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# PARASITOLOGICAL STUDIES ON SOME INTESTINAL PARASITES IN PRIMARY SCHOOL CHILDREN IN ASWAN GOVERNORATE, EGYPT

By

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## Abstract

This cross sectional study in Aswan Governorate determined the prevalence of intestinal parasites and to identify the risk factors for infection in primary school children in this geographical area. The results would facilitate evaluation of the endemic level of different intestinal parasites and the determination of whether widespread or focal measures of parasite control are required. After obtaining official permission from the school administration, information and consent forms were given to the parents of all the schoolchildren. They were three-hundreds children aged between 6-12 year were enrolled; a detailed questionnaire, complete clinical assessment complete as well as stool analysis was done The study showed that the over-all infection was 31%, single parasitic infection was 26% and mixed one was 5%.The commonest helminthic infection was *E. vermicularis* 6.6% followed by *H. nana* 3% *Ascaris lumbricoides*1%. The commonest protozoa infection *was E. histolytica* 8.3% followed *by Giardia lamblia* 3.7% and *Cryptosporidium parvum* 1.7%. Mixed infection was *E. vermicularis* plus *E. histolytica* (23.4%), *E vermicularis* plus *G. lamblia* (17.6%), *E. vermicularis* plus *C. parvum* (11.8%), *E. histolytica* plus *H. nana* (11.85%), *A. lumbricoides* plus *E. histolytica* (17.6%) and *G. lamblia* plus *E. histolytica* in (11.8%). Parasitic infection was more prevalent in boys (53.8%) than girls (46.2%) and more prevalent in rural children (39.73%) than urban ones (20.13%) among age ranged from 6 to 12 years (8.97±1.72).

**Key words:** Egypt, Aswan Governorate, Rural, Urban School-children, Intestinal parasites

## Introduction

The intestinal parasitic infection are amongst the most common infection worldwide It is estimated that 3-5 billion people are affected , and that 450 million are ill as a result of these infection. The majority were children .these infections as regarded as serious public health problem. They cause iron deficiency anemia, growth retardation in children and other physical and mental problems (WHO 1998). The high prevalence of these infections is closely correlated with poverty, poor environmental hygiene and poor health services. The fecal oral route significant in the transmission of parasitic infections to human via poor personal hygiene and environmental condition such as contaminated soil and water sources Nxasona *et al.* (2013).

It was important to measure their prevalence and identify the predisposing factors to infection as the first step for monitoring the progress of control efforts and for formulation of future intervention strategies (Hassan, 1994).

Due to lack of available studies on the intestinal parasitic infection in children in Aswan Governorate, the present study was planned to monitor the intestinal parasitic infection among urban and rural primary school children in Aswan Governorate.

## Subjects, Materials and Methods

This is a descriptive study carried out in Aswan Governorate during the period from October 2015 to March 2016. School children in four governmental primary schools from both urban and rural were selected. Random sample consisted of Three hundred (300) child were included. Their ages arranged from 6 to 12 years, 170 were males and 130 were females. An initial visit was carried out to each school. The aim of the

study was discussed with the personnel in change. Consent was taken from ministry of education and from national security office. Every child was subjected to a questionnaire about symptoms and signs suggestive of parasitic infection. The children were subjected to Careful history taking with special stress on symptoms suggestive of parasitic infection. General and/abdominal examination.as well as stool examination by: Direct smear method Garcia and Bruckner, (1988), Formol-ether concentration technique (Garcia, 1988). Special stains for diagnosis of intestinal protozoa were Modified Ziehl-Neelsen staining mainly for cryptospoidiosis (Casemore *et al*, 1985), Kato-Katz thick smears (Katz *et al*, 1972). An adhesive: cellophane tapes (Jacobs, 1942), Peri anal swab for those who gave history of anal itching.

Statistical analyses: Data was collected, tabulated and analyzed with SPSS version 9 statistical program comparisons between groups was done using chi-square test (X2) at 5% level of significance. To test significance between frequencies of different observation, chi square test was used

## Results

Table 1: Prevalence of intestinal parasites among children

| Laboratory diagnosis | No | Percentage |
|---|---|---|
| Infected | 90 | 30 |
| Non Infected | 210 | 70 |
| Total | 300 | 100 |

Table 2: Frequency of different intestinal parasites among school children

| Parasites recovered | Children (n= 300) | Percentage |
|---|---|---|
| *Enterobius vermicularis* | 20 | 6.6% |
| *Ascaris lumbercoides* | 3 | 1 |
| *Hymenolepis nana* | 9 | 3 |
| *Giardia lamblia* | 11 | 3.7 |
| *Cryptosporidium parvum* | 5 | 1.7 |
| *Endameba histolytica* | 25 | 8.3 |
| Mixed infection | 17 | 5.6 |
| • *E. vermicularis + E. histolytica* | 4 | 1.3 |
| • *E. vermicularis + G. lamblia* | 3 | 1 |
| • *E. vermicularis + C. parvum* | 2 | 0.6 |
| • *E. vermicularis + G. lamblia* | 2 | 0.6 |

Table 3: Pattern of mixed parasitic infection

| Mixed infection | Children (n=17) | Percentage |
|---|---|---|
| *E. vermicularis + E. histolytica* | 4 | 23.4 |
| *E. vermicularis + G. lamblia* | 3 | 17.6 |
| *E. vermicularis + C, parvum* | 2 | 11.8 |
| *E. histolytica + G. lamblia* | 2 | 11.8 |
| *E. histolytica + H. nana* | 2 | 11.8 |
| *E. histolytica + A. lumbercoides* | 3 | 17.6 |

Table 4: Incidence of single and mixed infection among children

| Infection | Children number | Percentage |
|---|---|---|
| Single | 73 | 24.2 |
| Mixed | 17 | 5.6 |

Table 5: Clinical symptoms and signs among infected and non-infected children

| Clinical feature | Infected (n=90) | | Non infected (n=210) | | Total | | Chi-square test | |
|---|---|---|---|---|---|---|---|---|
| | no | % | No | % | no | % | $X^2$ | P. value |
| Recurrent abdominal pain | 63 | 70.0 | 20 | 9.5 | 83 | 27.6 | 10.6 | <0.001** |
| Vomiting | 3 | 3.3 | 0 | 0.5 | 0.0 | 1 | 2.03 | 0.043* |
| Diarrhea | 30 | 33.3 | 4 | 1.9 | 134 | 11.3 | 7.7 | <0.001** |
| Pallor | 50 | 55.5 | 22 | 10.4 | 72 | 24 | 8.2 | <0.001** |
| Perineal itching | 30 | 33.3 | 3 | 1.4 | 33 | 11 | 7.9 | <0.001** |

Table 6: Distribution of intestinal parasites in infected children regarding to sex

| Parasite | Males (n= 47) | Female (n= 43) | Total (90) | P. value |
|---|---|---|---|---|
| *E. histolytica* | 10 (21.2%) | 15 (34.88) | 25 (27.7%) | 0.228 |
| *G. lamblia* | 8 (17.02%) | 3 (6.9%) | 12 (13%) | 0.258 |
| *H. nana* | 6 (12.67) | 3 (6.9%) | 9 (10%) | 0.574 |
| *A. lumbricoides* | 2 (4.25) | 1 (2.3) | 3 (3.3) | 0.937 |
| *C. parvum* | 2 (4.25) | 3 (6.9) | 5 (5.5) | 0.918 |
| *E. vermicularis* | 8 (17.02) | 12 (27.90) | 20 (22) | 0.324 |
| Mixed infection | 11 (23.40) | 6 (13.95) | 17 (18.8) | 0.382 |

Table 7: Distribution of intestinal parasite in children regarding to Age

| Parasites | 6-9 years (n= 47) | | 9-12 years (n= 43) | | P. value |
|---|---|---|---|---|---|
| single or mixed | No. | % | No. | % | |
| *E. histolytica* | 13 | 27.65 | 12 | 27.90 | 0.834 |
| *G. lamblia* | 5 | 10.63 | 6 | 13.95 | 0.875 |
| *H. nana* | 6 | 12.76 | 3 | 6.97 | 0.574 |
| *A. lumbercoids* | 2 | 4.255 | 1 | 2.32 | 0.937 |
| *E. vermcularis* | 13 | 27.65 | 7 | 16.27 | 0.297 |
| *C. parvum* | 3 | 6.38 | 2 | 4.65 | 0.918 |
| Mixed infection | 5 | 10.63 | 12 | 27.90 | 0.069 |

Table 8: Rural and urban distribution of intestinal parasites in infected children

| Parasites | Rural (n= 60) | | Urban (n=30) | | Total (n= 90) | | P. value |
|---|---|---|---|---|---|---|---|
| single or mixed | No. | % | No. | % | No. | % | |
| *E. histolytica* | 17 | 28.2 | 8 | 26.7 | 25 | 27.8 | 0.934 |
| *G. lamblia* | 8 | 13.3 | 3 | 10.0 | 11 | 12.2 | 0.909 |
| *H. nana* | 5 | 8.3 | 4 | 13.3 | 9 | 10.0 | 0.709 |
| • *lumbricoides* | 2 | 3.3 | 1 | 3.3 | 3 | 3.3 | 0.533 |
| *E. vermicularis* | 13 | 21.7 | 7 | 23.3 | 20 | 22.2 | 0.928 |
| *C. parvum* | 3 | 5.0 | 2 | 6.6 | 5 | 5.6 | 0.871 |
| Mixed infection | 12 | 20.0 | 5 | 16.7 | 17 | 18.9 | 0.924 |

## Discussion

In the present study the prevalence of intestinal parasites in children between (6-12) years living in Aswan town, Aswan Governorate was 30%. This agreed with Hassan (1994) who reported 31% prevalence of parasitic infection among school children in Zifta City (Gharbia Governorate), Ismail *et al.* (1998) reported 28.20% prevalence of parasitic infection among school children in Tala City (Menoufia Governorate) and Ibrahim (2011) who reported 29.3% prevalence of parasitic infection among Egyptian school children in El-Minia Governorate. However, the present results were less than that reported by El- Morsy *et al.* (2007) who reported prevalence of 60.20% in urban area and 88.5% in rural area among school children in Sohag Governorate, Hegazy *et al.* (2014) who reported t 51.8% prevalence of parasitic infection among school children in Damanhur City (Beheira Governorate) and Omran *et al.* (2013) who reported 55%.prevalence of parasitic infection among school children in Zewan Shorqia village (Sohag Governorate).

In the present work, age of the examined schoolchildren ranged from 6 to 12 years with mean (8.97±1.72). This agreed with Quinhui *et al.* (2006) who reported average age (8.2±1.4) and Hegazy *et al.* (2014) who reported (7.45±0.87) years. But, the age group disagreed with Okayay *et al.* (2004) reported (10.51±2.33) for boys and (10.34±2.77) for girls. This may be due to difference in the inclusion criteria and sample size.

In the present study, the recovered parasites were *E. histolytica* (27.90%), *G. lamblia* (13.95%) and mixed infection (27.90%). Parasitic infection was high in older ages compared to younger ages (27.6%, 10.63% & 10.63) respectively. Also, *H. nana*, *A. lumbericoids*, *E. vermicu-*

*laris* and *C. parvum* were more prevalent in younger ages (12.76%, 4.25%, 27.65% and 6.38%) compared to older aged children (6.9%, 2.32%, 16.27% & 4.65%) respectively. This agreed with Ibrahim (2011) who reported that *E. histolytica* and *E vermicularis* were more common in older children and in younger aged ones. But, these outcome results disagreed with Amuta *et al.* (2009) who found no significance difference in infection rate between age groups.

In the present study, males were more infected (15.66%) than females (14.33%). This agreed with Al Hindin (2002) who reported higher infection rate in males (48%) than females (27.8%), Ulukanligil and Seyrek (2004) found more parasitic infection in boys (57.2%) than girls (42.7%), Amuta *et al.* (2009) who reported that infection was more in males (53.33%) than females (46.66%), Omran *et al.* (2013) who reported parasitic infection in males (59.38%) than females (51.38%) and Hegazy *et al.* (2014) who reported that rate of infection among males (52.1%) than females (47.9%). No doubt, Egyptian boys are more active and play outdoors than girls (Curtale *et al*, 2007). But, this result disagreed with Nimri and Megdam (2004) who found the low immunity of females might account for higher prevalence in males than females.

In the present study, females were more infected with *E. histolytica, E. vermiculoris* and *C. parvum*; 34.88%, 27.90% & 6.9% and males showed 21.2%, 17.02 & 4.25% respectively. Males were more infected *with G. lamblia, H. nana, A. lumbericoids* and mixed infection (17.02%, 12.76%, 4.25% & 23.40%) than females (6.9%, 6.9% 2.3% & 13.95%) respectively without significant difference. These results agreed with Hegazy *et al.* (2014) who reported that infection was more in females than males. But, males were more infected with *G. lamblia, H. nana* and mixed infection (21%, 9% & 21%) than females (14%, 8.1 & 10.50%) respectively. These results agreed with Oluwafemi (2003) who reported that *E. histolytica* was higher who reported that *E. histolytica* was higher in females than males.

In the present study, the majority of infected children were living in rural areas (60%) with significance difference. This result agreed with Egger *et al.* (1990) in Thailand reported a high prevalence of parasitic infection among rural children, Fernadez *et al.* (2002) in India who reported up to 91% in school children in rural areas and Hegazy *et al.* (2014) who reported 66.1% in rural area and 33.6% in urban area. This may be due to the fact that in rural communities is always contaminated with agricultural fertilizer, animals excreta and stray dogs and cats (Sabry *et al*, 2012) Besides, the rural ecologic and environmental favor the cycles of many soil and water transmitted parasites. Also, in the rural areas mainly boys and youth use the Nile branches and canals for washing, playing and swimming and these sociocultural habits are difficult to be changed all factors helps in transmission of parasitic infection.

## Conclusions

The intestinal parasitic infection is an important public health problem in school children between 6-12years (8.97±1.72) living in Aswan City (31.0%), particularly in rural resident children than those in the urban ones.

Both sexes were affected but, males were more affected with *G. lamblia, H. nana. A. lumbricoides* and mixed infection than females whom were more affected with *E. histolytica, E. vermicularis* and *C. parvum*. The commonest parasite was *E. histolytica* and the least one was *A. lumbricoides*.

## Recommendation

Generally speaking, parasitosis is worldwide health distributed problem particularly in developing countries among pre-school and school aged children. No doubt, parasitosis has their impact on the children's ability to study due to the pathological complications of these parasites. The first of all to be considered is self-hygiene and the hand washing.

Consequently, the raising awareness about the parasitic disease and their clinical features is a must to the schoolchildren and better to their parents as well. These could be by simple educational illustrative programs or even in the Mosques or sporting clubs.

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