helminthiases [4].

Material and Methods

Ethics Approval

The research commission of the Centre Suisse de Recherches Scientifiques en Côte d'Ivoire gave institutional permission to the study protocol (CSRS). The ethics committees in Basel and Côte d'Ivoire gave their approval. Community members and local authorities (village chiefs) were made aware of the study's goals, methods, potential hazards, and advantages. For each individual, written informed consent was acquired (for children ageds below 18 years, consent was given by parents or legal guardians) [5]. It was made clear that participation was entirely optional and that there would be no consequences for quitting the study at any point. A single oral dosage of albendazole (400 mg for participants older than 2 years old and 200 mg for children between 1 and 2 years old) was given to every person living in the 56 communities. In areas where the prevalence of schistosomiasis was greater than or equal to 5%, community members aged 5 and older received a single oral dosage of praziquantel 40 mg/kg against the disease [6], but in areas with lower prevalences, individual case therapy was used. The "Programme National de Lutte contre les Maladies Tropicales Négligées à Chimiothérapie Préventive" (PNLMTN-CP)

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carried out the drug administration in collaboration with members of the local health districts and our research team [7].

Study Area and Population

In the south-central region of Côte d'Ivoire, in the departments of Taabo, Djékanou, and Toumodi, the study was carried out in August and September 2014. While Djékanou and Toumodi are a part of the Bélier area, the department of Taabo is a part of the Agnéby-Tiassa region. The Bandama and N'Zi rivers' tributaries drain the territory of the three departments. The former travels through the Taabo department before being impounded by a sizable dam to produce Lake Taabo, which is used to generate hydroelectric power. There are also seasonal streams, which often dry up between November and February. The research area is distinguished by a tropical climate with a recent propensity to have just one rainy season (March to July) and woodland savannah ecology. The majority of the population lives in rural areas and farms for food (such bananas, cassava, maize, and yams) as well as grows cocoa, coffee, and rubber for profit [8]. Fishing is a significant source of income for populations living close to Lake Taabo.

Due to the existence of the Taabo health and demographic surveillance system (HDSS), which has been monitoring a population of around 42,000 people since 2008, the study was originally intended to include 56 municipalities in the department of Taabo alone. To gather the necessary number of localities, the study was expanded into the nearby departments of Djékanou and Toumodi as there were fewer adequately sized settlements in the Taabo department than anticipated. To that aim [9], 40 places from the Taabo department, nine from the Djékanou department, and seven from the Toumodi department were included in our study. Each locality's houses were chosen as follows: six transects were put up from the community's centre in various directions towards the village's edge, and thus Five houses with at least one kid between the ages of 5 and 15 were chosen for each transect. As a result, 30 households in total were picked for each locality.

Discussion

All households in small hamlets with less than 30 inhabitants were encouraged to take part. All school-age children (5-15), one adolescent or adult (> 15), and one preschooler (5 years) were chosen from each family and offered to participate. The day before the field team's visit, project-associated community health workers (CHWs) and field enumerators from the Taabo HDSS gave participants two plastic containers: one for collecting urine and one for stools [10]. The filled containers were to be delivered back to the participating household members the next morning. The research team set up a mobile field laboratory at the dispensary of Leleble in the Taabo department, labelled each container with a special identification code, and stored them in racks to be moved to nearby labs at the general hospitals of Taabo and Djékanou, the community health centre of Kpouébo in the department of Toumodi.

Stool sample processing was done using the Kato-Katz method. Using standard 41.7 mg templates, duplicate thick smears were created on microscope slides. One of eight skilled laboratory professionals examined the slides under a microscope after allowing them to clear for 30 to 45 minutes. To calculate the amount of eggs per gramme of faeces, the number of eggs of each helminth species (such as Schistosoma mansoni, Ascaris lumbricoides, Trichuris trichiura, and hookworm) were counted and multiplied by a factor of 24. (EPG). For additional diagnostic testing, a little amount of faeces (1-2 g) was kept in 10 ml of sodium acetate-acetic acid-formalin (SAF) solution.

Conclusion

The Hemastix, Siemens Healtheare, Zurich, Switzerland, reagent strip testing results for microhaematuria-positive urine samples were subjected to a filtering procedure for displays the prevalence of intestinal protozoa and helminth infections specific to various species. Except for hookworm, which showed a prevalence of 35.3% in the Djékanou and 34.2% in the Toumodi departments, individual helminth infections were typically low (5%). The overall prevalence of hookworms in Taabo department was 10.9%. In some of the villages in the Toumodi and Taabo departments, we identified a few hotspots for schistosomiasis with prevalences exceeding 20% and as high as 43%. Depending on the species, the prevalences of intestinal protozoa infections ranged from 1.0% to 42.4% in all three departments. Entamoeba coli and Endolimax nana, two non-pathogenic species, were the most prevalent intestinal protozoa, with overall prevalences of 40.2% and 19.6%, respectively. In all three, there was a prevalence of roughly 13% for Giardia intestinalis.

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