Journal of Taibah University Medical Sciences (2016) 11(1), 13–18

Taibah University

Journal of Taibah University Medical Sciences

www.sciencedirect.com

Original Article

Pattern of parasitic infections as public health problem among school children: A comparative study between rural and urban areas

Ali Saad R. Alsubaie, Ph.D [a,*], Ahmed A. Azazy, Ph.D [b], Eltigani O. Omer, Ph.D [a], Latifa A. Al-shibani, Ph.D [c], Abdulsalam Q. Al-Mekhlafi, Ph.D [c] and Faiz A. Al-Khawlani, MSc [c]

[a] *Department of Environmental Health, Faculty of Public Health and Health Informatics, University of Dammam, KSA*
[b] *Medical Laboratory, Department of Laboratory Sciences, Faculty of Applied Medical Sciences, Albaha University, KSA*
[c] *Medical Laboratory, Department of Medical Parasitology, Faculty of Medicine, Sana'a University, Yemen*

Received 18 March 2015; revised 14 October 2015; accepted 31 October 2015; Available online 5 January 2016

الملخص

أهداف البحث: تهدف هذه الدراسة إلى تحديد مدى انتشار الإصابة بالطفيليات المعوية بين طلبة المدارس في أرياف ومدن منطقة "إب" في الجمهورية اليمنية.

طرق البحث: تم اختيار المشاركين في هذه الدراسة المقطعية بشكل عشوائي من كل من المدن والأرياف. حللت ما مجموعه ٢٥٨ عينة براز من ١١٢ طفلا و ١٤٦ طفلة. استُخدمت الطريقة المباشرة وطريقة التركيز في اختبار كل العينات لتحديد مراحل الطفيليات المعوية التي يمكن تشخيصها مجهريا.

النتائج: من بين الـ ٢٥٨ عينة التي تمت دراستها تبين إصابة ١٤٨ طالبا بطفيلي واحد على الأقل، بانتشار إجمالي يقدر بـ ٥٧.٤٪. وتبينت الإصابة عند ٨٩ (٦٤.٥٪) من بين الـ ١٣٨ طفلا في المدن، بينما كانت الإصابة عند ٥٩ من بين الـ ١٢٠ طفلا (٤٩.٢٪) في المناطق الريفية. كما كانت الإصابة إحصائيا أعلى في المدن. وكانت أعلى نسبة إصابة بين الأطفال في سن ١٠-١١ سنة ٣١.٨٪ تلاها سن ١٢-١٣ سنة ٢٨.٤٪. وسُجلت نسب إصابة ٢٣.٦٪ و ١٦.٢٪ للفئة العمرية ٨-٩ سنوات و ١٤-١٥ سنة على التوالي. وكانت نسب توزيع الطفيليات المُكتشفة بين طلبة المدارس تنازليا على النحو التالي: إنتاميبا هستوليتيكا ٣٣.٧٪، وجياردیا لامبليا ٢٣.٦٪، وأسكارس لمبريكويديز ١٤.٣٪، وترايكيورس ترايكيورا ٩.٣٪، وهايمنولبس نانا ٦.٢٪، وشيستوسوما مانسوناي ٣.١٪، وأنكيلستوما دوودينالي ١.٢٪، وإنتروبيوس فيرمكيولارس ٠.٨٪ وسترونغيلويديز ستيركورالس ٠.٨٪.

الاستنتاجات: بيّنت الدراسة أن الإصابة بالطفيليات المعوية منتشرة بين أطفال المدارس وقد تكون مشكلة صحية عامة وخطيرة. تُبرز هذه الدراسة الحاجة إلى التدخلات الصحية العامة لمواجهة المشكلة.

الكلمات المفتاحية: الصحة المدرسية؛ الإصابات الطفيلية؛ الصحة العامة؛ الصحة البيئية؛ المناطق الريفية والمدنية

Abstract

Objective: This study aimed to determine the prevalence of intestinal parasitic infections among school children in rural and urban areas of the Ibb region in Yemen.

Methods: In this cross-sectional study, participants were randomly recruited from both urban and rural areas. A total of 258 stool specimens from 112 boys and 146 girls were analysed. All samples were examined using both direct and concentration methods to identify microscopically possible diagnostic stages of intestinal parasites.

Results: Of the 258 samples studied, 148 students were found to be positive for at least one parasite infection with an overall estimated prevalence of 57.4%. Of the 138 children from urban areas, 89 (64.5%) were found to be infected, whereas 59/120 (49.2%) students from rural areas were infected. The infection was statistically higher in urban areas ($X^2 = 6.164$, $P = 0.013$). The infection rate was highest among the age group 10–11 years (31.8%) followed by 12–13 years (28.4%). Infection rates of 23.6% and 16.2% were recorded among 8- to 9-year-olds

* Corresponding address: Department of Environmental Health, Faculty of Public Health and Health Informatics, University of Dammam, Dammam City, KSA.
E-mail: asralsubaie@uod.edu.sa (A.S.R. Alsubaie)
Peer review under responsibility of Taibah University.

Production and hosting by Elsevier

 http://dx.doi.org/10.1016/j.jtumed.2015.10.006

and 14- to 15-year-olds, respectively. The distributions of parasites among school children detected in descending order were: *Entameba histolytica* (33.7%), *Giardia lamblia* (23.6%), *Ascaris lumbricoides* (14.3%), *Trichuris trichiura* (9.3%), *Hymenolepis nana* (6.2%), *Schistosoma mansoni* (3.1%), *Ancylostoma duodenale* (1.2%), *Enterobius vermicularis* (0.8%) and *Strongyloides stercoralis* (0.8%).

Conclusions: This study showed that infection by intestinal parasites is prevalent among school children and can be a crucial public health problem. This study emphasizes the need for public health interventions to tackle this problem.

Keywords: Environmental health; Parasitic infections; Public health; Rural and urban areas; School health

Introduction

Parasite infections have worldwide distribution, but are mostly prevalent and endemic in tropical and subtropical countries, particularly in rural communities with poor sanitation. The World Health Organization (WHO) and UNICEF 2006 reported[1] that at the beginning of the Water for Life decade, 1.1 billion people did not have access to an improved source of drinking water. Furthermore, 84% of the population without access to an improved source of drinking water live in rural areas. Unfortunately, 2.6 billion people, more than 40% of the world's population, do not use a toilet, but defecate in the open or in unsanitary places.[2] Therefore, if the current trend persists, nearly 1.7 billion rural dwellers will still not have access to improved sanitation by 2015.

The pattern of distribution depends mainly on the availability of certain conditions required by parasites, conditions such as suitable climate, human activity, population movement and poor sanitation.[3] Furthermore, intestinal parasites are prevalent where poverty prevails, where sanitation is inadequate or non-existent and where more health awareness and care are needed; these are factors that should be considered in most developing countries, particularly in rural areas.[4]

Intestinal parasites, including *Schistosomiasis*, which is a major cause of morbidity, are directly correlated with poverty and poor sanitation. According to WHO,[4] schistosomes are the primary cause of morbidity and mortality in the tropics, after malaria. Their spreading is closely interwoven with the customs and habits of the individuals in the community. It has been estimated that out of 500–700 million people in 77 countries exposed to potential schistosomal infections, 200 million are actually infected.[5] The transmission of intestinal parasites is effected directly or indirectly by objects contaminated with faeces. These include food, water, nails, and fingers, indicating the importance of faecal-oral human-to-human transmission. Moreover, agriculture and food production (e.g., raw vegetables) can be one of the main sources of parasitic infections.[6] Interestingly, soil-transmitted parasites are more prevalent in regions where warmth and moisture are abundant. Khuroo et al. (2001) reported that an estimated 1.4 billion people are infected with *Ascaris lumbricoides* worldwide, and the intensity of infection is highest in children under 10 years of age. Indeed, *Trichuris trichiura* is common among children, particularly among children under five years of age; it causes severe infection and serious clinical problems.[7] Furthermore, parasites with direct life cycles, such as *Entameba histolytica, Giardia lamblia, Hymenolepis nana* and *Enterobius vermicularis*, are spread more easily and more commonly among children.

In Yemen, several studies have been conducted to investigate the profile of parasitic infections among different populations in Yemeni communities. Studies by Farag et al., 1985[8]; Azazy and Al-Tair, 1999,[9] Al-Hadad and Al-Sabri, 1998,[10] Azazy and Raja'a, 2003,[3] Raja'a and Mubarak, 2006,[11] and Al-Shibani et al., 2009[12] were carried out on the Yemeni population in different districts, but no similar study was conducted in Ibb Governorate. Therefore, the primary aim of the current investigation is to unveil the status of infection with intestinal parasitosis. The prevalence of parasitic diseases among school children occupying rural and urban areas was emphasized.

Materials and Methods

This cross-sectional study was conducted in rural and urban areas, and the field investigation was conducted in October and December, 2010 in Ibb, Yemen. A multi-stage random sampling method was followed to select the study sample size. A total of four schools were selected from both areas (two from rural and two from urban areas) using a simple random sampling technique. The students were selected following systematic methods, yielding 258 stool samples from boys and girls attending primary schools. The school children were cooperative, and the selection of schools was conducted with the informed consent of the educational authorities and the agreement of each school head-master. Participants were informed prior to their inclusion in the study; they were selected randomly, and their ages ranged from 8 to 15 years old.

Standard guidelines for the collection of specimens for laboratory testing were followed. Before beginning specimen collection, we explained the procedure to the schools' principles and students. During collection of the specimens, we followed appropriate precautions for safety to avoid contamination and take a sufficient quantity of material (as guided by the laboratory tests). For stool samples, expert health workers collected the samples, placed them in a cold box and immediately transported them to the laboratory as quickly as possible. Each specimen was assigned with a unique identification number and labelled by the collection team. Each label contained the: student's name, unique identification number, specimen type, date and place of collection, and the name or initials of the specimen's collector. The investigations commenced as soon as possible after the samples were received.