

Epidemiological investigation of intestinal parasites in children of Sale city (Morocco)

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ABSTRACT

The objective of this study is to determine the prevalence of intestinal parasites in children of Sale city (Morocco) and identify the most frequent species. A parasitological examination was performed on 125 stool samples collected from June 2012 to May 2013. They are issued by children hospitalized Moulay Abdellah Hospital Sale (Morocco). Each sample was subjected to a direct microscopic examination in physiological saline and iodine, an enrichment method Balenger and MIF. Roughly one out of three contains one or more intestinal parasites. *Giardia intestinalis* (20.90%) and *Blastocystis hominis* (35.82%) are the most frequent, followed by *Entamoeba coli* (16.42%), *Endolimax nana* (8.96%) and *Entamoeba histolytica* (1.49%). *Enterobius vermicularis* (5.97%), *Ascaris lumbricoides* (4.48%), *Strongyloides stercoralis* (1.49%) and *Taenia saginata* (2.99%). The intestinal parasitism is significantly related to age, not the sex.

INTRODUCTION

The importance of intestinal parasitic infections in Public health is maintained as a result of their high frequency, their almost global distribution, and their effect on nutritional and immune status populations (WHO, 1982; Ait Messaad *et al*, 2022). They are related to low hygiene, promiscuity and extreme poverty (Raccurt *et al.*, 2006). Indeed, they are particularly severe in children in which they can cause undernutrition, dehydration, anemia and resistance to drop infections (Dianou *et al.*, 2004; El Kettani and Azzouzi, 2006).

Intestinal parasites reach the digestive tract through soiled food and water polluted by excrement human or animal containing the eggs or cysts of the parasites or directly by the faecal-oral route (Majer and Neumayr, 2015). Intestinal parasitosis is one of the main

causes of morbidity and mortality. Some studies have shown the contamination of water by intestinal parasites (Lotfi *et al.*, 2020; Ait Messaad *et al.*, 2022).

Our study aims to determine the prevalence intestinal parasites and identify the most species frequent in children referred for coprology parasitic hospital. For the investigation epidemiological took place from May 2012 to June 2013.

MATERIALS AND METHODS

1. The study population

This is a population of 125 children suspected intestinal parasites and hospitalized at Hospital Prefectural Sale for another disease distributed in 58 males (46.4%) and 67 females (53.6%). The study was conducted between May 2012 and the month of June 2013. Stools examined from children aged 11 months to 16 years.

2. Sampling and stool

The fresh faces collected in the morning, in clean plastic, are immediately stored in a 10% formalin solution and transported to laboratory of the National Institute of Hygiene Rabat.

3. Analytical applied methods

Feces collected are examined first macroscopically noted their consistency and presence of adult parasites. Then they subject to microscopic examination at first low magnification (x10) to identify eggs and larvae helminth then to medium and high magnifications (x40; x100) search vegetative and cystic forms for protozoa. Microscopic examination consisted first direct examination without staining and after Lugol staining, and then, after a review enrichment methods according Bailenger and MIF.

4. Statistical analysis of data

Data were processed with SPSS (Statistical Package for the Social Sciences) to set report parasitism and the various factors studied. The confidence interval used is 95% and association is considered significant when the p value is less than 0.05.

RESULTS

1. Intestinal parasite frequency

Results obtained, it appears that out of the 125 cases examined, 49 were infected with at least one parasite intestinal, an overall prevalence of 39.2 % (Table 1).

Table 3. Intestinal parasites frequency (%) in the group and in relation to the total.

Species	Workforce	% in group	%by the total
<i>Entamoeba coli</i>	11	19,64	16,42
<i>Entamoeba histolytica</i>	1	1,79	1,49
<i>Endolimax nana</i>	6	10,71	8,96
<i>Giardia intestinalis</i>	14	25,00	20,90
<i>Blastocystis hominis</i>	24	42,86	35,82
Total protozoa	56	100,00	83,58
<i>Ascaris lumbricoides</i>	3	27,27	4,48
<i>Enterobius vermicularis</i>	4	36,36	5,97
<i>Strongyloides strercoralis</i>	1	9,09	1,49
<i>Trichuris trichiura</i>	1	9,09	1,49
<i>Taenia saginata</i>	2	18,18	2,99
Helminths total	11	100,00	16,42
Total protozoa and helminths	67	100,00	100,00

2. Prevalence by sex

The prevalence of parasites in children of sex females and males respectively 63.27% and 36.73% (Table 2). And the 67 females examined, 31 had proved infected, and 58 males examined, 18 had proved infected. Statistically, there are not significant associations between sex and parasitism ($p > 0.05$).

Table 2. Intestinal parasites Prevalence in children by sex.

Sex	uninfected children	%	infected children	%
Males	40	52,63	18	36,73
Females	36	47,37	31	63,27
Total	76	60,80	49	39,20

3. Prevalence by age

A steady increase in Table 3 there after, prevalence with age. It is 0% for children <1 year, 28.57% for children from 1 to 4 years, 38.78% from children 5 to 9 years and 32.65% in children 10 to 16 years. Statistically, the results show a significant association between parasitism and age ($p < 0.05$).

Table 3. Prevalence parasite in children under the age brackets.

Age group	uninfected children	%	infected children	%
<1 ans	1	1,32	0	0,00
1-4 ans	20	26,32	14	28,57
5-9 ans	45	59,21	19	38,78
10-16 ans	10	13,16	16	32,65
Total	76	60,8	49	39,2

DISCUSSION

Our results showed prevalence general 39.2 %, roughly one in three children. This compares to 39.6% of **Assale *et al.*(1986)**, 38.9% of **Adu-Bryn *et al.*(2001)**, 37.04% of **Bachta *et al.* (1990)**, and 37% of **Alaoui *et al.* (1997)**. It appears superior to 33.3% of **Penali *et al.* (1993)**, 31.9% of **El Kettani *et al.* (2006)**, 31.3% of **Diouf *et al.* (2000)** and 30.6% of **Faye *et al.* (1998)**. It is significantly lower than against 68.1% of **El Qaj *et al.* (2009)**, 67.6% of Buchy and 57.1% of **Tligui and Agoumi (2006)**.

Statistically irrelevant factor on sex parasitism was recorded, but the factor age is significantly demonstrated. This one believes regularly without falling through all slices age. The most affected are those of 5 to 9 and 10 to 16 years, that of <1 years remains the least reached. In sum, the older the child the more it is exposed to parasite infestation. This is in agreement with **Alaoui *et al.* (1997)** and **Faye *et al.* (1998)** studies and contrast with those of **Dianou *et al.* (2004)** and **El Qaj *et al.* (2009)**.

Relative to the total of species detected, and *B. hominis* *G. intestinalis* are most represented species respectively 35.82 % and 20.90 %, *E. coli* (16.42 %) and *E. histolytica* (1.49%) are slightly away from them, *E. vermicularis* is a little behind with 5.97%. *A. lumbricoides* (4.48%), *T. saginata* (2.99%) and *E. nana* (1.45 %) are not very poorly represented.

G. intestinalis appears at an age and occurs early in the first years. This is a parasite usually very common in children. The absence of other flagellated probably explained by the late review stool especially for *T. intestinalis* that exists only vegetative form (**Lotfi *et al.*, 2020; Ait Messaad *et al.*, 2022**). Compared to the work of **Ayadi *et al.* (1991)** and **Diouf *et al.* (2000)**, it was flogged to head of a list of species, but this time with rate than ours which are respectively 47.92 % and 45.3%. In Côte d' Ivoire, it was in 1993 and 1999 respectively exceeded by *E. coli* and *A. lumbricoides* (**Penali *et al.*, 1993; Eholié *et al.*, 1999**). Just next to it is the case *B. hominis*, it has been found in the majority of cases combination with Protozoa.

This type of association is, according to several authors, in that it is sharing with them the same mode of oral transmission. In the literature, its prevalence is significantly high in the tropics (20-50%) than in temperate countries (2-12%) (**Trabelsi *et al.*, 2010, Ait**

Messaad et al, 2022). This is in agreement with our results since 24 out of 125, or 35.82% of children had the *B.hominis* in their digestive tract. In Morocco, she had occupied the first position in the work of **El Qaj et al. (2009)**.

For helminths, they did all that 16.42%. *A. lumbricoides* was demonstrated in three occasions, *T. saginata* in two. These two lines are counted among the most helminths in relation to water raw wastewater (**El Kettani and Azzouzi , 2006**). Ascariasis has been proposed as an excellent indicator of economic development and health (**Guardian et al., 1997**). The presence of *E. vermicularis* worm or children reflects the risk of direct transmission through dirty hands or by indirect objects and / or contaminated food.

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