



Urinary Schistosomiasis: Factors Associated with Modern Care Research by the Community of Lanta in Benin in 2023

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Abstract

Introduction: Urinary bilharziasis is the second most widespread parasitic disease in the world after malaria, is one of the seven (07) neglected tropical diseases which occurs in 78 countries around the world including Benin, a country in West Africa. In fact, the bilharziasis called also by its scientific name shistosomiasis is an infectious disease concentrated in deprived areas and affecting communities living along waterways such as that of Lanta located in the southern part of the Republic of Benin. The objective of our study was to study the factors associated with the modern therapy research on urinary bilharziasis by the Lanta community from Benin in 2023. **Methodology:** This was a cross-sectional and analytical study which took place from July 9 to 31, 2023 including 734 subjects aged at least 18 years old and all residing in the seven (07) villages of the Lanta district. A pre-tested and validated questionnaire served as a data collection tool. Data analysis has been done with R 3.4.1 software. The odds ratio was used as a measure of association. The confidence threshold was set at 5%. In order to obtain a predictive model of the modern therapy research for the exposed people to the urinary bilharzia, a multiple logistic regression using the likelihood ratio was carried out in the community of Lanta. **Results:** The average age of the subjects investigated was 15.93 ± 39.26 years. Of the 734 subjects, 73.57% cannot read or write. The sex ratio (Female/Male) was 0.87. The proportion of subjects with adequate knowledge of urinary bilharziasis was 25.89% with 95% CI = [22.85; 29.17%]. The prevalence of urinary bilharziasis was 30.11% with 95% CI = [26.90; 33.52]. But only 54.29% have been consulted in a health ser-

vice and received drug treatment. The main factors which sufficiently predicted the non-use of modern therapy in cases of urinary bilharziasis were the residence of the subject, a low household income (less than 52,000 CFA francs per month), the unavailability of the health agent (agent always busy) and the non-knowledge of a person who has suffered from urinary bilharziasis. **Conclusion:** Adults in the Lanta community have poor knowledge about urinary bilharziasis. Their prevention attitudes are unfavorable with little recourse to a health facility in Lanta to seek modern therapy in the event of the appearance of urinary bilharziasis. Predictors of this behavior are village of residence, low purchasing power, unavailability of health personnel and not knowing anyone affected by the disease. Those responsible for the health system in Benin should direct targeted actions towards this Lanta community to control this phenomenon, in order to get a social and behavioral change.

Subject Areas

Hematology, Translational Medicine

Keywords

Urinary Schistosomiasis, Knowledge, Attitudes, Practices, Associated Factors, Lanta, Benin

1. Introduction

Neglected tropical diseases (NTDs) are a diverse group of conditions that occur primarily in tropical areas with a single commonality: their impact on impoverished communities [1]. Together, they affect more than a billion people with devastating health, social and economic consequences [1]. They are mainly infectious diseases which are concentrated in deprived areas of remote rural areas of Africa and Latin America [2]. These diseases are little noticed and are viewed with disinterest because they do not lead to explosive outbreaks that attract the attention of leaders and the media [2].

Urinary schistosomiasis, a debilitating and chronic disease, is one of seven neglected tropical diseases that currently threaten the well-being of more than a billion people worldwide [3]. It is the second most widespread parasitic disease in the world after malaria [4].

The prevalence of urinary bilharziasis worldwide remains relatively high despite the prevention measures put in place in each country [5] [6].

It is endemic in developed countries such as France and Italy [7] [8]. In 2022, the World Health Organization said that sub-Saharan Africa is the most affected with more than 200 million people infected with schistosome parasites. It remains endemic in Senegal, Nigeria, Zambia, Mozambique, Burkina Faso and Zanzibar [9]. It mainly affects young children [10] [11] throughout the world. Its prevalence varies from 5.6% to 20% in Burkina Faso, between 2014 and 2017

[10]. It was 79.00% in Senegal in 2016 [12]. Since 2017, the prevalence of this condition has been increasing in different regions of the Federal Republic of Nigeria: it was 65.10% and 69.00% respectively in the communities of Jidawa and Zobiya [13]. In 2021, Green *et al.* reported a prevalence of 30.1% in the south-west region of Cameroon [14]. In Benin the prevalence of the disease is 29.40% in the commune of Pehunco in the north and 32.78% in the lake region of Sô-ava in the south [15] [16].

Literature data on urinary schistosomiasis in the Republic of Benin have been more focused on adolescents with school age [15]. Epidemic outbreaks still exist in the Republic of Benin and especially in the Klouekanmé-Toviklin-Lalo health zone (HZ KTL) despite the priorities of the Ministry of Health of Benin and its partners, such as the World Health Organization, in the fight against Urinary bilharziasis.

Despite these targeted interventions, cases of urinary schistosomiasis are also well recorded among children and adults from the community of Lanta living along the Couffo River with a low recourse to modern therapy care, while medical management of urinary bilharziasis promotes its healing and the prevention of subsequent complications. Young children are the most affected by urinary bilharziasis [10] [11] and parents are the first decision-makers in seeking child and family care in the event of illness [17].

Identifying the main factors influencing the community's research for modern therapy will enable targeted interventions to prevent outbreaks and later complications.

The present study aimed to identify the main factors influencing the community's research for modern therapy. It will help targeted and effective interventions in the fight against this illness in the Klouekanmé-Toviklin-Lalo health zone but also in other localities in the Republic of Benin.

2. Materials and Methods

2.1. Community, Type and Study Objective

The study took place in the seven (07) villages constituting the district of Lanta (Commune of Klouekanmè) in the Couffo department in Benin. It extends over an area of 394 km². The population is estimated at approximately 14,686 inhabitants in 2013 [13] [14]. The economy of the Lanta district is essentially focused on agriculture, fishing, hunting, trade, small restaurants and livestock.

This was a cross-sectional study with an analytical aim targeting subjects aged 18 and over whose objective was to evaluate the level of knowledge, attitudes and practices of the community of Lanta about urinary bilharziasis in Benin in 2023.

2.2. Sampling, Eligibility Criteria, Recruitment and Data Collection

This involved probability sampling using the random cluster technique; the clusters were the households selected according to a probability proportional to

the size of the households and by the method of cumulative totals. The minimum sample size was determined by the Schwartz formula (estimated prevalence $p = 34.70\%$) according to a

$$n = k \frac{Z^2 p * q}{i^2}$$

study carried out by Dawaki *et al.* [18] in Nigeria; $q = 1 - p$ ($q = 65.30\%$), $Z = 1.96$; precision chosen $i = 5\%$ and a cluster effect $k = 2$. This size was 697 increased by 5%. A total of 734 households were selected according to the technique indicated above. Any subject residing in Lanta, aged at least 18 years old and having consented to participate in our study was included in the study if they gave their verbal, free and informed consent to participate or having decided not to continue the interview. In a selected household, all the adults present, meeting the inclusion criteria and having given their free and informed verbal consent were taken into account and participated in this study. Data collection was digital. The questionnaire was previously assembled on electronic support for Smartphones using the free and accessible mobile data collection application KoboCollect® v1.30.1. This digital data collection was carried out on the 799 targets surveyed. The main dependent variable in this study was the research for modern therapy in a health facility in the district of Lanta in the event of the appearance of a probable episode of urinary bilharziasis. It is a binary variable with Yes/No modalities.

The dependent variable of interest was attitudes/practices of urinary bilharziasis prevention. It is a composite variable and is composed by inclusive association from the variables: swimming practices in rivers or streams, first recourse in the event of contamination, hygiene and sanitation and drinking water management. The total scores served as the basis for this evaluation. A method adapted to the measurement scale of Corlien M. Varkevissier [19] has been used. But for our study, the variable attitude/practice was favorable for a subject when the average was greater than or equal to 80% and it was said unfavorable otherwise. The independent variables consisted of sociodemographic and socioprofessional variables, knowledge about the disease, organizational factors and practices and attitudes.

2.3. Data Processing and Statistical Analysis

The data were analyzed with R Studio software version 4.3.1. The central tendency and dispersion parameters were used for the description of the quantitative variables and the proportions for the qualitative variables accompanied by their confidence interval (CI). Pearson's chi-square tests were used in the comparison of proportions. In identifying associated factors, binary logistic regression was also performed. The associated factors were identified in relation to the dependent variable "attitudes/practices for the prevention of urinary bilharziasis". It is binary, coded 1 for the "YES" modality and 0 for the "NO" modality.

2.4. Ethical Considerations

We took steps to obtain from the health authorities of the department the authorization to conduct the research. Verbal, oral, free and informed consent from each subject was obtained and all data collected are strictly confidential. Then a unique identifier was assigned to each subject. This study does not involve any harm to the participants who are included. It will shed light on the disease and its consequences, and means of fighting disease in order to help individuals and the community of Lanta to adopt preventive measures on this silent disease with medium and long-term consequences. Moreover, it will provide to political and administrative authorities updated factual data about disease for next prevention and eradication measures in the Lanta district.

3. Results

3.1. Description of the Study Population

The average age of the subjects surveyed was 15.93 ± 39.26 years with extremes ranging from 18 years to 98 years. People in the age group of [20]; 40 were the most represented (Figure 1). Male subjects were the most represented with a proportion of 53.54%, *i.e.*, a sex ratio (female/male) of 0.87 (Figure 2) Among the 734 respondents, 73.57% cannot read or write (French and local language). More than 9 out of 10 respondents (93.73%) earned less than the Beninese SMIGS (52,000 F CFA) and more than three quarters of the subjects' households (86.51%) had a monthly income lower than the Beninese SMIGS (52,000 F CFA).

3.2. Knowledge of Topics on Urinary Bilharziasis

Of the 734 subjects, 648 (*i.e.* a proportion of 88.28%) had already heard of urinary bilharziasis. According to the statements,

- 76.84% of subjects stated that urinary bilharziasis is a normal disease,
- 12.26% stated that it is a disease of the type,
- 5.59% think it is due to a spell.

3.3. Attitudes and Practices of the Population in the Prevention of Urinary Bilharziasis

The proportion of subjects with a favorable attitude to the prevention of urinary bilharziasis was 4.77% with 95% CI = [3.45; 6.56]. Of the 734 subjects surveyed, approximately 8 out of 10 (73.84%) were used to bath in the river.

More than three quarters of the subjects (75.48%) were used to make use of backwater for daily needs but only 5.32% of them ensured decontamination before use. Only 22.89% of households had a drinking water point.

In the event of illness, 95.49% of adults surveyed said they have the decision-making power to seek treatment in a health facility.

3.4. Organization of the Health Service

The healthcare staff is always available according to the declarations of 54.22% of

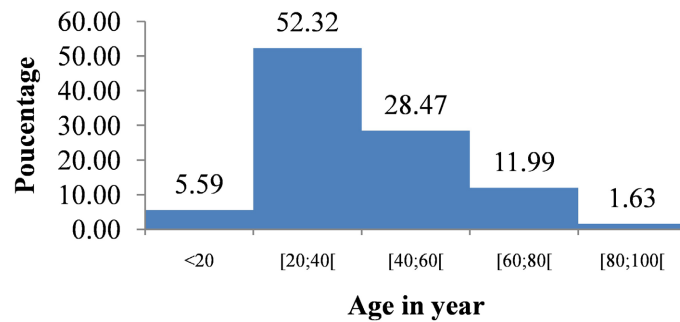


Figure 1. Distribution by age group of subjects surveyed on urinary Bilharzia in the district of LANTA in 2023 (n = 734).

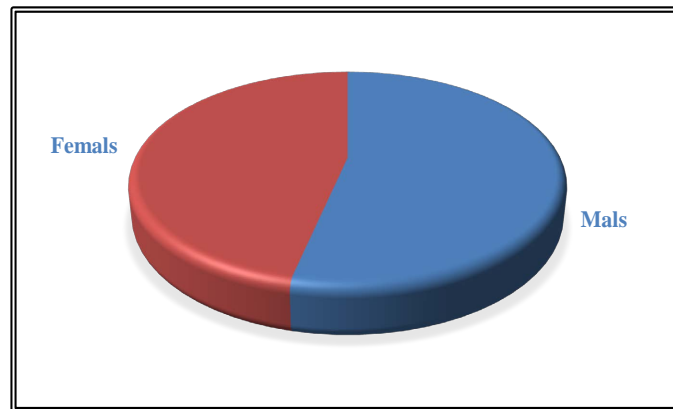


Figure 2. Distribution by sex of subjects surveyed on urinary Bilharzia in the LANTA district in 2023 (n = 734).

the subjects surveyed but 68.26% considered that the services in the health centers were too expensive. The two main reasons for not attending health centers in the Lanta district mentioned by the community in the event of an episode of urinary bilharziasis were: high cost of services in health facilities (75.48%) and low purchasing power of surveys (lack of financial resources) (43.46%).

3.5. Prevalence of Urinary Bilharziasis

The prevalence of urinary bilharziasis was 30.11% (*i.e.* 221 subjects) with 95% CI = [26.90; 33.52].

3.6. Factors Associated with Attitudes and Practices for Preventing Urinary Schistosomiasis among the Subjects Surveyed

- The odds of an unfavorable attitude to the prevention of urinary bilharziasis in a subject living in a household with an income of at least the minimum wage was 0.12 times that recorded in a subject living in a low-income household (less than 52,000F CFA), and this recorded difference in risk is statistically significant at the 5% threshold.
- The odds of an unfavorable attitude to the prevention of urinary bilharziasis

in a subject living less than 5 km from a health center was 0.08 times that recorded in a subject living 5 km or more from a health center, and this observed difference in risks is statistically significant at the 5% threshold.

4. Discussion

The prevalence of urinary bilharziasis was 30.11% (*i.e.* 221 subjects) with 95% CI = [26.90; 33.52]. Our prevalence is close to that found by Green *et al.* (30.1%) in the southwest region of Cameroon in 2021 [14]. This prevalence found by our study is higher than the one found by Atalabi TE *et al.* in Nigeria in 2015 (22.7%). The difference observed may be due to the different targets used by each of the studies.

Our prevalence is lower than those found by Ben and Useh (32.8%) in Adim, Nigeria in 2017 [11], by Atalabi TE *et al.* (30.54%) in 2016 in Nigeria [6], by Balogun JB *et al.* in Jidawa (65.1%) and Zobiya (69.0%) in 2022 [13] and by Léger E. *et al.* (47%) in 2017 in two regions in Senegal [20]. The proportion of subjects with a favorable attitude to the prevention of urinary bilharziasis was 4.77% with 95% CI = [3.45; 6.56]. Our proportion is lower than that found by Barrow A. *et al.* in 2020 in The Gambia where 96.9% had a positive attitude and 57.7% had good practices in the prevention and control of bilharziasis [21]. Among the 221 subjects who recently contracted the disease in our study, 54.29% were able to be consulted at a health service for treatment, according to their declarations. This proportion, which does not confirm the data from the curative care registers of local health facilities, is higher than that found in 2016 by Angelo *et al.* where only 34.7% of subjects received treatment in health services [22].

5. Data/Result Analysis

All villages were surveyed according to their weight. Subjects in the age group of [20; 40[were the most represented at 52.32% and a predominance of endogenous beliefs at 53.95% (Table 1). In this community, approximately 82% of subjects cannot read or write.

63.08% of households in the Lanta community are located within a radius of less than 5 km from the district's health facilities. For 68.26% of respondents, health training services are too expensive. For 82.15% of surveys the waiting time before treatment by health personnel is acceptable with availability of this personnel at 54.23% (Table 2).

The main factors which sufficiently predicted the non-seeking of modern therapy found among subjects who contacted urinary bilharziasis in the community of Lanta are: the village of residence of the subject with a variable risk ratio from one village to another, the low average individual monthly income of the subject (less than 52,000 CFA francs per month) as care are supposed to be very expensive in health facilities (Table 3). To all this, we must also add the Unavailability of nursing staff (very busy) with no previous experience of the disease, particularly through someone who had suffered an episode of urinary bilharziasis.

Table 1. Distribution of subjects surveyed on urinary bilharziasis according to socio-demographic characteristics, Lanta (Republic of Benin), 2023.

	Effective	%
Village		
Dekandji	143	19.48
Gbowime	126	17.17
Golouhoué	72	9.81
Lanta	100	13.62
Sawame-houeyiho	76	10.35
Tikanme-kpodji	121	16.49
Tokanme Aliho	96	13.08
Age in year		
<20	41	5.59
[20; 40[384	52.32
[40; 60[209	28.47
[60; 80[88	11.99
[80; 100[12	1.63
Religion		
No religion	16	2.18
Christian	312	42.51
Muslim	ten	1.36
Endogenous Religion	396	53.95
Instruction		
No level, cannot read and write	602	82.02
Kindergarten/primary	65	8.86
Secondary	55	7.49
University	12	1.63

Table 2. Distribution of subjects surveyed in the district of Lanta on urinary bilharziasis, according to the Organization of health services mentioned in 2023 (N = 734).

	Effective	%
Distance between a CS and home		
5 km and more	271	36.92
Less than 5 km	463	63.08
Cost of services in the CS		
Cheaper (Good)	20	2.72
Moderately expensive (acceptable)	213	29.02
Too expensive	501	68.26

Continued

Welcome in the CS		
Unsatisfactory	50	6.81
Unsatisfactory	119	16.21
Satisfying	254	34.60
Very satisfying	311	42.37
Waiting time during consultations		
Court (acceptable)	603	82.15
Long	95	12.94
Too long (unacceptable)	36	4.90
Staff availability		
Available	398	54.23
Busy	313	42.64
Very busy	23	3.13

Table 3. Summary of analyzes for modern therapy research.

	Multivariate analysis		
	RCa	IC 95%	p-value
Investigation Village			
Dekandji	-	-	-
Gbowime	8.69	2.39 - 31.56	<0.001
Golouhoué	4.08	1.28 - 13.03	0.01
Lanta	1.55	0.44 - 5.45	0.48
Sawame-houeyiho	5.96	1.60 - 22.15	<0.001
Tikanme-kpodji	0.68	0.22 - 2.11	0.50
Tokanme Aliho	8.42	1.45 - 48.72	0.01
Occupation			
Housewife/Unemployed			
Artisan/Worker	1.35	0.41 - 4.41	0.61
Pupil/Student/Apprentice	1.29	0.28 - 5.87	0.73
Breeder	3.42	0.28 - 5.87	0.33
Official	-	-	0.97
Fisherman	0.83	0.06 - 11.41	0.89
Reseller/Trader	4.05	0.84 - 19.52	0.08
Others	0.73	0.26 - 1.99	0.54
Individual income			
<52,000F CFA			
≥52,000F CFA	0.23	0.05 - 0.96	0.04

Continued

Household income			
<52,000F CFA			
≥52,000F CFA	0.97	0.30 - 3.07	0.96
Remote residency - CS			
5 km and more			
Less than 5 km	0.50	0.19 - 1.32	0.16
Cost of services at the CS			
Cheaper (Good)			
Moderately expensive	3.70	0.47 - 29.08	0.21
Not too expensive (acceptable)	1.44	0.14 - 14.29	0.75
Too expensive	3.72	0.54 - 25.33	0.17
Waiting time at CS			
Court (good)			
Long	2.15	0.56 - 8.23	0.26
Not long (acceptable)	0.85	0.38 - 1.86	0.68
Too long (unacceptable)	5.90	0.84 - 41.19	0.17
Staff availability			
Available			
Busy	0.72	0.23 - 2.26	0.58
Little available	1.36	0.64 - 2.88	0.41
Very busy	4.53	1.06 - 19.23	0.04
Effective modern treatment			
No			
Yes	0.37	0.11 - 1.26	0.11
Knowledge of a victim			
No			-
Yes	0.29	0.14 - 0.62	<0.001

6. Conclusions

Adults in the Lanta community have poor knowledge about urinary bilharziasis. Their prevention attitudes are unfavorable with little recourse to a health facility in Lanta to seek modern therapy in the event of the appearance of urinary bilharziasis. Predictors of this behavior are village of residence, low purchasing power, unavailability of health personnel and not knowing anyone affected by the disease. Those responsible for the health system in Benin should direct targeted actions towards this Lanta community to control this phenomenon, in order to get a social and behavioral change.

Urinary schistosomiasis remains a public health problem in the community of

Lanta in the Republic of Benin with a high prevalence (30.11%). We note low research for therapy in health facilities by this community in case of the disease, while drug treatment is available and free.

Conflicts of Interest

The authors declare no conflicts of interest.

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