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Research Article

Prevalence, Intensity of Infection and Co-infections of Soil-Transmitted Helminths among Students of the University Félix Houphouët-Boigny in the south of Ivory Coast

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Abstracts: Soil-Transmitted Helminths (STH) are public health problem in the world and particularly in developing countries. This study initiated at the University Félix Houphouët-Boigny of Cocody (Abidjan - Ivory Coast) aims to determine the level of prevalence, the intensity of infestation and co-infections due to Soil-Transmitted Helminths and the various associated factors. The Mini Flotac technique combined with a questionnaire was the method used to achieve the set objective. The study resulted in prevalence rates of 23.45% for *Ascaris lumbricoides*, 16.81% for *Trichuris trichura* and 0.88% for *Ankylostoma* spp. Co-infection of *Ascaris lumbricoides* and *Trichuris trichiura* was identified, i.e. a prevalence of 7.96%. The logistic regression model showed that *Ascaris lumbricoides* infection is associated with property in university toilets (OR=2.53, $p \leq 0.05$). This study made it possible to initiate an integrated control programme against Soil-Transmitted Helminths in general and *Ascaris lumbricoides* and *Trichuris trichura* infection in particular at Félix Houphouët-Boigny University.

Keywords: Soil-Transmitted Helminths, infection, Students, University.

INTRODUCTION

Soil-Transmitted Helminths are parasitic diseases that are widespread throughout the world, especially in sub-Saharan Africa. They represent a major public health problem, particularly in areas with poor hygiene and sanitation conditions (Rindra, R. 2012). According to the World Health Organization (WHO), Soil-Transmitted Helminths are caused by different species of parasitic worms. They are transmitted through eggs in human excreta that contaminate soils where sanitation facilities are poor (SWA. 2020). It is estimated that about 1.5 billion people worldwide are affected by Soil-Transmitted Helminths.

Soil-Transmitted Helminths infection control strategy is based on periodic deworming to eliminate the worms; health education to prevent re-infection; and improved hygiene and sanitation to reduce egg contamination (SWA. 2020).

Every year, about 3.5 million people die from gastrointestinal diseases, particularly Soil-Transmitted Helminths infection, especially in developing countries (SWA. 2020 ; & OMS. 2015). The health of a population is therefore closely linked to the quality of sanitation and hygiene services (WHO-UN-Habitat 2010). In developing countries, poor hygiene and lack of basic sanitation are the basis for many diseases, especially geohelminthiasis (IFRCS. 2007; OMS. 2017; Briscoe, J. *et al* ., 1987 ; The PLoS Medicine Editors. 2009; Living water. 2010 & OMS. 2014). They are also the cause of absenteeism in learning institutions and significant economic and income losses in developing countries (Living water. 2010 ; & Diallo A. C. 2015). The physical environment and the degree of cleanliness of training facilities affect the health and well-being of learners. Where this environment lacks acceptable sanitation and hygiene conditions such as good hand-washing and toilet facilities, diseases develop and spread rapidly. It becomes a high-risk space for its learners, increasing their vulnerability to helminths infection (Anonymous. 2013; & SuSan, A. 2019).

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However, the provision of hygiene and sanitation facilities and good hygiene practice could reduce these gastrointestinal diseases by up to 90% (Strunz, E. C. *et al* ., 2014 ; Gruber, J. S. *et al* ., 2013 ; Fewtrell, L. *et al* ., 2005 ; & Eisenberg, J. N. *et al* ., 2012).

Some recent studies conducted at Félix HOUPHOUËT-BOIGNY University have shown a low level of hygiene among students (Romaric, A. 2016 ; N'Gbesso, N. J. P. *et al* ., 2017 ; & Demedeiros, K. *et al* ., 2019). On this basis, it seemed appropriate to assess the prevalence, intensity and epidemiological profile of Soil-Transmitted Helminths infection at the University Félix Houphouët-Boigny.

MATERIALS AND METHOD

Presentation of the Study Area

The study was conducted (Figure 1) at the University Félix Houphouët-Boigny of Cocody in the district of Abidjan (Ivory Coast) from February to March 2020. This is the main University of Côte d'Ivoire. It is located between 5° 20 and 5° 38 north latitude and 3° 48 and 3° 49 west longitude. The university population is estimated at over 60,000 (UFHB. 2016). The climate is equatorial (UFHB. 2016), characterized by two rainy seasons (A small one from September to October, a large one from April to July) interspersed by two dry seasons (A small one from July to August, a large one from November to March). The temperature varies between 25 and 33°C, with a high rainfall of more than 1500 mm of rain per year (UFHB. 2016).

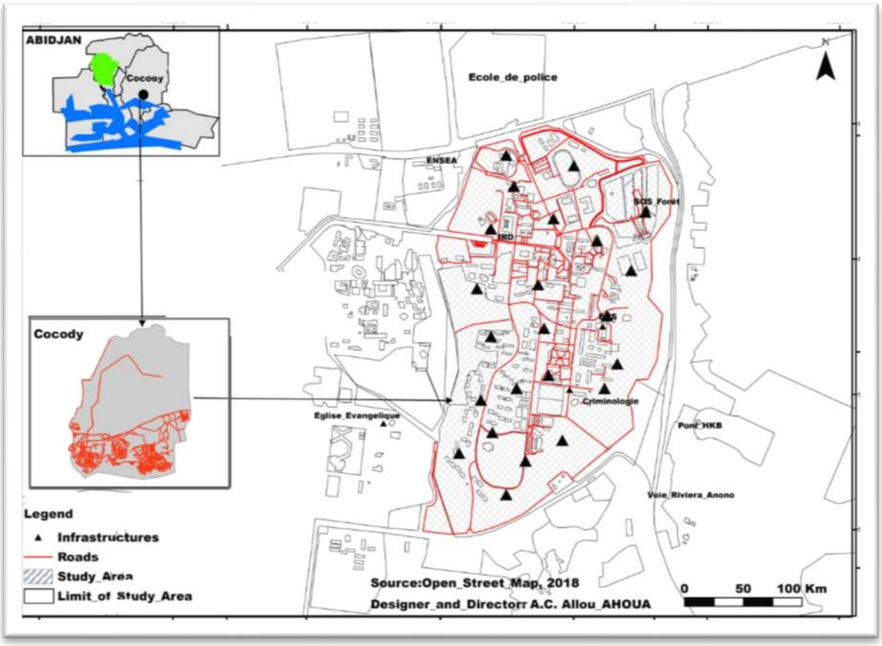


Figure 1 : Study Area

METHODOLOGY

Collection of stool samples

The investigation began with a presentation of the study on the WhatsApp, Facebook and Messenger groups by students from Biosciences, ESMR (Earth Sciences and Mining Resources) and Modern Letters, and then in amphitheater. These groups were targeted because they had been included in a study on the evaluation of hand hygiene practices. Participants were registered by taking down their names and telephone numbers via WhatsApp and Messenger. Stool samples were collected from February 13-29, 2020 depending on student availability. After labeling each individual's stool jar, they were asked to make the stool and transfer a portion to the jar. Early the next morning, the stool samples were collected at the study site and placed in a appropriate place. The stool samples were transported under room temperature conditions to the laboratory and stored at 37°C. For a given sample, 2 g of stool was stored in 02 tubes containing 2 ml of 5% formalin for further analysis 7-14 days later. Each participant was given a barcode number to identify his biological sample.

Methodology in the laboratory

To prepare the Mini-Flotac solutions, the contents of each stool tube were transferred to the conical Flotac collector. The 40 ml volume of the flotation solution (SF1 : Sodium Chloride : NaCl or SF2 : Zinc Sulfate : Zn SO4) was added to the stool (Cringoli, G. 2004 ; & Barda, B. *et al* ., 2014). The conical Flotac collector was tightly closed and lightly shaken for 1 min to facilitate dissolution and homogenisation of the stool suspension in the flotation solution. A precision tip grafted onto the side trunk of the conical collector allowed the transfer of the stool solution into each chamber of the Mini-Flotac apparatus. The prepared Mini-Flotac solutions were left to stand for 10 minutes to allow the eggs of the parasites to rise to the surface of the solution by the principle of flotation of eggs with a density lower than that of the flotation liquid (Cringoli, G. *et al* ., 2013). The preparation time before microscopic analysis is estimated at 12 minutes. Two minutes to prepare the sample, then 10 minutes to wait for the eggs or oocysts to rise to the surface. Then 5-7 minutes are required for microscopic reading. The search for and count of parasite eggs in stool solutions was carried out under an optical microscope by an experienced biologist. The results of the Mini-Flotac reading are recorded on a sheet.

Data processing and analysis

EXCEL software was used to enter the data collected and to produce the figures and tables. The Chi-square test was used to compare the observed differences to measure the degree of significance of the frequency differences. The kruskal wallis test was used to compare the averages obtained between the different values. This type of analysis was performed with R software version 3.3.3. The prevalence of infection is the proportion of positive samples out of all samples tested. It was determined for the parasite species *Ancylostoma* spp, *A. lumbricoides* and *T. trichura*. Infection intensity is the number of eggs per gram of stool (epg). The average egg intensity of the parasite species was calculated using the geometric mean. The parasite load (epg) was stratified according to WHO recommendations (WHO. 1987) into mild, moderate and heavy infection. The ranges of these infection classes vary considerably from species to species:

- For *A. lumbricoides* the ranges [1-4999], [5000-49999], and ≥50000 epg, defeat mild, moderate, and severe infections, respectively;
- for *T. trichura*, the intervals [1-999], [1000-9999], and ≥ 10000 epg define them;
- for *Ancylostoma* spp. the ranges [1-1999], [2000-3999], and ≥4000 epg;
- Feces have been treated as follows for the basic mini-FLOTAC technique (WHO. 1987). The number of epg in the sample was obtained by multiplying the number of eggs counted by the multiplication factor.

Ethical considerations

In order to carry out this initiated study, the scientific agreement of the university authorities was obtained through the Vice-President in charge of scientific research. In addition, during the survey, the subjects were reassured about the anonymity of the answers, the benefits of the study, and the confidentiality of the information collected. The informed consent of the respondents had been obtained before the survey was conducted. They were also reassured that there were no sanctions for refusing to participate in the study at any time. Individuals who tested positive were treated.

RESULTS

Epidemiological profile of Soil-Transmitted Helminths

Characteristics of the study population

The study concerned 03 groups of students belonging to 03 different fields of study, namely : Life and earth sciences, earth sciences and mining resources and Modern Letters. It involved 226 students distributed as follows: 57 (25.22%) of the students in Biosciences, 76 (33.62%) of the students in ESMR and 93 (41.15%) in Modern Letters. It was obtained by gender, 157 (69.46%) male and 69 (30.54%) female. The minimum age was 18 with a maximum of 26 and the average age was 22.96. The age range from 21 to 23 was the majority proportion with 47.34% of the study population respectively. The participation rate was 75.33% (out of a sample of 300 individuals considered).

Prevalences of Soil-Transmitted Helminths

The helminths obtained by the mini-flotac technique required the use of 02 flotation solutions, namely SF1 (Sodium Chloride : NaCl) and SF2 (Zinc Sulphate: Zn SO4). The results obtained in terms of the number of positive cases as a function of the flotation solution showed no statistically significant difference for *Ascaris lumbricoides* (23.45 [18.08 29.52], *p-value* = 0.9106), *Trichuris trichura* (16.81 [12.18 22.34] ; *p-value* = 0.9686) and *Ancylostoma* spp (0.88 [00.10 03.16], *p-value* = 0.9141). With regard to the arithmetic number of eggs obtained, it should be noted that a non-significant difference was obtained for *A. lumbricoides* (W = 24415, *p-value* = 0.9050), *Trichirus trichiura* (W=25537, *p-value* = 0.9996) and *Ancylostoma* spp (W = 25540, *p-value* = 0.99960) (Table 1).

Table 1: Comparative study between the 02 flotation solutions according to sex

	SF1 : Flotation solution			SF2 : Flotation solution			
Helminths	**N**	**n**	**% [95% IC]**	**N**	**N**	**% [95% IC]**	***P_value***
Ascaris lombricoïdes	226	53	23.45 [18.08 – 29.52]	226	53	23,45 [18.08 29.52]	**0.9106**
Trichuris trichura	226	38	16.81 [12.18 – 22.34]	226	38	16,81 [12.18 22.34]	**0.9686**
Ancylostoma spp	226	2	00.88 [00.10 – 03.16]	226	2	0,88 [00.10 03.16]	**0.9141**
	SF1 flotation solution			**SF2 flotation solution**			
Helminths	**N**	**n**	**Mn_EPG**			**Mn_EPG**	***P_value***
Ascaris lombricoïdes	226	53	131.32	226	53	119.81	**0.905**
Trichuris trichura	226	38	37.89	226	38	35.78	**0.9996**
Ancylostoma spp	226	2	15	226	2	25	**0.9965**

N: Number of participants, **n :** Number of infected participants **Mn_EPG:** Arithmetic mean of eggs per gram of stool

Prevalence and Intensity of *Ascaris lumbricoides* infection

The overall prevalence of *Ascaris lumbricoides* infection is 23.45%. By sex, a prevalence of 18.14% among male students and 5.30% among female students was recorded. However, no statistically significant difference was observed ($\chi 2$ = 1.575; df = 1 ; *p-value* = 0.2095). Concerning the age group, the age group between 21 and 23 was the one where more infection was noted (11.94%). Also at this level no statistically significant difference was observed ($\chi 2$ = 0.6829; df = 2 ; *p-value* = 0.7107). The Lettre Modernes channel was the population group where a high prevalence was observed (10.61%). It should be noted that at this level no statistically significant difference was also observed ($\chi 2$ = 5.6134; df = 2 ; *p-value* = 0.064). Concerning the intensity of infection, no strong and moderate intensity of infection was observed (Table 2).

Prevalence and Intensity of *Trichuris trichiura* infection

The overall prevalence of *Trichuris trichura* infection was 16.81%. Prevalence by sex was 11.94% among male students and 4.86% among female students. No statistically significant difference was observed ($\chi 2$= 0.0015; df = 1 ; *p-value* = 0.9686). The age group from 21 to 23 was the age group where more infection was noted (9.29%). Also at this level no statistically significant difference was observed ($\chi 2$ = 1.1558; df = 2 ; *p-value* = 0.5611). Students in the CLL stream were the population group where a high prevalence was observed (06.63%). It should be noted that at this level no statistically significant difference was also observed ($\chi 2$ = 0.7129; df = 2 ; *p-value* = 0.7001). Only mild intestinal helminth infections were observed (Table 3).

Prevalence and Intensity of *Ancylostoma* spp infection

The overall prevalence of infection with *Ankylostoma* spp was 16.81%. A prevalence of 0.44% for each sex. No statistically significant difference was observed at the sex level ($\chi 2$= 2.53e-31 ; df = 1 ; *p-value* = 1), at the age group level ($\chi 2$= 0.7081; df = 2 ; *p-value* = 0.718). Only two cases were obtained among ESMR students (0.44%) and Modern Letters students (0.44%). It should be noted that at this level no statistically significant difference was also observed ($\chi 2$ = 0.28687; df = 2 ; *p-value* = 0.8664). Only mild intestinal helminth infections were observed (Table 4).

Prevalence of co-infections with *Ascaris lumbricoides*, *Trichirus trichiura* and *Ancylostoma* spp.

Of the 226 individuals who provided stool samples, 151 were not infested with any helminth species. A total of 75 (33.18%) individuals were infested with at least one species of the parasites sought. Two (02) species of parasites were identified in 18 individuals, i.e. *Ascaris lumbricoides* and *Trichuris trichura*. In terms of helminth parasites present per individual, mono-infestation is the most frequent with a rate of 25.22% infestation at 3 species were not identified. Figure 3 shows the distribution of co-infections. The distribution of polyparasitism by age showed a statistically significant difference by sex ($\chi 2$ = 4.75; df = 1 ; *p-value* = 0.0299).

This distribution also showed no significant difference between the 18-20 and 21-23 age categories ($\chi 2$ = 0.01; df = 1 ; *p-value* = 0.936). This was also reported according to individual categories ($\chi 2$ = 1.23; df = 1 ; *p-value* = 0.268).

Table 2 : Prevalences of Helminthes infestations as a function of demographic parameters

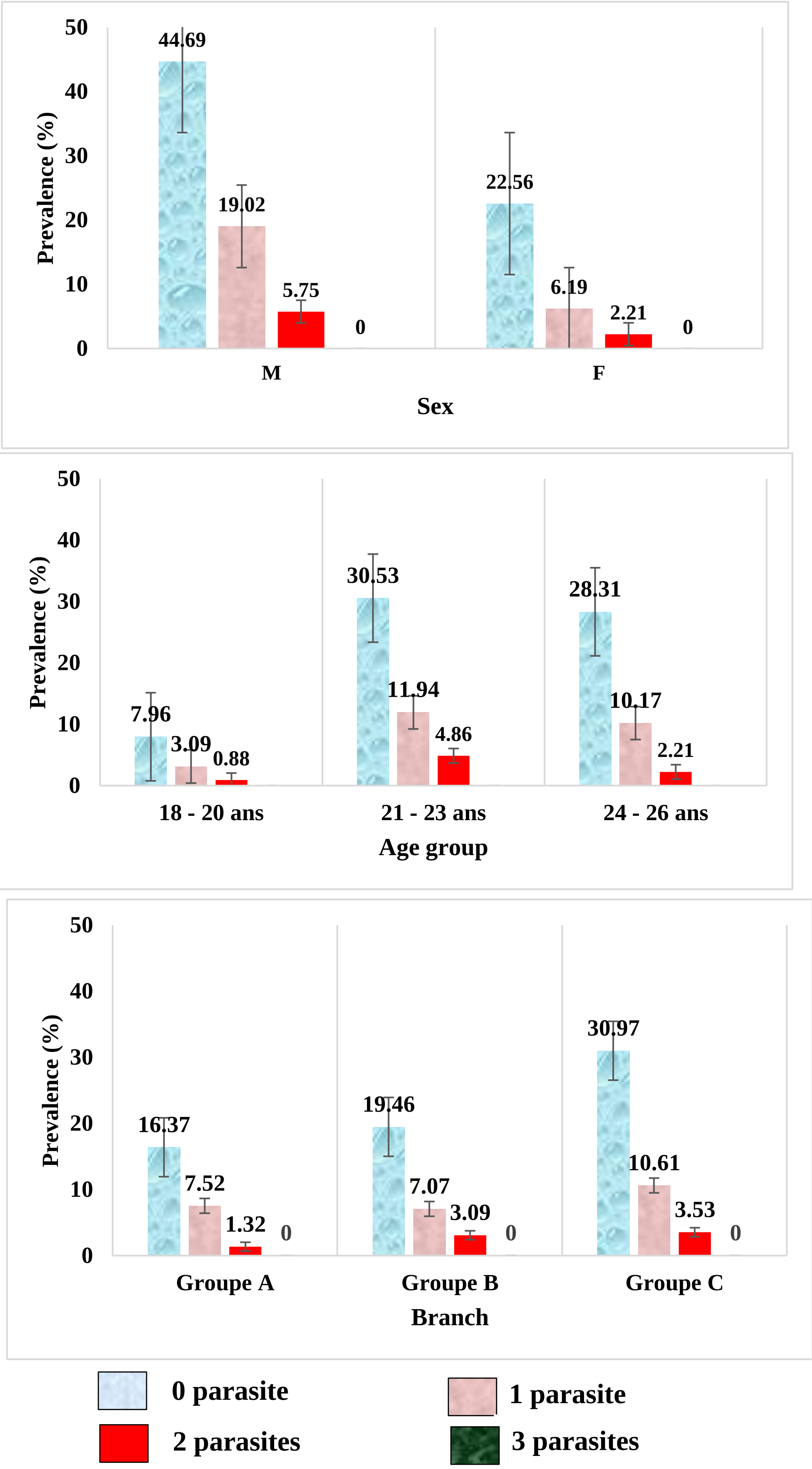
Helminthes	*Ascaris lombricoïdes*			*Trichirus trichura*			*Ancylostoma* spp		
Sexe	**N**	**n (%)**	***p-value***	**N**	**n (%)**	***p-value***	**N**	**n (%)**	***p-value***
Female	69	12 (5.30)	**0.2095**	69	11(4.86)	**0.9686**	69	01 (0.44)	**1.000**
Male	157	41 (18.14)		157	27 (11.94)		157	01 (0.44	
Total	**226**	**53 (23.45)**		**226**	**38 (16.81)**		**226**	**2 (0.88)**	
Age range (year)									
18-20	27	7 (3.09)		27	04 (01.76)		27	0 (0)	
21-23	107	27 (11.94)	**0.7107**	107	21 (09.29)	**0.5611**	107	01 (0.44)	**0.7018**
24-26	92	19 (8.40)		92	13 (05.75)		92	01 (0.44	
Total	**226**	**53 (23.45)**		**226**	**38 (16.81)**		**226**	**2 (0.88)**	
Branch									
ESMR	78	15 (06.63)		78	14 (06.19)		78	01 (0.44)	
Biosciences	57	14 (06.19)	**0.0640**	57	09 (03.98)	**0.7001**	57	**0 (0)**	
Modern Letters	93	24 (10.61)		93	15 (06.63)		93	01 (0.44)	**0.8664**
Total	**226**	**53 (23.45)**		**226**	**38 (16.81)**		**226**	**2 (0.88)**	

N: Number of participants, n : Number of infected participants

Table 3 : Intensity of infestation according to groups of individuals

Helminthes	**Group A : (N=57)**			**Group B : (N=76)**			**Group C : (N=93)**			**Total**
	n (%)	**Zn_EPG**	**Na_EPG**	**n (%)**	**Zn_EPG**	**Na_EPG**	**n (%)**	**Zn_EPG**	**Na_EPG**	**n (%)**
Ascaris lombricoïdes										
Low intensity	14 (24.56)	75.71	101.42	15 (19.73)	176	178	24 (25.80)	110.41	119.16	**53 (23.45)**
Moderate intensity	0 (0)	NA	NA	0 (0)	NA	0 (0)	0 (0)	NA	NA	**0 (0)**
High intensity	0 (0)	NA	NA	0(0)	NA	0 (0)	0 (0)	NA	NA	**0 (0)**
Trichuris trichura										
Low intensity	9 (15.78)	28.88	32.22	14 (18.42)	41.42	46.42	15 (16.12)	34.66	33.33	**38 (16.81)**
Moderate intensity	0 (0)	NA	NA	0 (0)	NA	0 (0)	0 (0)	NA	NA	**0 (0)**
High intensity	0 (0)	NA	NA	0 (0)	NA	0 (0)	0 (0)	NA	NA	**0 (0)**
***Ancylostoma* spp.**										
Low intensity	0 (0)	NA	NA	01 (01.31)	10	20	01 (01.07)	30	20	**2 (0.88)**
Moderate intensity	0 (0)	NA	NA	0 (0)	NA	0 (0)	0 (0)	NA	NA	**0 (0)**
High intensity	0 (0)	NA	NA	0 (0)	NA	0 (0)	0 (0)	NA	NA	**0 (0)**

Group A: Biosciences**; Group B:** ESMR **; Group C:** Modern Letters
Zn_EPG : Eggs per gram of stool with ZnSO4 solution **; Na_EPG :** Eggs per gram of stool with NaCl solution
NA : Not Applicable



Group A : Biosciences ; Group B : ESMR ; Group C : Modern Letter

Figure 2 : Prevalence of infection by age and sex and by sector according to the number of species of intestinal parasites per individual at Felix HOUPHOUËT-BOIGNY University

Hygiene practices of the study population

The survey conducted among individuals who participated in the parasitological surveys provided an understanding of the distribution of socio-sanitary factors. A proportion of 93.80% of the individuals surveyed stated that they regularly use university toilets. A lack of WASH (Water, Sanitation and Hygiene) sanitary infrastructures with a proportion of 98.67% (223 participants). In addition to this, it was noted the inexistence of hygienic material. The logistic regression model showed that *Ascaris lumbricoides* infection is associated with property in university toilets (OR=2.53, p≤0,05). It should be noted that the presence of excitatory posters was also reported. However, it should be noted that 143 participants (67.27%) reported using the bush for their needs. 51 (22.56%) reported that the bush is an open defecation area for them (Table 4).

Table 4: Transmission factors of *Ascaris lumbricoides* at the population level

Variable	Sample Size							
	n (%)	**OR**	**IC 95%**		**RR**	**IC 95%**		***p-value***
Regular use of toilets								
Yes	212 (93.80)	0.7515	0.2257	2.5019	0.8090	0.3410	1.9191	0.7445
No	14 (6.19)							
Toilet Adequacy								
Yes	3 (1.32)	1.6442	0.73		1.6321	0.1510	17.6459	0.5533
No	223 (98.67)							
Existence of hygienic equipment								
Yes	2 (0.88)	0.0000	NA		0.0000	NA		1.0000
No	224 (99.11)							
Separation of toilets								
Yes	45 (47)	1.0707	0.4995	2.2951	1.0560	0.5760	1.9363	0.8461
No	181 (24)							
Regular cleaning								
Yes	84(37.16)	2.2300	1.0228	3.5643	1.4632	1.0359	2.0669	0.0500
No	142 (62.83)							
Presence of a poster on hand hygiene								
Yes	184 (81.41)	1.1148	0.3931	3.1616	1.0108	0.9141	1.1179	1.0000
No	42 (18.59							
Toilet qualification								
Acceptable	24 (40)	0.9757	0.5139	1.8526	0.9844	0.6530	1.4840	1.0000
No	03 (25)							
Place to urinate								
Toilets	83 (36.73))	1.1749	0.6244	2.2106*	1.1056	0.7504	1.6290	0.6283
In the open air	143 (67.27)							
Place of defecation								
Toilets	175 (77.43)	1.3356	0.6170	2.8909	1.0633	0.9114	1.2405	0.5740
In the open air	51 (2256)							

NA : Not Applicable

DISCUSSION

The global goal is the elimination of morbidity and mortality due to Soil-Transmitted Helminths (WHO. 2018). This is to be achieved through regular treatment of individuals in endemic areas. The drugs recommended by the WHO (World Health Organization) are albendazole (400 mg) and mebendazole (500 mg). They are effective and inexpensive and can be easily administered by non-medical staff. Recent studies by Mathew and colleagues (Freeman, M. C. *et al* ., 2014) have demonstrated that improvements in water, sanitation and hygiene (WASH) infrastructure and appropriate health-seeking behaviour are necessary to achieve sustainable control, elimination or eradication of many neglected tropical diseases (NTDs), particularly Soil-Transmitted Helminths.

This study revealed the following prevalence rates at Félix HOUPHOUET-BOIGNY University: 23.45%, 16.81% and 0.88% respectively for *Ascaris lumbricoides* infection, *Trichuris trichura* infection and *Ancylostoma* spp. infection. Results showed that *Ascaris lumbricoides*, *Trichuris trichura* and *Ancylostoma* spp. infections are of low endemicity (WHO. 1987). This observation is mainly due to the mass treatment campaign with praziquantel carried out by the National Program for the Control of Schistosomiasis, Geohelminthiasis and Lymphatic Filariasis (NPCSGLF) in the Abidjan health district, particularly at the Félix HOUPHOUËT-BOIGNY University of Cocody. The intensity of the infestation corresponds to the number of eggs excreted in the faeces of infected persons has been determined (WHO.

1987). Thus, the intensity of infection is mostly mild for infestation with *Ascaris lumbricoides, Trichuris trichura* and *Ancylostoma* spp. The mild infection is explained by a low parasitaemia (WHO. 1987).

The almost non-existent (0.88%) *Ancylostoma* spp infection could be explained by the fact that this pathology is mainly transmitted by transcended voice, but our population does not walk barefoot, which does not expose them to this pathology.

According to our results, the prevalences of *Ascaris lumbricoides* and S *Trichuris trichura* infestation are higher in the 21-24 year age group than in the 18-20 year age group. This finding could be explained by the fact that these students constitute the majority of the individuals questioned and have risky behaviours that expose them to the infestation. Among these behaviours, the use of toilets where the presence of enterobacteria was reported and the lack of hand washing were noted. Hence the possibility of infection and reinfection.

There is also the possibility of contaminating the environment by urinating or defecating without washing their hands normally.

The study showed a higher prevalence of *Ascaris lumbricoides* and *Trichuris trichura* infection in boys than in girls. However, when we cross sex and helminthiasis, the observed difference is not significant for both forms of infection. The results are in contradiction with those obtained in Agboville and Adzopé which found a significant difference between parasitized boys and girls (p<0.01) (Utzinger, J. *et al* ., 2009).

Our results have an association between *Ascaris lumbricoides* infection and property in university toilets. Lack of hygiene, limited access to sanitation could also be factors associated with the transmission of this disease in this locality. It should be noted that the answers to the questionnaires administered to the participating students helped to identify a crucial sanitation problem. It should be noted that *Ascaris* spp parasites live in the intestine and *Ascaris* spp eggs pass through the faeces of infected people. If an infected person defecates outside (for example, near bushes, in a garden or field). The eggs can then mature into a form of infectious parasite. Ascariasis is caused by the ingestion of eggs. This can happen when hands or fingers contaminated with dirt are put in the mouth or by eating vegetables or fruit that have not been thoroughly washed (Singer, B. H., & de Castro, M. C. 2007).

The prevention, control and eventual elimination of many neglected tropical diseases (NTDs) depend heavily on the availability of improved water, sanitation and hygiene (WASH) in endemic communities. Treatment alone will not break the cycle of transmission ; improved WASH infrastructure and appropriate health-seeking behaviours are essential to achieve sustainable control, elimination or eradication of many NTDs (Singer, B. H., & de Castro, M. C. 2007 ; & Utzinger, J. *et al* ., 2009). Global strategies for the control and elimination of several neglected tropical diseases (NTDs), such as helminthiases, specifically refer to the need to improve water and sanitation. However, in practice, the repeated large-scale administration of antibiotics or anthelmintics to at-risk populations (WHO. 2012; & Bartram, J. *et al* ., 2010) is the main objective of many neglected tropical diseases (NTDs) control programmes. Hence the need to identify best practices and build a strong evidence base for sustainable and scalable collaborative programming for integrating WASH control activities into NTD control.

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Conclusion

Ascaris lumbricoides infection and Trichurus trichura infection are circulating at the Félix HOUPHOUËT-BOIGNY University in Cocody (Ivory Coast). This preliminary survey found prevalence rates of 23.45% for *Ascaris lumbricoides* infection, 16.81% for *Trichuris trichura* infection and 0.88% for *Ancylostoma* spp infection in this locality, highlighting the main environmental factors associated with transmission. These results will be used to raise awareness among the public authorities and the population and will enable an integrated control programme to be drawn up to combat helminthiases in general and *Ascaris lumbricoides* and *Trichuris trichura* infection in particular at Félix HOUPHOUËT-BOIGNY University.

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