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Original article

Prevalence and evolution of intestinal parasites and urinary in hospital luxembourg: endemicity risk of ascaris lumbricoides and entamoeba histolytica in the district of bamako

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ABSTRACT

The aim of the study was to determine the prevalence and evolution of intestinalis parasites in hospital area. For the present investigation, 2401 samples, including 403 urines and 1998 stool, were collected. The age of patients ranged from 2 months to 87 years with a mean of 24.24 ± 18.58 years. Females predominated (51.1%) with a sex ratio of 1.04. The average prevalence of parasitic infection was 15.58 %. Throughout the years, it was found that the infectivity rates varied significantly, Chi2 = 87.522 p = 0.0000. There was no significant variation between sex and parasitic infection, p> 0.05. Fourteen species of parasites were identified, including 11 in the feces and urine 3. In stool (n=1998), the prevalence of parasites were as followings: Entamoeba histolytica 4.80% (96/1998) , followed by Ascaris lumbricoides 4.20% (84/1998) , Trichomonas intestinalis 3.35 % (67/1998), Giardia lamblia 1.65% (33/ 1998), Hymenolepis nana 0.70% (14/ 1998) Schistosoma mansoni 0.60% (12/ 1998), 0.55% Taenia saginata (11/1998), Strongyloides stercoralis 0.20% (4/ 1998), Ancylostoma duodenal , 0.15 % (3/1998) and Taenia solium 0.05 % (1/ 1998). In urine, the prevalences of parasites were: Schistosoma haematobium was 10.42% (42/ 403), followed by Trichomonas vaginalis 2.23% (9/403), Candida albicans

0.74 % (3/403). The prevalence evolution of parasitic infections following the years from 2005 to 2010 were respectively 11.61% , 12.26% , 15.62% , 8.33 %, 20.05 % and 33.45% . In 2010, prevalence of A. lumbricoides was 76.90 % among children aged less than 10 years. Protozoa were the most frequent, but showed no infection mixed together in the same patient. The distribution of these parasitic infections (for patients of Luxembourg Hospital) was increasingly growing in the district of Bamako, despite efforts in the fight against these diseases. This study showed that intestinal parasites are weakly present in hospital in Bamako. The latter could be explained by the effect of mass treatment in the population. But urinary schistosomiasis was still important. Although, endemicity risk of Ascaris lumbricoides and Entamoeba histolytica was considerable.

1. Introduction

Intestinal and urinary parasites are an integral part of so-called neglected tropical diseases. They are represented by helminths which represent the majority of which two billion people are infected (WHO, 2002). In Mali, several studies have shown that the prevalence varies according to ecological zones. The studies (Locality of Yanfolila and Kolokani) have shown that carriage of intestinal parasites was respectively 67.81 % in the Community Health Centre and 25.36 % in school (Diallo et al, 2003; Ousseini Mama, 2004). Studies from 1984 to 1989 and from 2004 to 2006 showed that the prevalence of Schistosoma haematobium was respectively 25.7 % and 38.3% that of Schistosoma mansoni was 7.4% and 6.7% in communities and among schoolchildren in Mali (Archie CA. Clements et al., 2009). In Diema, Dabo showed that preschool children are more infected by Schistosoma haematobium with 51,2% of cases (Dabo A, et al 2011). These parasitic diseases are related to most of precarious hygienic conditions. Nnochiri in 1968 describes the relationship between the proliferation of parasitic infections and urbanization in Nigeria. Since 2005, in Mali, several programs against these parasitic diseases are implemented, this through administrations albendazol, praziquantel and ivermectin to significantly reduce their impact on the health of the Malian population, especially among children. The present study at the Luxemburg hospital will contribute to evaluate the prevalence and evolution of the parasitic infections.

2. Materials and methods

2.1. Population and study site

This retrospective study was conducted at the Mother and Child Hospital Luxembourg, situated in Hamdallaye in the District of Bamako. The study focused on data collected from patients who presented in the medical diagnostic laboratory of the Mother - Child - Hospital for tests stool and urine.

2.2. Analysis of biological substrates

Analysis of stool and urine examinations was performed by routine techniques for fresh research of parasitic elements (cysts, eggs and vegetative forms of parasites) by using the optical microscope Olympus. Stool samples were mixed with physiological water saline on a slide, on which a strip has been made with an optical microscope and viewed. After centrifugation, a drop of urine was deposited between slide and cover slip and viewed under an optical microscope at 100X.

2.3. Statistical analyses

SPSS version 12 and ArcGIS 9.3 software were used for statistical analysis and the preparation of distribution maps infected and uninfected in the district of Bamako subjects. Spatial variables such as latitude and longitude of

the districts of Bamako district were used for the software ArcGIS 9.3. Chi2 statistical tests and prevalence were used to explain the variations. The significance level (alpha) was set at 5%.

3. Results

The age of the patients was between 2 months and 87 years. The average age was 24.40 ± 18.58 years. 83.22 % (1998/2401) of laboratory tests were stools and 16.78% (403/2401) were urine. Females predominated (51.1 %) with a sex ratio of 1.04. The average prevalence of parasitic infection was 15.58 %. There was no significant relationship between sex and infection Ki2 = 0.128, p = 0.720.

Table 1
Frequency of types of association of parasites found in patients from 2005 to 2010.

Association type parasites infecting	Effectif n	Percentage %(n/N)
Helminths	160	42.78
Protozoa	196	52.41
mushrooms	7	1.87
Helminths + helminths	2	0.53
Helminths + protozoa	8	2.14
Protozoa+ protozoa	0	0
Protozoa + mushrooms	1	0.27
Helminths + mushrooms	0	0
Total	N=374	100

Table 2
Prevalence of intestinal parasites observed in the MCH of Bamako 2005-2010.

Species of parasites	Positive stool	Prevalence
Total stool examined (N= 1998)	n	n/N
Ancylostoma duodénal	3	0.15
Ascaris lumbricoïdes	84	4.20
Dicrocoelium dendriticum	1	0.05
Entamoeba histolytica	96	4.80
Giardia intestinalis	33	1.65
Hymenolepis nana	14	0.70
Schistosoma mansoni	12	0.60
Strongyloïdes stercoralis	4	0.20
Tenia saginata	11	0.55
Tenia solium	1	0.05
Trichomonas intestinalis	67	3.35
Total	326	16.32

Table 3
Prevalence of urinary parasites observed in MCH of Bamako from 2005-2010.

Species of Parasites Samples examined N=403	Positive urine (n)	Prevalence (n/N)
Schistosoma haematobium	42	10.42
Trichomonas vaginalis	9	2.23
Total	51	12.65

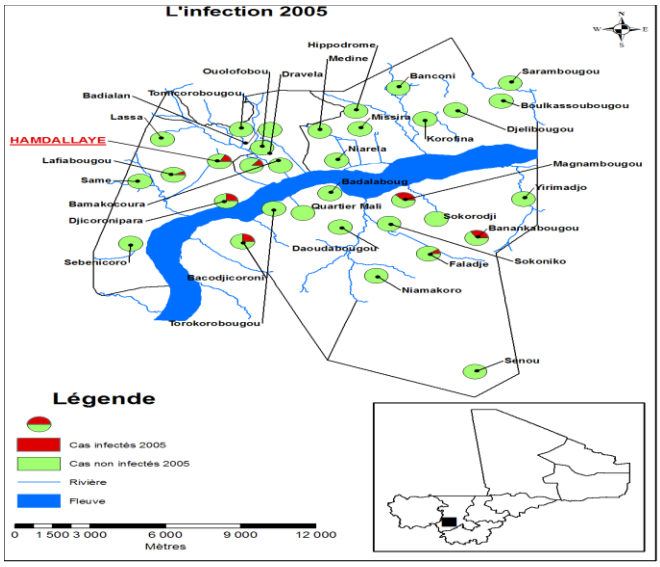

Fig. 1. Distribution of infections cases of parasites in 2005.

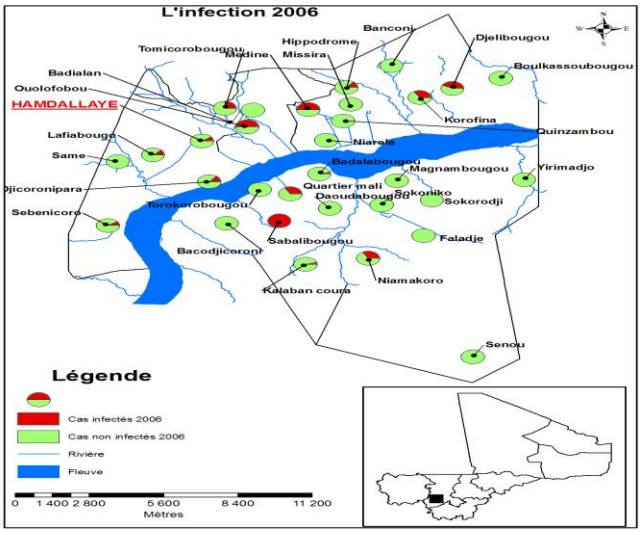

Fig. 2. Distribution of infections cases of parasites in 2006.

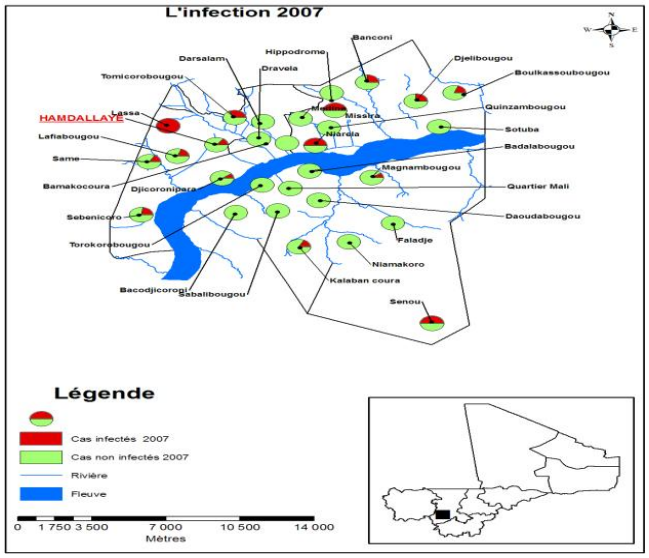

Fig. 3. Distribution of infections cases of parasites in 2007.

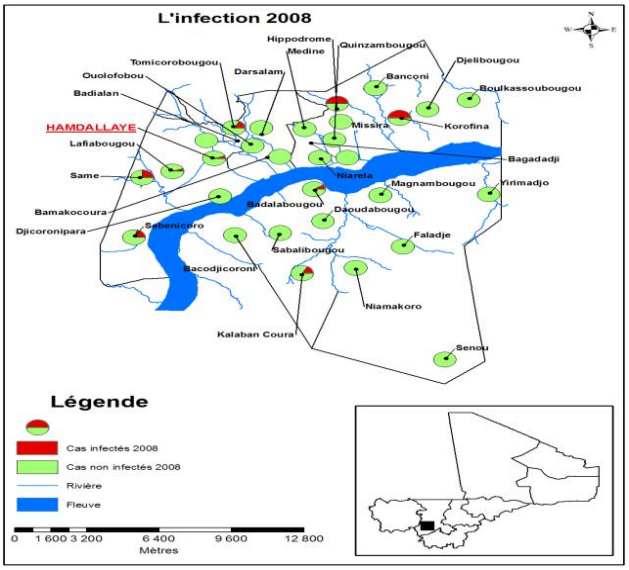

Fig. 4. Distribution of infections cases of parasites in 2008.

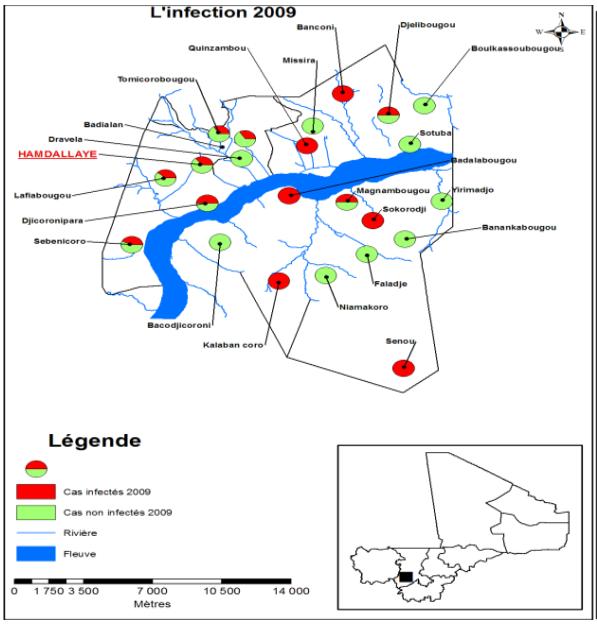

Fig. 5. Distribution of infections cases of parasites in 2009.

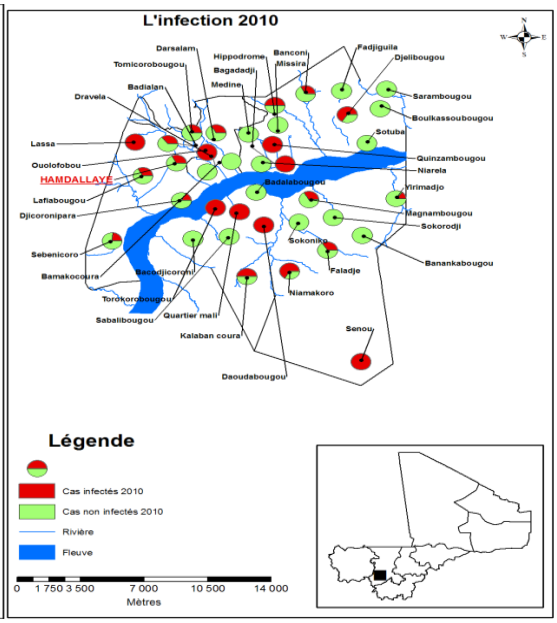

Fig. 6. Distribution of infections cases of parasites in 2008.

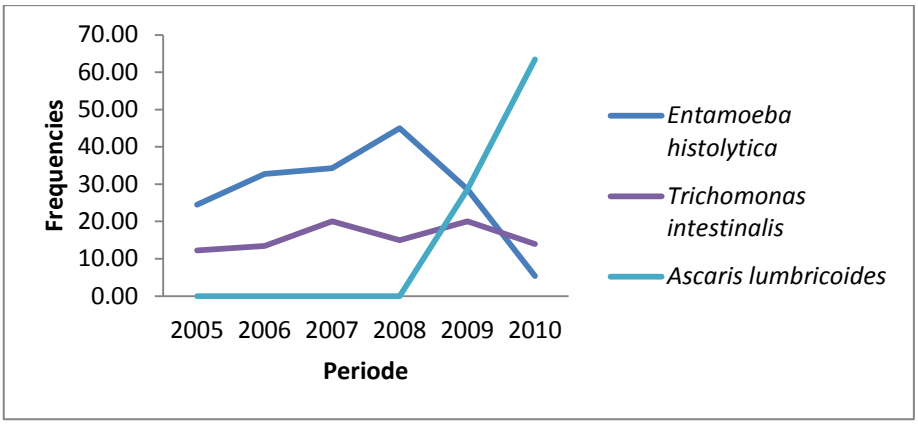

Fig. 7. Temporal Variation of the main parasite species observed in the most prevalent stools during the study from 2005 to 2010.

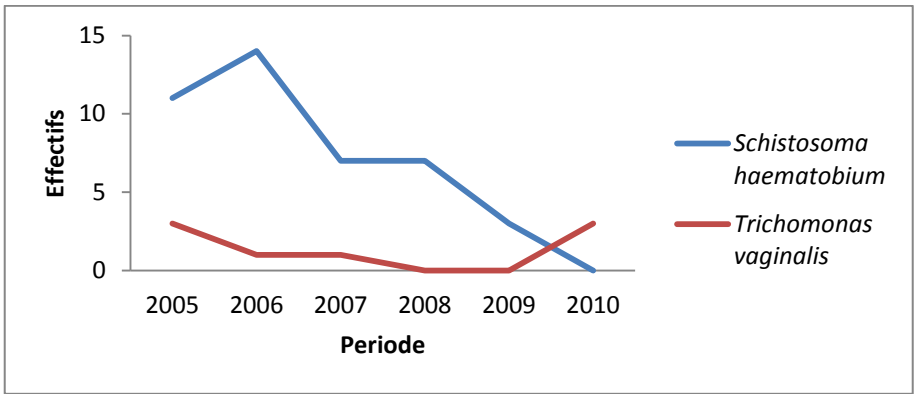

Fig. 8. Evolution of the frequency of Schistosoma haematobium and Trichomonas vaginalis in MCH of Bamako from 2005 to 2010.

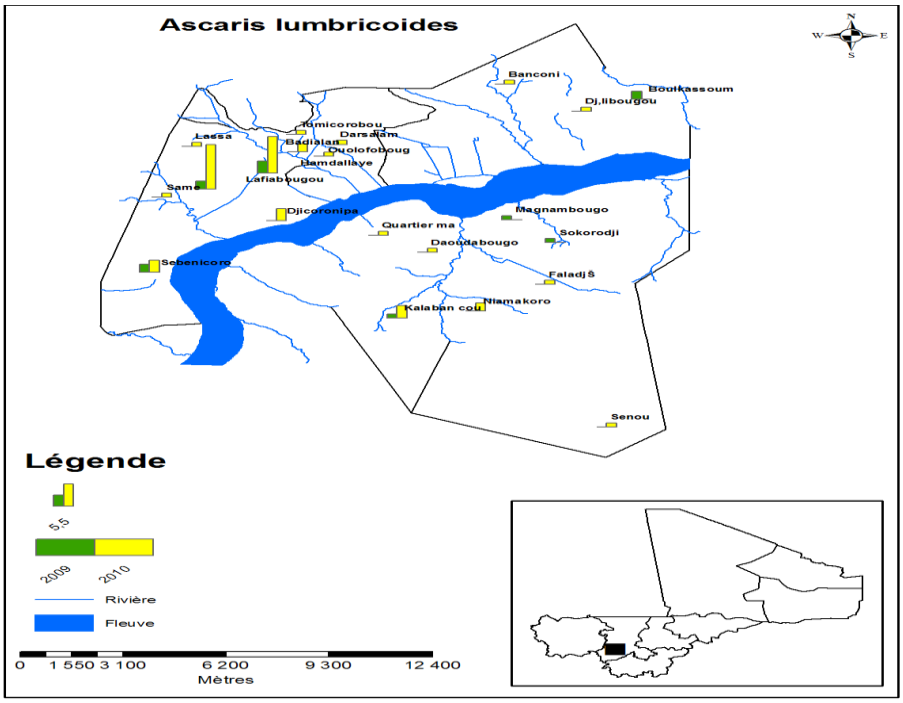

Fig. 9. Distribution of Ascaris lumbricoides infection according the residence of patients in the district of Bamako from 2009 à 2010.

Table 4
Variation of Chi2 of Ascaris lumbricoides, E. histolytica, T. intestinalis and S. haematobium infection depending age class from 2005 to 2010 in MCH of Bamako.

Species of Parasites (stool, N=1599)	Nombre Infection	X2	dl	P
Ascaris lumbricoïdes	75	10.64	6	0.100
Entamoeba histolytica	81	16.43	6	0.01
Trichomonas intestinalis	57	8.03	6	0.23
Species of parasites (urine, N=319)				
Schistosoma haematobium	33	41.75	6	0.000

4. Discussions

The average prevalence of parasitic infection was 15.58 %. In the feces, the prevalence was 16,32% and in the urines it was 12,65%. These results were not far-reaching than rural area. But these results show that parasitics diseases are presents in hospital area. Parasitics infectious are influenced by ecological or geographical factors. In certain area of Mali, higher rates were found: in Yanfolila Diallo found 67.81 % (Diallo Y, 2003) in the health center, and Ousseini found 25.36 %) at school in Didiéni (Ousseini Mama, 2004) in rural area.

In the stool, 11 species of parasites were identified, 320 infected feces, and 330 infections were observed, including the case of poly-infections. In the urine two parasites and fungus were identified.

In the feces (n = 1998) , Entamoeba histolytica, Ascaris lumbricoides and Trichomonas intestinalis have been most prévalentes infections with respectly prevalence 4.80%, 4.20% and 3.35%. These results were less importants than other area. Further, a higher rate of infection by E. histolytica was raised by Zahida (21.69%) in Pakistan hospital (Zahida Tasawar et al., 2010).

In urine, the prevalence of parasites was: Schistosoma haematobium 10.42% (42/403), followed by Trichomonas vaginalis 2.23% (9/403), and Candida albicans 0.74 % (3 /403).

Mixed infections accounted for 2.94 % (11/374).The frame was predominated parasitic infections by protozoa (52.41%) followed by helminths (42.78 %), fungi (2.14%). The helminths more protozoan Association was the most

common type of mixed infection with 2.14%. There was no case of association of two protozoa, or helminths and fungus on six years. This event must have more consideration, and induct most investigation to more understand.

The evolution of the prevalence of hospital infections parasitic disease is variable depending on the year. The prevalence of parasitic infections following the years from 2005 to 2010 were respectively 11.61%, 12.26%, 15.62%, 8.33 %, 20.05 % and 33.45%. It was found a decrease in infections in 2008, and then increased steadily from 2009 to 2010. Probably this could be explained by the effect of mass treatment in the population in 2007. Most of the districts of Bamako lived cases of parasitic infections, including their distributions were well pronounced in the years 2009 and 2010 (Figures 2, 3, 4, 5, 6, and 7). As the years, the infectivity rates varied significantly, Chi2 = 87.522 p = 0.0000. There was no significant variation between sex and infection by parasites, p> 0.05. Parasites most frequently encountered were E. histolytica, A. lumbricoides, S. haematobium and T. intestinalis. Only A. lumbricoides varied significantly from 2009 to 2010, with a chi2 of 8.32512, $p < 0.025$ and df = 2. Species E. histolytica and S. haematobium vary significantly depending on age.

In stools, three parasites were more experienced, evolving differently over time. The species Entamoeba histolytica increased steadily from 2005 (22.0 %) to (48.0 %) in 2008. Hence, the frequency then dropped to 5.0% in 2010. Trichomonas intestinalis has evolved sawtooth, with a slight peak in 2007. Ascaris lumbricoides had a subsequent outbreak from 2009 to reach a prevalence of 60 % in 2010, and is observed on a large distribution in the district of Bamako (Figure 9). Way this augmentation of case infection of A. lumbricoides on 2010?

In urine, two parasites were very important: Schistosoma haematobium and T. Vaginalis. The low prevalence of T. Vaginalis was very poorly distributed with frequencies not reaching 5.0% and even zero in 2008 and 2009. The frequency of infection with Schistosoma haematobium after a slight increase from 11.0% to 14% between 2005 and 2006, declined gradually to cancel in 2010.

In 2010, Ascaris lumbricoides was the most prevalent infection (53.44 %) followed by Trichomonas intestinalis (13.97 %). But, Diallo found 47.12 % of Ascaris lumbricoides infection in health center Yanfolila patients attending the clinic. In Senegal, Faye found a prevalence of infection at 69 % in sellers and 45.5 % of consumers in 1998 (O Faye et al., 1998). In Burkina Faso, a hydro-agricultural area, Sourou Dianou have found an overall infection with 46.5%, Schistosoma mansoni was predominant with 20.9 % (Dianou D. et al, 2004). Hamit found against a prevalence of 10 % in N'Djamena in 2008 (Hamit MA et al, 2008). That proves that the prevalence of A. lumbricoides is geographically different. The age of 0-10 year olds housed the 17.98 % of parasites. Ascaris lumbricoides accounted for 76.90 % of infections in this age group, and affected virtually every other. Although a study conducted in malaria endemic area in Kenya among preschoolers revealed carriage rates of 29 %, 20% and 15% respectively of Ankylostome, Ascaris and Trichuris (S Brooker et al. 1999). The mixed infection rate was 5.38% in 2010, while overall; it is 2.15% over the six years. We had found no infection of Schistosoma haematobium in 2010. It seems that the prevalence of urinary tract infection by Schistosoma haematobium is steadily declining in some areas of Africa, which reveals some studies respectively in the town of Mali Fourou (1.44 %), and Chad (0.2 %) (Godefroy et al, 2010; Hamit et al, 2008). This leads us to suggest that the fight against urinary schistosomiasis has made considerable progress. There's no there not also the considerable impact of the development of the general collector Hamdallaye?

These parasites, given their low frequency of infection, have been the subject of geographical distribution in virtually all areas of the District of Bamako. It was for this study to have an idea about the geographical distribution of infection by parasites. Ecological data were not taken into account, which is a limitation of this study. Contamination of most of these parasites has a link with the environment; it would be much more interesting to combine the risk factors for infection.

5. Conclusion

This study shows that intestinal parasites are weakly present in hospital in Bamako. The latter could be explained by the effect of mass treatment in the population. But urinary schistosomiasis is still important. The Protozoa (ex. E. histolytica) is more prevalent than helminths hospital. The year 2010 recorded the highest percentage of parasitic infections including Ascaris lumbricoides was the most prevalent species, children less than 10 years were the most infected. Although, endemicity risk of Ascaris lumbricoides and Entamoeba histolytica is considerable.

6. Thanks

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References

Archie, C.A., 2009. Clements, Elisa Bosque' Oliva, Moussa Sacko, Aly Landouré' Robert Dembele' Mamadou Traore' Godefroy Coulibaly, Albis F. Gabrielli, Alan Fenwick, Simon Brooker. A Comparative Study of the Spatial Distribution of Schistosomiasis in Mali in 1984-1989 and 2004-2006. www.plosntds.org, May | Volume 3 | Issue 5 | E43.

Brooker, S., Peshu, N., et al., 1999. The epidemiology of hookworm infection and Its contribution to anemia Among preschool children on the Kenyan Coast. Trans R Soc. Trop. Med. Hyg., 93 (3), 240-06.

Dabo, A., Haroun, M.B., Bary, B., Doumbo, O.K., 2011. Urinary schistosomiasis among preschool-aged children in Sahelian rural communities in Mali. Paras. Vect., 4, 21 doi:10.1186/1756-3305-4-21.

Dianou – D, J.N., Poda, L.G., Savadogo , H., Sorghum, S.P., Wango, B., 2004. Sondo: intestinal parasitosis in the area of hydro-agricultural complex Sourou in Burkina Faso., Research Institute for Health Sciences (ICES) / National Center for Scientific and Technological Research (CNRST), 03 BP 7047. j. Sci. env., Vol 5 , No. 2, September Ouagadougou Burkina Faso , Emails : dayerid@yahoo.fr / podajnl@yahoo.fr.

Diallo, Y., Coulibaly, A., Guindo, I., Bertha, M., Lopez, P.L., Konate, D.A., 2003. Tembely: Prevalence of intestinal parasites in the circle Yanfolila: the case of consultants Disease Health Center Yanfolila June 2001 to August 2002. Medicine Black Africa, vol 50, No. 3, pp. 133-135.

Godefroy Coulibaly., 2010. Final report health assessment in 7 villages in the rural town of Fourou (Circle Kadiolo) Available for SOMISY (Société des Mines de Syama).

Hamit, M.A., Mr, Tijani, T., Bilong Bilong, C.F., 2008. Recent data on the prevalence of intestinal parasites in N'Djamena, Chad Republic. Afr. J. Env. Sci. Technol., Vol. 2 (12), pp. 407-411, December Available online at ISSN 1991 - 637X http://www.academicjournals.org/AJEST © 2008 Academ. J.

Nnochiri , E., 1968., Parasitic disease and urbanization in a developing community. London, Oxford University Press.

Faye, O., Fofana, P., Correa, J., Gaye, O., Dieng, T., Dieng, Y., Bah, I.B., N'Dir, O., Diallo, S., 1855. Intestinal parasites among food vendors and consumers of the street. Study conducted at the Dakar agglomeration. www.pathexo.fr/documents/articles-bull/T91-2-pdf,

Ousseini - M., 2004. Impact of certain intestinal and urinary parasites on school performance in northern savannah area in Mali: the case of Didiéni (Circle Kolokani). DEA, Parasitology , FAST. University of Bamako.

WHO., 2002. The Partenerschip For Parasite Control (PPC) The Second Meeting - Rome - 25 - 26th WHO. April Visit in January 2011. http://www.who.int/wormcontrol/about_us/en/mtgnotes_april2002.pdf.

Zahida - Tasawar Shaban Lashari Kausar, M.h., 2010. Prevalence of Entamoeba histolytica in humans. Institute of Pure and Applied Biology, Bahauddin Zakariya University Multan, 60800 Pakistan. Pak. J. Pharm. Sci., Vol.23, No.3, July pp.344 -348.