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Enteric parasites prevalence at Saint Camille Medical Centre in Ouagadougou, Burkina Faso

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ABSTRACT

Objective: To assess the prevalence of parasitic infections among patients attending Saint Camille Medical Centre and to estimate co-parasitic infections rates. **Methods:** From January to December 2009, stool samples were collected from 11 728 persons, aged from five months to 72 years and suffering from gastroenteritis. After macroscopic description, the stools were examined by light microscopy to search for the presence of parasites. **Results:** From the 11 728 analyzed stools, 6 154 (52.47%) were infected with at least one parasite. Protozoan frequently encountered were: *Giardia intestinalis* (43.47%), *Entamoeba histolytica/Entamoeba dispar* (30.74%) and *Trichomonas intestinalis* (21.72%), while *Hymenolepis nana* (2.25%) was the most common helminth. Co-infections occurred in 22.34% cases. Within the multi-infected samples, dual and triple infections accounted for 71.18% and 20.00%, respectively. *Giardia intestinalis* for protozoan and *Hymenolepis nana* for helminths were the most implicated co-infections. **Conclusions:** This study confirms that intestinal parasites are still a public health problem in Burkina Faso. To reduce the incidence of parasitic infections, it is necessary to promote the education of people so that they practice the rules of individual and collective hygiene.

1. Introduction

Gastroenteritis (GE) due to protozoan and helminths are a major public health problem world wide, especially in developing countries[1–4]. It is estimated that more than three billion people are infected with intestinal parasites in the world[5]. The intestinal parasitic infections cause severe GE and are common in children of school age in the poorest communities. As a consequence, children have growth retardation and low academic performance. Similarly the children illness reduces productivity and work capacity of adults[6]. Protozoan such as *Entamoeba histolytica* (*E. histolytica*)/*Entamoeba dispar* (*E. dispar*) and *Giardia intestinalis* (*G. intestinalis*) and helminths such as *Ankylostoma duodenale*, *Ascaris lumbricoides*,

Hymenolepis nana (*H. nana*), *Enterobius vermicularis* and *Taenia saginata* also cause anemia in pregnant women and children under five years[7,8].

Despite the intensive progress in medicine in recent years, intestinal parasites by their disease, remain a serious health problem for developing countries[9]. The highest rates of protozoan and helminths in the world are found in tropical regions and their distribution depend on conditions such as suitable climate, human activities, population movements due to wars and sanitation decadent[3].

Burkina Faso is a tropical semi-arid country of Western Africa. Intestinal parasitic infections are major cause of infant gastroenteritis (IEG) that induces a high mortality rate[10,11]. The present study included all patients suspected of intestinal parasitic infection whose stools were examined at the Laboratory of the Saint Camille Medical Center in Ouagadougou. The aim was to assess the prevalence of intestinal parasites in the Medical Centre St Camille (CMSC) of Ouagadougou (Burkina Faso) and to estimate the rate of parasitic co-infections.

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2. Materials and methods

From January to December 2009, stool samples were collected from 11 728 persons aged from five months to 72 years [(13.48±7.96) years] for parasite research. Data on age, sex, educational level and the function of each patient or each parent (in the case of infants) were gathered. The stool samples underwent a macroscopic examination for the presence of blood, mucus and adult worms. Afterwards stools were examined microscopically for the presence of eggs and vegetative forms of parasites. The stools were further stained with lugol for microscopic examination.

3. Result

The present study included patients aged from 5 months to 72 years [medium age of (13.48±7.96) years]. Male accounted for 45.50% (5 336/11 728) and female for 54.50% (6 392/11 728). The patients were divided into three age groups: 0–5 years, 6–15 years and > 15 years. The group of 6–15 years was the most represented with 40.79% (4 784/11 728) patients. The groups 0–5 years and >15 years accounted for 20.64% (2 421/11 728) and 38.57% (4 523/11 728), respectively. Parasite identification was attempted for 52.47% (6 154/11 728) samples. Among the identified parasites, protozoan and helminths accounted for 95.95% (5 905/6 154) and 4.05% (249/6 154), respectively. The results showed that *G. intestinalis* (43.47%), *E. histolytica/E. dispar* (30.74%) and

Trichomonas intestinalis (*T. intestinalis*) (21.72%) were the most common intestinal protozoan. *Balantidium coli* was identified in only one sample and accounted for less than 0.01%. *H. nana* (2.25%) was the most represented helminth. It was followed by *Dicrocoelium dentriticum* (0.90%), *Ankylostoma* sp (0.45%) and *Strongyloides stercoralis* (0.16%). Helminths such as *Taenia* sp., *Enterobius vermicularis*, *Shistosoma mansoni* and *Trichirus trichiura* accounted for less than 0.01% each.

The distribution of parasites in relation with the age of the patients is summarized in Table 1. The data in the table revealed that the young infants (0–5 years) were most affected by the protozoan mostly *G. intestinalis* (51.70%) and *T. intestinalis* (32.70%). People between six and 15 years were infected with both protozoan and helminths; but helminths were most represented. Thus, *A. duodenale* was found in 53.60% cases and *S. stercoralis* in 66.70% cases. Similarly, people of more than 15 years were most affected by *E. histolytica/E. Dispar* (77.30%), *T. intestinalis* (59.30%) and *D. dentriticum* (66.10%).

The analysis of co infections rates revealed that co infections occurred in 22.34% (1375/6154) cases. According to Table 2 no co infection helminth–helminth was observed, however, there were high co infection rates of protozoan–protozoan such as *E. histolytica/E. dispar*–*G. intestinalis* (27.93%), *E. histolytica/E. dispar*–*G. intestinalis*–*T. intestinalis* (20.00%). *H. nana* was the only helminth involved in few co infections: *E. histolytica/E. dispar*–*G. intestinalis*–*H. nana*–*T. intestinalis* (9.82%) and *G. intestinalis*–*H. nana* (0.80%).

Table 1

Distribution of parasites in relation with the age of patients (%).

| Age groups | <i>E.h/E.d</i> (n = 1892) | <i>G.l</i> (n = 267) | <i>T.i</i> (n = 1 337) | <i>B.c</i> (n = 1) | <i>H.n</i> (n = 139) | <i>A.d</i> (n = 28) | <i>E.v</i> (n = 10) | <i>D.d</i> (n = 56) | <i>S.m</i> (n = 7) | <i>S.s</i> (n = 6) | <i>T.t</i> (n = 1) | <i>T.sp</i> (n = 2) |
|------------|------------------------------|-------------------------|---------------------------|-----------------------|-------------------------|------------------------|------------------------|------------------------|-----------------------|-----------------------|-----------------------|------------------------|
| 0–5 years | 13.6 | 51.7 | 32.7 | 0.0 | 16.5 | 14.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 6–15 years | 9.1 | 6.9 | 8.0 | 100.0 | 32.4 | 53.6 | 20.0 | 33.9 | 14.3 | 66.7 | 100.0 | 0.0 |
| > 15 years | 77.3 | 41.4 | 59.3 | 0.0 | 51.1 | 32.1 | 80.0 | 66.1 | 85.7 | 33.3 | 0.0 | 100.0 |

E.h/E.d=*Entamoeba histolytica/Entamoeba dispar* *G.l*=*Gardia intestinalis*; *T.i*=*Trichomonas intestinalis*; *B.c*=*Balantidium coli*; *H.n*=*Hymenolepis nana*; *A.d*=*Ankylostoma duodenale*; *E.v*=*Enterobius vermicularis*; *D.d*=*Dicrocoelium dentriticum*; *S.m*=*Shistosoma mansoni*; *T.t*=*Trichurus trichiura*; *T.sp*=*Taenia sp*; *S.s*=*Strongyloides stercoralis*.

Table 2

Frequencies of parasitic associations most experienced.

| Co-infection | Number | Percentage (%) |
|---|--------|----------------|
| <i>E. histolytica/E. dispar</i> – <i>G. intestinalis</i> | 384 | 27.93 |
| <i>E. /E. dispar</i> – <i>T. intestinalis</i> | 266 | 19.34 |
| <i>G. intestinalis</i> – <i>T. intestinalis</i> | 256 | 18.62 |
| <i>E. histolytica/E. dispar</i> – <i>H. nana</i> | 11 | 0.80 |
| <i>G. intestinalis</i> – <i>H. nana</i> | 37 | 2.69 |
| <i>H. nana</i> – <i>T. intestinalis</i> | 11 | 0.80 |
| <i>E.histolytica/E. dispar</i> – <i>G. intestinalis</i> – <i>T. intestinalis</i> | 275 | 20.00 |
| <i>E.histolytica/E. dispar</i> – <i>G. intestinalis</i> – <i>H. nana</i> – <i>T. intestinalis</i> | 135 | 9.82 |

4. Discussion

The present study aimed to estimate the incidence of enteric parasites in the Saint Camille Medical Centre. The results revealed a parasitic prevalence of 54.47% (6 154/11 728). These results indicated that many people are continuously suffering from GE due to enteric parasites, thus enteric parasites remain a major public health problem in Burkina

Faso. However, the recorded rate of parasitic infection is less than that found in Venezuela[7], and in Argentina[12], in 2007. In contrast this rate seemed to be very high according to the study of Okyay *et al*[13] and Ostan *et al*[6] in Turkey.

Parasites found in our study are mainly protozoan, mostly *G. intestinalis* which alone accounts for 43.47%. This high prevalence of *G. intestinalis* was previously reported by several authors who presented this protozoan as the leading

parasite implicated in intestinal infections both in young infants and in adults^[14–17]. It should be noted that human infections with the protozoan are more important than those due to helminths, because of their ability to change shape (form cystic) to survive the hard living conditions, their spread by water and the small size are a major factor in persistence in the environment^[18]. *G. intestinalis* is the most common pathogenic protozoan, because contaminated water is a major source of human infection by direct consumption or use in food processing. Among helminths *H. nana* was the most common. This was also noted by Quihui *et al*^[1] in Mexico and by Carvalho *et al*^[4] in Brazil. The prevalence of co-infections found in our study is lower than that found by Brito *et al*^[19] in Brazil and that of Quihui *et al*^[1] in Mexico. However, it is similar to that found by Miller *et al*^[20] in Venezuela. In these co infections biparasitism is the most encountered according to previous reports^[13,21]. It should be noted that the co infection is an aggravating factor of IGE. When two or more pathogens coexist the simultaneous action of these parasites has more severe effects in infants. A diagnosis and a description of these associations of parasites are important for the specific treatment of each parasite. The majority of the subjects in the presents study are of low educational level. This could explain the high rate of parasitic infections. In fact the educational level plays an important role in the behavior of populations towards food and/or body hygiene. Our results confirm the importance of education that allows people to understand the advantage of good hygiene and to be able to apply it well.

The results of this study revealed a high prevalence of protozoan especially *G. intestinalis*, while helminths were mainly represented by *H. nana*. Recorded prevalence showed that Burkina Faso is among the regions with high prevalence of intestinal parasites. The implementation of an appropriate strategy is therefore necessary for a more effective fight against these intestinal parasites.

Conflict of interest statement

We declare that we have no conflict of interest.

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