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Impact of hygienic level on parasite infection

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ABSTRACT

Objective: To find out the prevalence of intestinal parasites among primary school population (the most vulnerable group) in rural and urban areas in south Jordan. **Methods:** During a medical civic action in the south of Jordan in summer 2000, stool specimens were collected from 2400 primary school children, aged from 6–12 years, and examined for the detection of intestinal parasitic infection from both urban (1100 samples) and rural (1300 samples) areas in south Jordan. **Results:** The results indicated that the overall prevalence of intestinal parasitic infection was 28.5%. It was more in rural (33.2%) than in urban (23.0%) areas, but no sex difference was found. As regard to the type of infection, *Giardia lamblia* was the commonest intestinal protozoa, with a rate of 42.6%, while *Enterobius vermicularis* was the commonest helminth recorded in our study with a rate of 5.9%. **Conclusions:** Health education by health and school authorities is recommended, particular attention should be paid to repairing the sewage disposal system as well as water supply, which acts as main source of water pollution.

1. Introduction

Intestinal parasitic infection represents a large amount of and serious medical and public health problems in developing countries[1]. Investigations showed that intestinal parasitic infection adversely influence the health and nutritional status of people[2–4]. The prevalence of parasitic infections in developing countries is high ranging between 30%–60%.

The commonest port of entry for intestinal parasites is through ingestion of contaminated food or water with cysts of *Entamoeba histolytica*[5] or *Giardia lamblia*, which may cause infections and symptoms, or remain asymptomatic[6]. As regard to gender, there is no significant difference in the prevalence of intestinal parasites in general[7].

Intestinal parasites are relatively common worldwide, in rural and urban areas, industrialized and unindustrialized countries[8], varying from one area to another depending on the degree of personal and community hygiene, sanitation and climatic factors[9]. Amebiasis is common in central and South America, Africa, and Asia. Studies showed wide range of infection rate including 20% in northeastern Brazil, 46% in southwestern Brazil, 11.7% in Chile, 14.9% in Equatorial Guinea, 25.1% in Tanzania, and 28.4% in Sudan[10]. In Dhaka, Bangladesh, approximately 50% of children show serological evidence of exposure to

Entamoeba histolytica[11]. The study is aimed to find out the prevalence of intestinal parasites among primary school population (the most vulnerable group) in south Jordan and to study the impact of sanitation on this prevalence.

2. Material and methods

Our study was conducted on the results obtained during the civic action in the summer of 2000. A sample of 2400 primary school children were investigated, 1100 from Aqaba and Maan cities representing urban areas, 580 males and 520 females from various socio-economic status. The remaining 1300 cases were chosen from rural districts, including 590 males and 710 females, respectively. Stool specimens were collected and sent directly to the laboratory for analysis. Inspection of stool specimen was done to detect the presence of any adult worm, then direct microscopic examination was made on all stool samples by using the saline stool smear method (the stool was mixed with saline and then a cover slip was put on the smear). A drop of lugol's iodine is added to one edge of the smear.

The results were presented in percentage and analyzed by using chi-square test.

3. Results

Our study has revealed that the prevalence of intestinal parasitic infection among primary school children in south

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Jordan was 28.5% (684/2400). *Giardia lamblia* was the commonest parasite (42.6%). 26.2% cases had *Entamoeba histolytica*, 12.4% had *Entamoeba coli*, and 7.5% had *Trichomonous hominis*. On the other hand, intestinal helminths including *Enterobious vermicularis* and *Ascaris lumbricoids* showed the rate of 5.9% and 5.4%, respectively. In urban area, out of 1 100 children examined 253 were positive for infection (23.0%), out of which 132 males were harboring intestinal parasitic infection, while the number of females with infection was 121. *Giardia lamblia* was the commonest parasite (18.3%). 12.1% had *Entamoeba histolytica*, 5.3% had *Entamoeba coli*, 3.2% had *Trichomonous hominis*. While *Enterobious vermicularis* and *Ascaris lumbricoids* showed the rate of 2.3% and 2.3%, respectively.

The prevalence rate of intestinal parasitic infection in rural areas was 33.2% (431/1300). 196 males and 235 females were harboring intestinal parasites. Similarly, the commonest specie of infection in rural area was *Giaradia lamblia* (24.3%) followed by *Entamoeba histolytica* (14.1%). 7.1% had *Entamoeba coli*, and 4.3% had *Trichomonous hominis*. On the other hand, *Enterobious vermicularis* and *Ascaris lumbricoids* showed the higher prevalence rate in rural area (3.6% and 3.1%, respectively).

4. Discussion

The subject of intestinal parasites in primary school children possesses a public health importance, and the rate of infection give an indication about the standard of sanitation in the community and the personal hygiene^[12].

In our study, the overall rate of infection with intestinal parasites was 28.5% with infection rate of 23.0% in urban areas and 33.2% in rural, this difference could be attributed to the sanitary measures introduced into both areas. Safe water supply as well as the hygienic conditions are relatively lower in rural areas than in urban areas, in addition to the low level of health education, which may make the inhabitants more susceptible to parasitic infection. This result is identical to other result obtained by previous studies^[9–11].

No significant difference in intestinal parasitic infection had been found between both sexes in our study which coincides with study of Kadhum^[9]. Giardiasis was the commonest parasitic infection in school children which could be attributed to the variations in method of transmission especially through contaminated water and food, and by house flies (the cyst can survive up to 60 days in fresh water)^[13], but it is very easy to remove it by filtration^[14]. As regard to the intestinal helminthes, *Enterobious vermicularis* and *Ascaris lumbricoids* were the most prevalent helminthes as our study revealed which matches the results of studies of Kadhum and Haque *et al*^[9,11].

Nearly 25% of the global population are infected with *Ascaris lumbricoides*^[15]. It is well known that the chance of finding enterobious vermicularis in faces is less than 1/19 as detecting in single perianal swab examination^[16]. Thus the rate of infections given above is surely an underestimate of the actual prevalence and because of lack of material required for the perianal swab (scotch cellulose tape) we unfortunately, could not achieve this test in this study.

Intestinal helminthes have different mode of transmission,

some are soil transmitted, others are mechanically transmitted, and only *Enterobious vermicularis* and *H. Nana* have direct mode of transmission. This may explain the low infestation rate of helminthes^[17].

This study shows clearly an increase in the prevalence of intestinal parasites mainly the feco-orally transmitted parasites. So it could be concluded that the aggression and embargo has an obvious impact on the hygiene and sanitations as well as on the socio-economic status that have an influence on the spread of this infection.

Health education by health and school authorities is recommended in which it should play an active role in controlling this public health problem. All damages in public services should be repaired and particular attention should be paid to repairing the sewage disposal system as well as water plants, which act as main source of water pollution.

Conflict of interest statement

We declare that we have no conflict of interest.

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