



Prevalence of Intestinal Parasitosis in the Pediatrics Department at the Hospital of Zone Saint Jean De Dieu De Tanguieta (Hz Sjdt) Atacora (Republic of Benin, West Africa)

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Authors' contributions

This work was carried out in collaboration among all authors. Author AN designed the study, performed the statistical analysis and wrote the manuscript. Authors OP, CD, AAT and OBG managed the analyses of the study. Authors LZ, GBR, LMAN and NEAAA managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Aims: The general objective of this study was to evaluate the prevalence of intestinal parasitosis in children consulting in pediatrics at the Saint Jean de Dieu Hospital in Tanguieta.

Patients and Methods: Parasitological examination of stool was performed in 121 children.

Results: Of the subjects examined, 92 were carriers of one or more parasites, for an overall infestation index of 76.03% (CI = 85.95%). Parasitism occurs from a young age (0 to 5 years) where it is 85.87% and then progressively decreases with age. The intestinal parasites encountered were in decreasing order of frequency: *Giardia lamblia* (39.42%), *Entamoeba histolytica* (25.96%), *Entamoeba coli* (11.54%), *Trichomonas intestinalis* (10.58%), *Hookworm* (4.81%), *Strongyloides stercoralis* and *Hymenolepis nana* (2.88%), *Schistosoma mansoni* (1.92%).

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Conclusion: In view of these results, it appears necessary to promote measures to reduce parasitism by intestinal protozoa and to prevent the spread of helminthiasis.

Keywords: Intestinal parasitosis; helminthiasis; protozoan; parasitism.

1. INTRODUCTION

Africa is entirely located in the intertropical belt, which is a prime breeding ground for parasitic diseases [1]. Among these diseases, intestinal parasitosis occupies a prominent place [2]. Although they are of little interest today alongside diseases such as malaria, AIDS, tuberculosis, and onchocerciasis, intestinal parasitosis is a public health problem in the tropics [3]. They spread rapidly in neighborhoods that are characterized by insufficient or no sanitary facilities and promiscuity. The corollary of all this is the aggravation of the faecal peril, perceived as a consequence of the lack of sanitary facilities for the elimination of faecal matter (often emitted from the ground), the lack of drinking water and the lack of individual and collective hygiene. According to WHO estimates for the year 2017, the number of people infested by intestinal parasites is around 3.5 billion, and the number of people suffering from parasitic diseases of the digestive tract is around 450 million [2]. In addition, intestinal *amoebiasis*, caused by the protozoan *Entamoeba histolytica*, is the third leading cause of death from parasitic diseases worldwide after malaria and bilharzia [4,5]. It affects approximately 180 million people, of whom 40,000 to 110,000 die each year [6]. Also, giardiasis, caused by *Giardia intestinalis*, is a common cause of diarrhea [7,8], and can have a negative impact on the growth and development of children [8]. It affects almost 200 million people worldwide [10]. Benin is no exception to this reality, as statistical reports from certain regions of the country [11] have shown the endemic nature of intestinal parasitosis, particularly among children who are a risk group, due to the difficulty of ensuring effective hygiene at this age.

In view of all this, we have carried out a prospective study of a transversal type among children consulting in pediatrics at the Hospital of Zone Saint Jean de Dieu de Tanguiéta (HZ SJDT) in the Republic of Benin. The overall focus was on the prevalence rate of intestinal parasitosis in children at the HZ SJDT. Specifically, the aim is to investigate the different

parasite species encountered in the study population and to determine the parasite carrying rate in the children included in this study.

2. PATIENTS AND METHODS

This study is carried out in one of the reference hospitals in the northern region of Benin, the Zone Saint Jean de Dieu Hospital of Tanguiéta, which covers 126 villages or city districts spread over fifteen districts. The study involved 121 fresh stool samples from patients hospitalized in the center's pediatrics department who were suspected of having intestinal parasitosis. This was a prospective, three-month cross-sectional study covering the period from March to May 2018, and included all children, of both sexes and ages between 0 and 15 years, received at the laboratory of Hôpital Saint Jean de Dieu in Tanguiéta for stool examinations. The prevalence of parasitic carriage in the children included, was studied according to sex, age, commune of residence, type of intestinal parasites encountered, profession of the parents and diagnosis. Macroscopic and microscopic examinations and both the Willis method and the formalin-ether method were used on each sample.

2.1 Statistical Analysis

The results obtained were processed using SPSS stat version 16.0, R software and the Excel 2010 spreadsheet program. The proportions were compared using the Pearson Chi2 test. The significance level was set at 5%.

3. RESULTS

- ✓ overall prevalence of single parasitic carriage (SPC)
- ✓ Study of the Corrected Para Situational Index (C.P.I.)

In our study, we encountered 104 parasites with a CPI of 85.95%.

- ✓ Groups of parasites encountered

Table 1. Prevalence of intestinal parasitism in the study population

	Parasitized cases (positive)	Non-parasitized cases (negative)	Total
Number of cases	92	29	121
IPS (%)	76,03	23,97	100

Table 2. Prevalence of protozoa in children

Pest Groups	Species	Number of cases	I.P.Sp/examinations performed (%)	Total
Amoebae	<i>Entamoebahistolytica</i>	27	22,31	32,23%
	<i>Entamoeba coli</i>	12	9,92	
Flagellés	<i>Giardia lamblia</i>	41	33,88	42,97%
	<i>Trichomonas intestinalis</i>	11	9,09	

Table 3. Respective prevalences of the flagellates encountered

	Species	Number of cases	I.P.Sp/ flagellates (%)	I.P.Sp/ parasites encountered (%)
Flagellés	<i>Giardia lamblia</i>	41	78,85	39,42
	<i>Trichomonas intestinalis</i>	11	21,15	10,58
	Total	52	100	50

Table 4. Respective prevalences of amoebae encountered

	Species	Number of cases	I.P.Sp/ amoebae (%)	I.P.Sp/ parasites encountered (%)
Amoebae	<i>Entamoeba histolytica</i>	27	69,23	25,96
	<i>Entamoeba coli</i>	12	30,77	11,54
	total	39	100	37,50

Table 5. Prevalence of helminths in Children

Pest Groups	Species	Number of cases	I.P.Sp / examinations performed (%)	Total
Nemathelminths	Anguillule	3	2,48	6,61%
	Hookworm	5	4,13	
Plathelminthes	<i>Schistosoma mansoni</i>	2	1,65	4,13%
	<i>Hymenolepis nana</i>	3	2,48	

Table 6. Respective prevalence of nemathelminths encountered

	Species	Number of cases	I.P.Sp/ Nemathelminths (%)	I.P.Sp/ parasites encountered (%)
Nemathelminths	Anguillule	3	37,50	2,88
	Hookworm	5	62,50	4,81
	Total	8	100	7,69

Table 7 Respective prevalence of plathelminths encountered

	Cash	Number of cases	I.P.Sp/ plathelminths (%)	I.P.Sp/ parasites encountered (%)
Plathelminthes	<i>Schistosoma mansoni</i>	2	40	1,92
	<i>Hymenolepis nana</i>	3	60	2,88
	total	5	100	4,81

Table 8. Polyparasitism index

I.P.C	I.P.S	I.P.P
85,95	76,03	9,92%

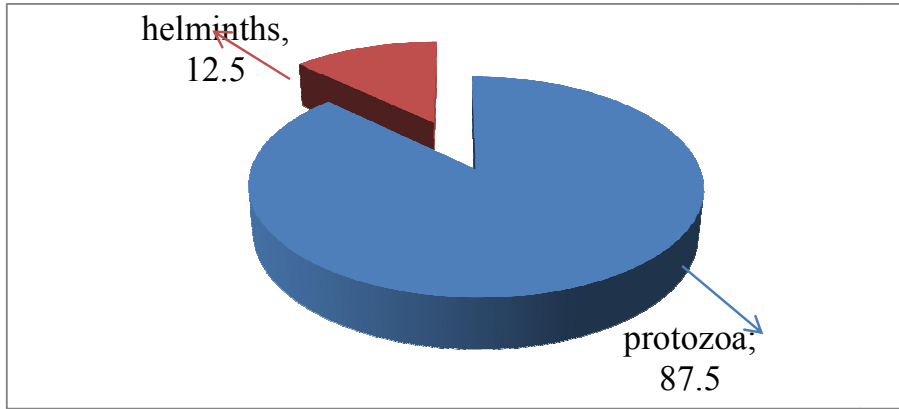


Fig. 1. Distribution of different pest groups

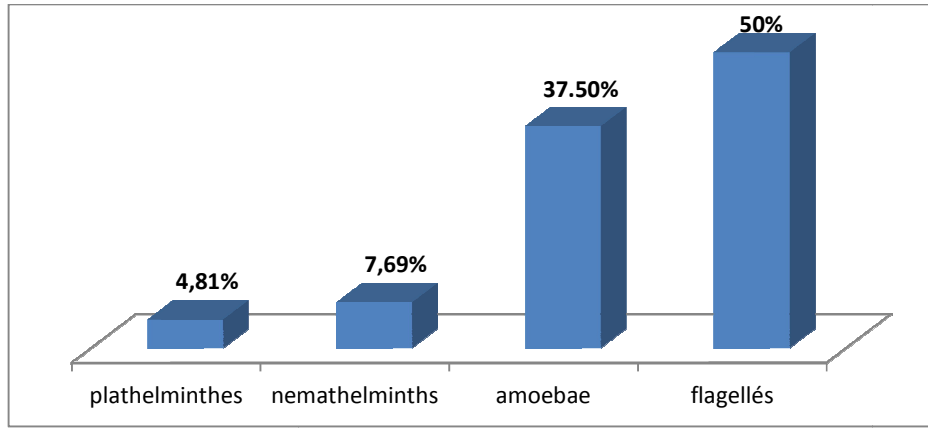


Fig. 2. Distribution of parasites encountered

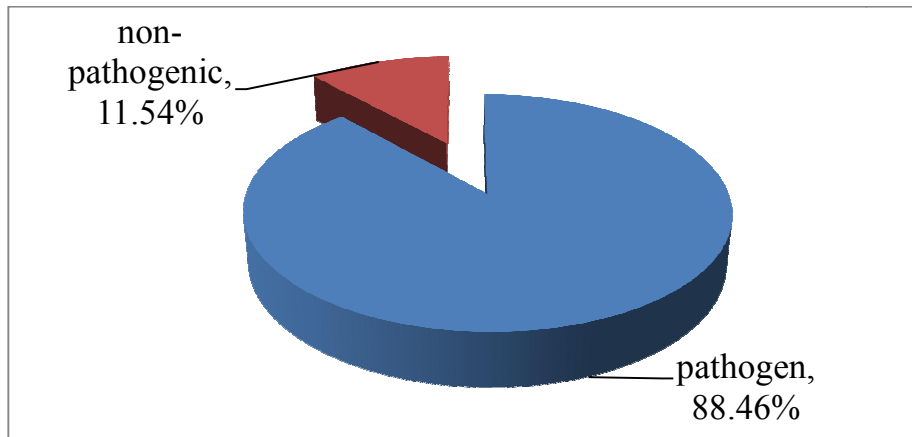


Fig. 3. Distribution of parasites by pathogenicity

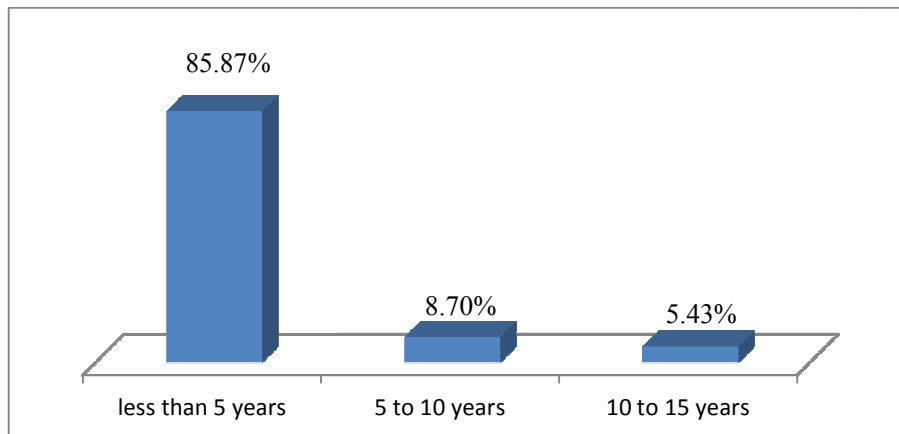


Fig. 4. Distribution of parasitic carriage as a function of age

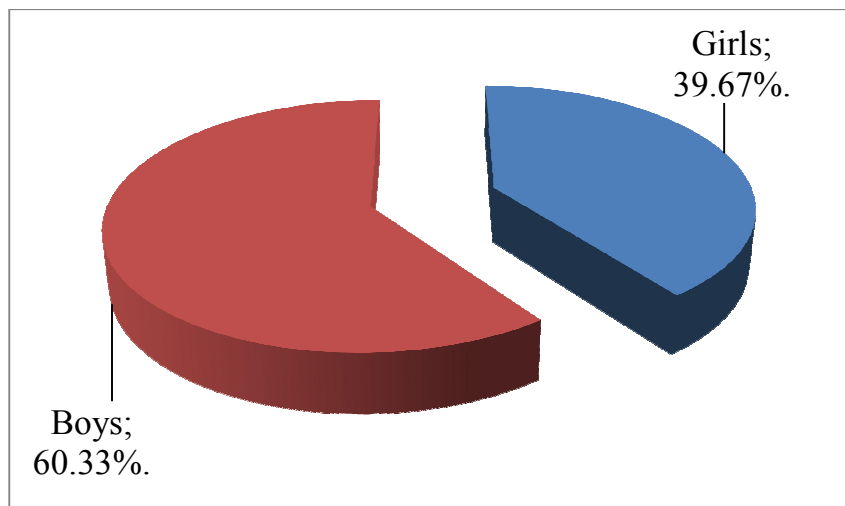


Fig. 5. Number of Children in the Study by Gender

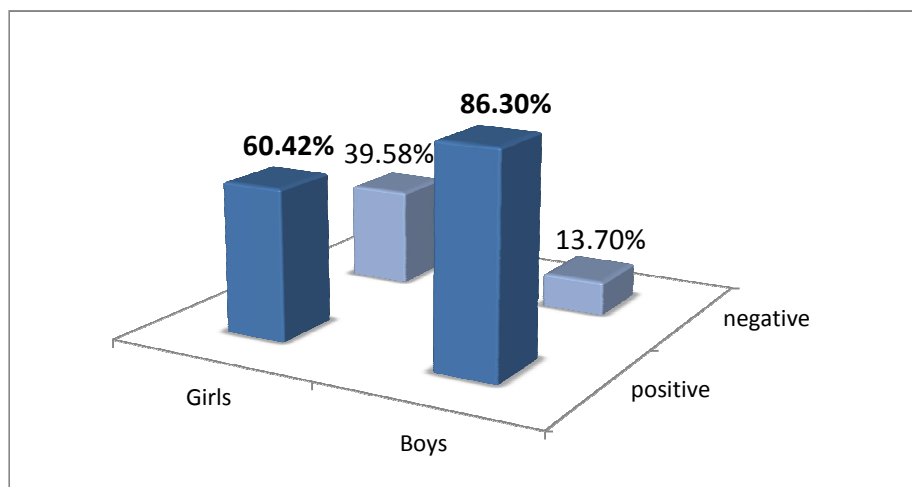


Fig. 6. Distribution of parasitic carriage by gender

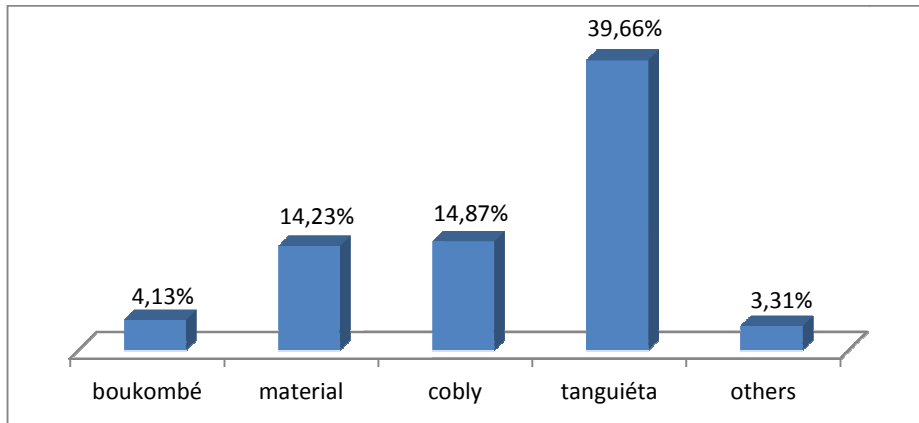


Fig. 7. Distribution of parasitic carriage by municipality of residence
Other = municipality not belonging to the department of Atacora

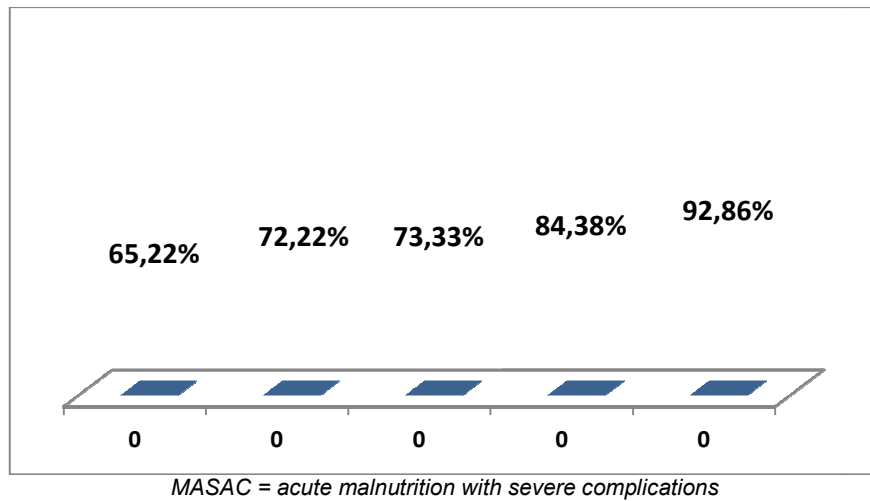


Fig. 8. Prevalence of parasitic carriage as a function of diagnosis

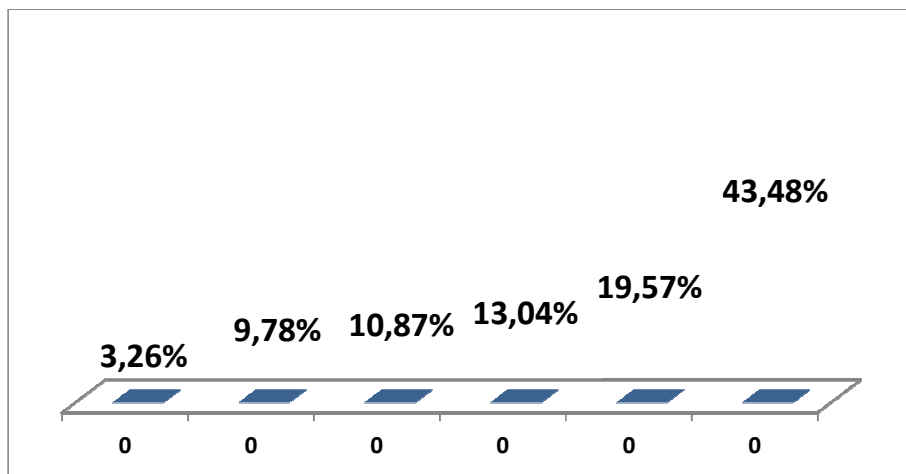


Fig. 9. Distribution of parasitized children according to the occupation of the household head

4. DISCUSSION

The main objective of this study conducted at the Saint Jean de Dieu Hospital in Tanguiéta was to determine the prevalence rate of intestinal parasitosis among children in this locality. It is based on cases diagnosed in the laboratory and not on active screening of the population. At the end of our study, it was found that of the 121 stool examinations performed, 92 children had one or more parasites, for an overall prevalence rate of 76.03%. The high frequency of positive cases is comparable to other similar studies conducted prior to this one. For example, in Morocco, Elqajet et al. [12] in 2009 found a prevalence rate of 68.1% among rural school children in kintira; Salem et al [13] in 2001 found an infestation rate of 74% after analyzing the stool of 570 children aged 0-4 years in Pikine, Senegal. The frequency of positive cases appears to be significantly higher than that reported by Bouskraoui [14] in 2010 in Morocco and by Ozgumuset al. [15] 2007 in Turkey, who found a frequency of positive cases of 23.78% and 15% respectively.

Moreover, environmental conditions such as the ever-increasing anarchic urbanization, the increased promiscuity, the lack of collective and individual hygiene, the almost non-existent sanitation system, the anarchic deposit of household waste in this locality could explain this high frequency of intestinal parasitosis.

Intestinal parasitism in our study was dominated by protozoa, parasites strongly linked to hand and fecal peril, which represent 87.5% of all isolated parasites.

This observation is similar to those made in Morocco by Khaled [26] and Jemaoui [17], who obtained 76.91% and 97.05% respectively.

Statistically, parasitic carriage as a function of age, sex, municipality of residence and occupation of the parents was statistically demonstrated, but not as a function of diagnosis ($p=0.25$).

As far as age is concerned, intestinal parasitosis affects more children under five years old and decreases with age, this could be explained by the fact that at this age the child is in almost permanent contact with the ground due to his or her recreational activities.

As for gender, boys are more affected than girls, with respective proportions of 86.30% and

60.42%. This could be explained by the fact that boys are more exposed to fecal peril and especially to contact with the ground, due to their behavior (games between boys).

The distribution according to the commune of residence presents Tanguiéta as the commune with the highest prevalence of parasitosis. This could be explained by the fact that the study took place in the commune and that the majority of the children included came from that commune.

The distribution of parasitized children according to the occupation of the parents shows that the children of farmers and herdsmen are the most affected by intestinal parasitosis. Indeed, the occupations of farmer and herdsman limited to frequent exposure to soil and animals respectively may explain this state of affairs.

Although not statistically significant, the difference in the distribution of parasitized children corroborates the results of the Diouf et al. study [18] which noted an association between parasitosis and poor nutritional status. They also stated that intestinal parasitosis is a public health problem because of its nutritional impact as a partial or complete inducer of malnutrition.

The analysis of the samples classified *Giardia lamblia* as first line (39.42%) followed by *Entamoebahistolytica* (25.96%), *Entamoeba coli* (11.54%) then *Trichomonas intestinalis* (10.58%). *Giardia lamblia* seems to predominate in children, mainly those living in communities, which is explained by a high exposure to fecal peril at a young age, and probably also by a greater sensitivity to the parasite at this age [19].

Apart from the fresh examination and the different methods of concentration in parasitic coprology such as the KATO, WILLIS, FORMOL-ETHER method. We can also do PCR, RT-PCR and ELISA method. All these methods are more expensive and take more time, but they are more specific because each reagent is specific to each parasite.

5. CONCLUSION

This study on the epidemiological profile of intestinal parasites in children attending the HZ SJDJ pediatrics during the period from March to May 2018 showed an overall prevalence of 76.03% of intestinal parasitic carriage, coinciding with data from the international literature; a predominance of protozoa which represent

87.5% of all parasites found; a decrease in the prevalence of intestinal parasitism with age. The peak being reached at preschool and school age (5 years) and a significant association between parasitic carriage and the age, sex, commune of residence and occupation of the parents. The frequency of parasitized children in Tanguiéta is therefore not negligible. It is a protozoan parasitism essentially dominated by Giardiasis. The child is parasitized at an early age and especially at school age. The fight against intestinal parasites is essential; therefore we recommend screening and treatment of asymptomatic carriers, especially in schools and communities. These prophylactic measures require multidisciplinary intervention to combine healthy living conditions with the active and serious responsibility and participation of the community. This requires promotion and awareness of general and individual hygiene.

CONSENT

As per international standard or university standard written patient consent has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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