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Prevalence of urinary schistosomiasis in Ahomey-Lokpo, Commune of So-Ava, Benin Republic

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Abstract

Schistosomiasis is a chronic tropical disease that is contracted after *Schistosoma haematobium* parasite larvae pass through the skin in contact with water. In Benin, *S. haematobium schistosomiasis* is still one of the most widespread and neglected human parasitic infestations. The objective of this study is to determine the prevalence of urinary schistosomiasis in Ahomey-Lokpo in the commune of Sô-Ava. This prospective and descriptive study was conducted on 104 randomly selected inhabitants aged 2 to 75 years. It consisted of the collection of urine samples and their macroscopic examination (urine color) and microscopic examination (presence of *S. haematobium* eggs)., Each individual whose urine was collected was subjected to a questionnaire. In order to compare the averages, excel software was used for data analysis. This study revealed that several factors such as gender, age and especially occupation favor or not schistosomiasis. Among the respondents, men are more infested (41%) than women (26%) because of their profession. The results showed that 78.32% of people who have haematic urine, 76.71% of those who have dysuria, 75.11% of those who experience abdominal pain, and 69.88% of those who experience burning on urination are infested. The Sô River and the swamps are real sites of schistosomiasis transmission infestation. The majority of the people who practice their daily activities there are infested.

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Introduction

Schistosomiasis, also called schistosomiasis, is a chronic parasitosis that has lived in tropical and subtropical regions for millennia. It is a neglected parasitic disease (Engels D, Chistulo L, Montresor A, Savioli L. 2002). Worldwide, the number of people exposed is estimated at 600 million, of whom more than 200 million are infested and nearly 280,000 people die each year from complications of schistosomiasis (WHO. 2011, Chippaux JP. 2000, Chistulo L, Loverde P, Engels D. 2004).

The populations at risk are much more schoolchildren, children, women, fishermen, farmers who use irrigation technology and pastoralists (Molyneux DH, Hotez PJ, Fenwick A. 2005). There are sixteen species of schistosomes, 5 of which are known to infect humans (Riveau G, Dupé L. 2000). These are S. *haematobium, S. intercalatum, S. mansoni, S. japonicum* and *S. mekongi.* Only the first 3 species are found in Africa. In Benin, epidemiological studies still fragmentary reveal the presence of two species of schistosomes: the species S. *haematobium (*bladder form) responsible for urogenital schistosomiasis and the species *S. mansoni* (intestinal form) (Ibikounlé M, Mouahid G, Minsta Nguéma R, Sakiti NG, Massougbodji A, Moné H. 2013, Ibikounlé M, Mouahid G, Sakiti NG, Massougbodji A, Moné H. 2009). Urogenital schistosomiasis, which is a parasitic disease, occurs in areas where drinking water supplies are lacking (Labo R, Bremond P, Boulanger D, Garba A, Chippaux J P. 1998). In 53 African countries, an estimated 70 million people are currently suffering (Chippaux JP. 2000).

The present study, which consists in making an inventory of urinary schistosomiasis, aims to determine the prevalence of urinary bilaziosis in Ahomey-Lokpo which is one of the 7 districts of the commune of Sô-Ava and whose inhabitants, formerly, were only peasants have become peasant-fishermen, and finally exclusively fishermen.

Material and methods

The biological material used in this study is urine and blood.

Materials and equipment

It consists of consumables, equipment and laboratory reagents.

Laboratory consumables

Slides and slides, Pasteur pipettes, disposable gloves, toilet papers, 10mL conical tubes, racks, permanent markers, micropipettes, cones and waste boxes.

The equipment used

The OLYMPUS optical microscope, the 80-2 Electronic Centrifuge.

The reagents used

CYPRESS brand urine strips and alcohol at 95°

Study methods

Sample

It consists of 104 urine samples taken in appropriate sterile jars or ECBU jars from the inhabitants of the village of Ahomey-Lokpo who agreed to participate in this study. Excluded from the study were anyone who did not live in Ahomey-Lokpo or who opposed the study. A questionnaire drawn up and presented to the inhabitants who had given their consent to participate in the study made it possible to collect all the information concerning them, in particular socio-economic data and symptoms.

Urine collection

The collection of urine samples was systematically done the same day between 10 am and 3 pm because this is the time when the urine is richer in schistosome eggs that are found in the last drops. For each person, only one urine sample was collected in a urine cytobacteriological examination jar and then tightly sealed. Beforehand, each inhabitant concerned by the study was asked to perform

just before urination a light physical effort such as 20 rapid flexions, or ask him to run 100 meters, or to go up and down several times a staircase. These exercises have the effect of increasing egg elimination. The urine samples are then kept cool before being sent to the laboratory for macroscopic and microscopic examinations.

Urinalysis

Each urine sample was analyzed using direct diagnostic techniques. This involves looking for *Schistosoma haematobium eggs* in the centrifugation pellet of urine. Indeed, each urine sample first goes through the macroscopic examination which makes it possible to assess the nature of the sample before the microscopic examination in the fresh state.

Macroscopic examination

This is the first essential step in any parasitological examination. Each urine sample was detected:

- The color: red, yellow-dark, yellow-citrin, yellow-cloudy.
- The presence of non-parasitic elements (or over-added elements): in the urine can be found abnormally blood, mucus.

This step is completed by the search for urinary parameters using CYPRESS test strips. Thus it is sought the presence or absence of red blood cells and leukocytes.

Microscopic examination

Microscopic examination is based on looking for *Schistosoma haematobium eggs* in the urine through the fresh state. The urine is centrifuged to obtain a pellet before being examined under a microscope with the X10 objective and then with the X40 objective between slide and slide.

Data processing

All data was entered and analyzed using Microsoft Office Excel 2013 software followed by a check to eliminate all inconsistencies to validate the entry. The graphs and tables comparing the means were then produced.

Result and discussion

Result

A total of 104 urine samples collected from respondents. 47.12% of respondents are male and 52.88% of respondents are female (Fig. 1A). With a percentage of 53.84, children aged 2 to 17 were the most represented in the study; on the other hand, those under 2 years of age and older children aged 62 to 75 were the least represented with a rate of 0.96% and 2.88% respectively (Table I). Fig. 4B shows that agricultural farmers (39.42%) and schoolchildren (30.77%) were the most surveyed in this study.

During the epidemiological investigation, the clinical sign most reported by the subjects is burning on urination (30.12%). The fig. below shows the macroscopic appearance of the urine analyzed. The macroscopic examination shows that the majority of the population questioned had presented urine of light yellow color or 38.46% considered normal fig. 6.

According to the results of Table III, 57.70% surveyed showed the presence of *S. haematobium* eggs in their urine.

The prevalence of urogenital schistosomiasis is higher in men (41.30%) than in women (26.42%) (Fig. 7).

The fig. below provides information on the prevalence of *S. haematobium* according to the age of the respondents. From the analysis of this fig., the prevalence of urogenital schistosomiasis is higher in subjects aged 2 to 17 years or 33.65%. The fig. below shows the prevalence of *S. haematobium* according to the occupation of the respondents. Half of the schoolchildren and fishermen surveyed are infested with *S. haematobium.* Analysis of the relationship between gross urine examination and *S. haematobium*

infestation in subjects with clear-looking urine showed that 61.54% were found infested (Fig. 10).

Among subjects whose urine is haematic, 78.32% are infested with *S. haematobium*; 69.88% of those who experience burning on urination are infested with S. haematobium and *76.71%* of those who experience dysuria are infested with S. haematobium. 75.11% of those who feel abdominal pain.

Table 1. Distribution of respondents by age.

Age group/ (years)	Workforce	Percentage (%)
<=2	1	0,96
[2 ,17[	56	53,84
[17 – 32[	19	18,26
[32 – 47[	15	14,32
[47 – 62[	10	9,61
[62 – 75[	3	2,88
Total	104	100

Table 2. Distribution according to the clinical signs of the respondents.

Clinical signs	Workforce	Proportion(%)
Hematuria	54	21,69%
Burning when urinating	75	30,12%
Dysuria	58	23,29%
Abdominal pain	62	24,90%

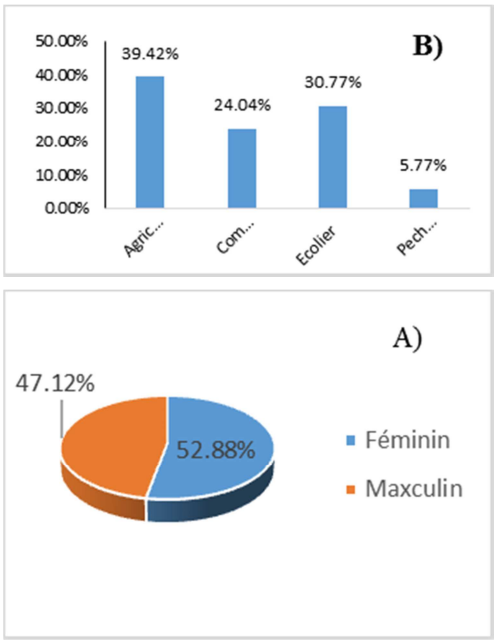

Fig. 1. Distribution of respondents (A) by sex and (B) by occupation.

Table 3. Distribution by presence or absence of *S. haematobium* in the urine.

Subjects	Workforce	Prevalence
Presence of eggs of S. haematobium in urine	60	57,70%
Absence of eggs of S. haematobium in urine	44	42,30%
Total	104	100

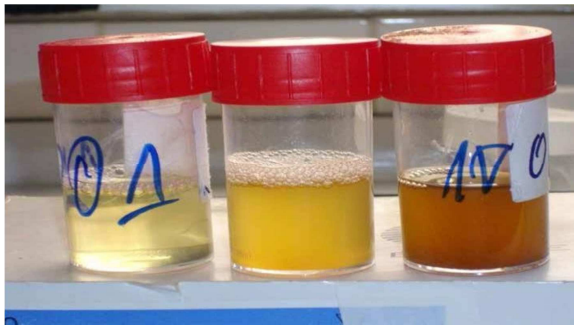

Fig. 1. Macroscopic appearance of urine analyzed.

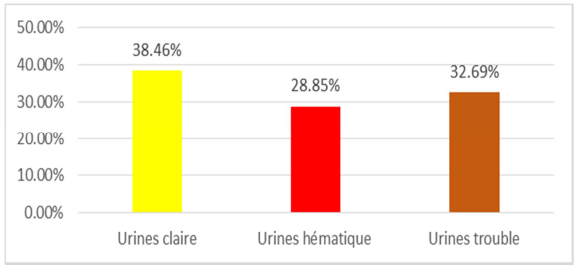

Fig. 2. Distribution according to macroscopic examination of the colour of the urine of the respondents.

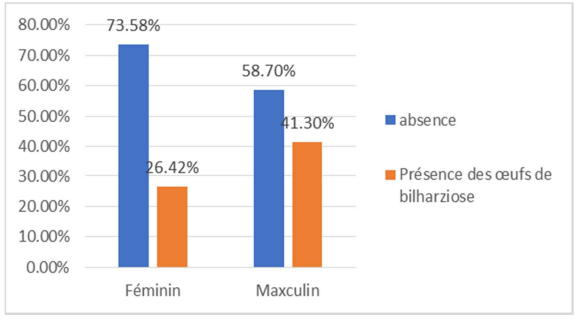

Fig. 3. Prevalence of *S. haematobium* according to gender.

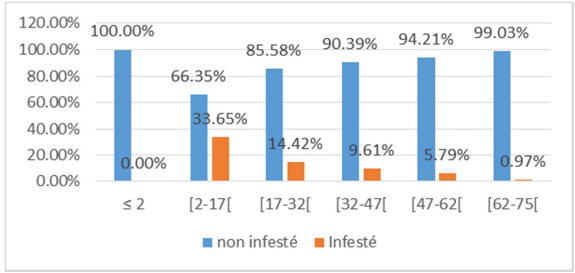

Fig. 4. Prevalence of *S. haematobium* according to the age of the respondents.

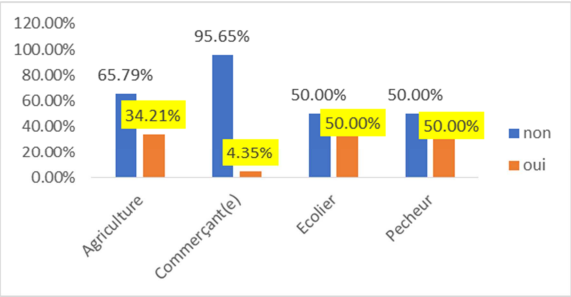

Fig. 5. Prevalence of *S. haematobium* according to the profession of the respondents.

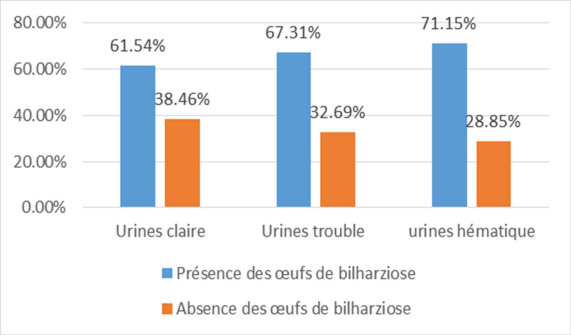

Fig. 6. Relationship between gross urine examination and *S. haematobium.*

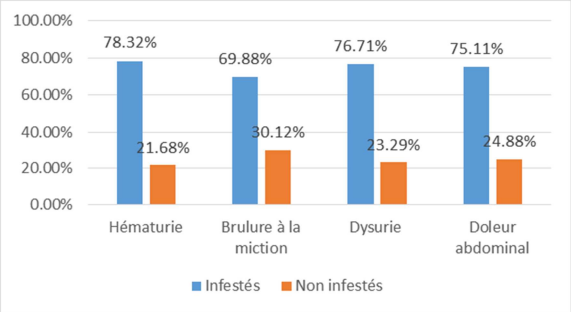

Fig. 7. Relationship between clinical signs and the presence of *S. haematobium.*

Discussion

The present study to determine the prevalence of urinary schistosomiasis in Ahomey-Lokpo, Sô-Ava revealed that among the inhabitants, the prevalence of *Schistosoma haematobium* is 57.70% (Table IV). Our results are higher than those obtained by Ibikounlé *et al.,* (Ibikounlé M, Satoguina J. 2013) who had found in 3 villages of the same commune a prevalence of 32.78%. The increase in infestation rate that we observed compared to the work of Ibikounlé *et al.,* can be explained by the difference in sample size and other environmental factors that could have changed over time.

Based on our results, the prevalence of S. *haematobium* is higher in men than in women, 41.30% versus 26.42% (Fig. 4). The same observations were made during the work carried out by Seck *et al*., (Seck I, Faye A, Gning B, Tal-Dia A. 2007) in Senegal. We think that these differences in infestation could be related to the occupation of men who are mostly farmers and fishermen, as already demonstrated by Cadot *et al.,* (Cadot E, Fournet F, N'Guessan NA. 1998) in Nigeria. The prevalence of *S. haematobium* infestation is lower in the 62-75 age group or 0.97% than in the 2-17 age groups or 33.65% and 17-32 years or 14.42% (Fig. 9). Our results show that the prevalence of urogenital schistosomiasis does not increase with age. These results are comparable to those obtained by Ankotche (Ankotche A. 1990) in Côte d'Ivoire who showed that children and adolescents represent the most active fraction of the human parasite's reservoir.

Our results confirm that hematuria is the main symptom of urogenital schistosomiasis, 78.32% of people presenting hematuria as a clinical sign are infested with S. haematobium; the value of the *macroscopic appearance of urine in the diagnosis of urogenital schistosomiasis has also been demonstrated in endemic areas by some authors such as Garba* [8], Sellin *et al,* (Sellin B, Simonkovitch E, Ovazza L, Sellin E, Desfontaine M, Rey JL. 1982) which have shown that the relationship can be made between non-translucent urine (unclear) and urogenital schistosomiasis.

Conclusion

The study showed that *schistosoma haematobium schistosomiasis* has a prevalence of 57.70% in Ahomey-Lokpo. This is confirmed by the clinical signs recorded during the epidemiological investigation. The study also showed that men are more exposed and are mostly farmers,

schoolchildren and fishermen. The age groups of [2-17 years] and [17-32 years] are the main prey of the disease in the village of Ahomey-Lokpo. The study also showed that the clear and cloudy aspects are not synonymous with non-infestation by urogenital schistosomiasis. The hematuria reported by the inhabitants is important in the detection of the disease. In the study area, temporary ponds, floodplains, swamps and the Sō River are likely to be dangerous to the population as they are very close to dwellings and infected intermediate host molluscs could be present. Factors that promote transmission are also linked to poor hygiene and sanitation conditions in the environment. Finally, this study made it possible to assess the level of endemicity of schistosomiasis with *schistosoma haematobium* in the village of Ahomey-Lokpo and thus helps to draw the attention of the authorities in the commune of Sô-Ava to this neglected disease in order to consider adequate means for the fight against this parasitosis.

Recommendation(S)

For the local authorities of the district of So Ava and Ahomey-Lokpo

Organize periodic sensitization on hygiene in the villages of the district of Ahomey-Lokpo and in the neighboring districts.

Drilling to increase people's access to drinking water

To the research team

Organize awareness-raising on drinking water treatment and hygiene

Continue with the research in another districts of So Ava

To the Populations

Treating drinking water

Deworming periodically

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