



## Epidemiological Behavior of Schistosomiasis in Rural Area of Arapiraca, Alagoas, Brazil during the 2010-2014 Period

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### ABSTRACT

The study aimed to verify the Schistosomiasis epidemiological behavior in the second largest city in the state of Alagoas-Brazil, Arapiraca, from 2010 to 2014, as well as understand the existing water collections contaminated by *Biomphalaria* genus snail. Secondary data collected in the Zoonosis Control Center were used, through the municipal Schistosomiasis Control Program. The study was approved by the Ethics Committee on September 3, 2015, under registration number 1.214.466. During the period studied, 44.000 results of parasitological examinations were analyzed, carried out by the Kato-Katz technique in a broad manner, that is, no restrictions in age, gender, race or other variables. Thereby, 1.953 positive cases of schistosomiasis were found, and the year 2012 presented the highest incidence of the disease; individuals aged from 16 to 20 years were the most affected by the parasite and the male gender was the most affected with 69% of cases. Regarding the 1.566 water collections analyzed, 285 were contaminated, however, only 116 were properly treated. It is noticed that the Schistosomiasis Control Program in the city of Arapiraca still works incipiently, and the schistosomiasis should be seen not only as a public health matter, but also as a social issue, where multidisciplinary activities must be seen as a priority by all governmental fields, investing in rural basic sanitation, health education and monitoring of infected individuals, thereby avoiding new outbreaks.

**Keywords:** Epidemiology; Public health; Schistosomiasis; Basic sanitation; Water collections

### INTRODUCTION

The enteroparasitosis undergo inter and intraregional alterations, and depend on sanitation, educational and social conditions, crowding index, conditions of use and contamination of soil, water and food, and the development capacity of larvae, helminth eggs and cysts protozoans in each of these locations [1].

Brazil is one of the countries with the highest reports of cases of schistosomiasis due to poor socioeconomic conditions and contaminated water consumption [2]. According to Couto [3], Brazil presents alarming rates related to the presence of mollusk *Biomphalaria glabrata*, directly linked to the contamination of people by schistosomiasis in the northeast of Alagoas. As reported by Costa et al. [4], population growth in urban centers has made access to education and basic sanitation precarious and insufficient to maintain population quality of life, facilitating the disease outbreak.

The transmission of schistosomiasis in a particular region depends on the existence of intermediate hosts, since it represents the condition required to establish the transmission cycle of the disease. In Brazil, it was observed the presence of three species that may be the intermediate host: *Biomphalaria glabrata*, *Biomphalaria straminea* and *Biomphalaria tenagophila*. The first two are the most frequent in Alagoas, although *Biomphalaria glabrata* represents the highest prevalence rate [5]. Due to the lack of epidemiological data of schistosomiasis in several municipalities in the state of Alagoas, including the city of Arapiraca, the interest in developing this research and evaluate the municipal situation was awakened. The city of Arapiraca is located in the northeast of Brazil, in the state of Alagoas, which covers 102 municipalities, with Arapiraca as the second largest city in the state.

The epidemiological schistosomiasis study is related to the quantity, the distribution of parasitic load and its determinants, besides having as its objective the verification of the effectiveness of intervention projects in infected areas, analyzing the occurrence of the disease, relating the time, localities and physical space [6]. This study aims to determine the epidemiological behavior of schistosomiasis in the city of Arapiraca, Alagoas, Brazil in the 2010-2014 period.

## METHODS

The study was evaluative, analytical and observational, conducted in partnership with the Zoonosis Control Center (ZCC) of Arapiraca city, Alagoas, with permission of the ZCC director. It was executed after the approval of the Ethics Committee of the Federal University of Alagoas, number 1.214.466 on September 3, 2015, CAAE 45344015. The study was conducted with all individuals aged between 1-70 years who underwent parasitological examinations through the Schistosomiasis Control Program (SCP) between 2010 and 2014. In addition, the contaminated and treated water collections were analyzed with *B. Glabrata* genus snail.

Fecal samples were collected and examined by Kato-Katz method [7], and the results were recorded in spreadsheets and tabulated by month, stating the Monthly Bulletin of the Zoonosis Control Center. Descriptive data analysis was conducted, from the calculation of simple absolute and percentage frequencies for categorical variables and organization of the results in tables and graphs.

## RESULTS

### Sociodemographic distribution of schistosomiasis in the city of Arapiraca, Alagoas

During the period of 2010-2014, 44.000 people were assisted by the SCP, 1.953 were diagnosed with schistosomiasis, reflecting an average index of prevalence of 4.42%, as illustrated in figure 1.

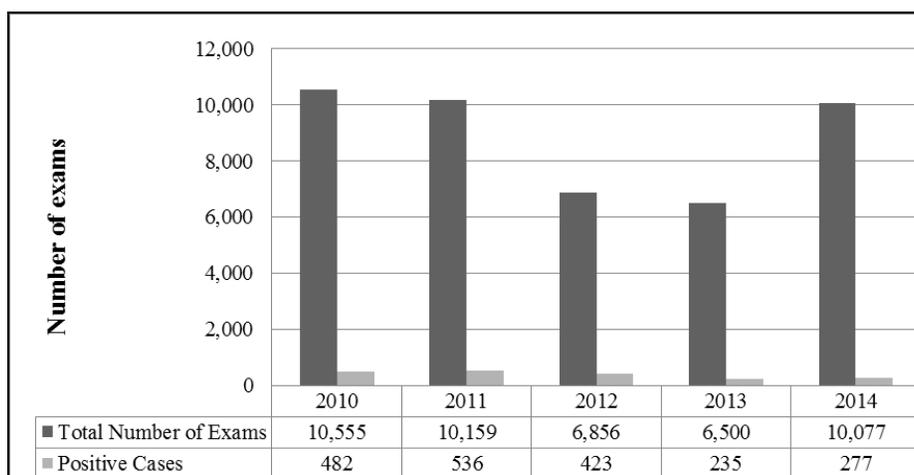


Figure 1: Number of positive cases for schistosomiasis for the years between 2010 and 2014

In 2010, 482 out of 10.555 tests analyzed were positive, showing an incidence of 4%. In the subsequent year, there was a decrease in the quantification of tests, where a total of 10.159 exams were performed. However, there was an increase of positive diagnostics, rising to 536 cases, with an incidence of 5%. In 2012 there was also a reduction in the number of tests carried out, where 423 out of 6.856 tests were positive, representing an incidence of 6%. The year 2013 presented the lowest number of tests, with 6.500 of which 235 were positive, with an incidence of 3.6%. In 2014, 10.077 coprological examinations were carried out, and 277 were positive, which is inversely proportional to the previous year. Individuals infected with *S. mansoni* were residents of several rural locations in the region, making it possible to map out the urban perimeter that had a greater risk of infection due to the proximity of water collections, which has been reported the occurrence of transmitters mollusks.

#### Schistosomiasis incidence according to age and sex:

Due to scarcity of data for the years 2010 to 2013, it was only possible to correlate the age and sex most affected by *S. mansoni* in the year 2014, where 277 out of 10.777 tests performed were positive, and 192 of these were male (69%) and 85 female (31%), as shown in figure 2.

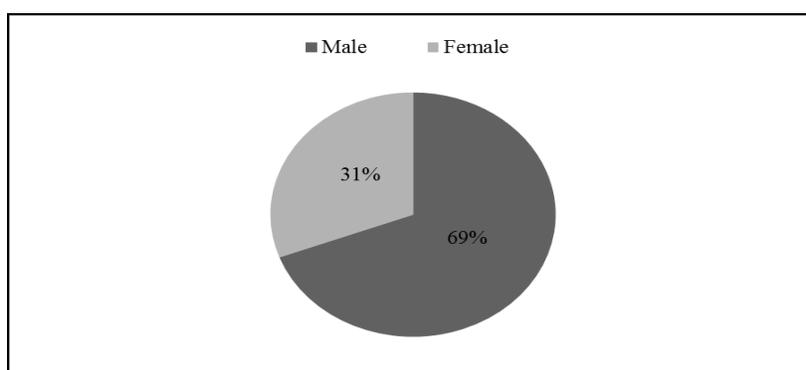


Figure 2: Percentage of schistosomiasis cases according to sex in the municipality of Arapiraca - Alagoas in 2014

By analyzing table 1, it can be seen that schistosomiasis reached all age groups, highlighting males between 16-20 years old who were the most affected, totalizing 29 cases. Females between 36-40 years old presented 10 positive cases.

#### Analysis of water collections from 2010 to 2014:

One of the major reasons for transmission of schistosomiasis is the inappropriate use of water collections. Between 2010-2014, 285 out of 1.566 water collections examined were contaminated with *B. glabrata* genus snail and only 116 were treated with Bayluscid/Niclosamid (Figure 3).

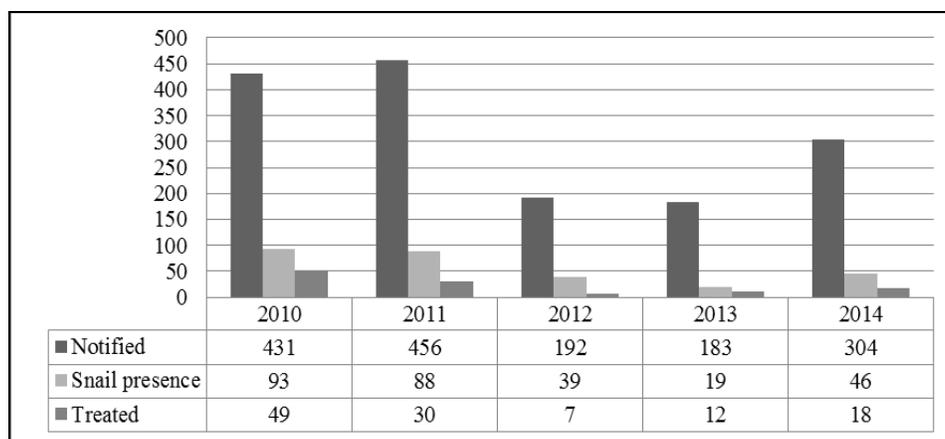


Figure 3: Total number of contaminated and treated water collections reported from 2010 to 2014 in the city of Arapiraca - Alagoas

By analyzing figure 3 it can be observed that the year 2011 presented the highest notification of water collections, while 2013 had lowest notification index with 19 focus of *Biomphalaria glabrata* snail. This reduction in outbreaks may result from an idle search, considering that there was no reduction only in water collections, but also a decrease in quantifying examinations during the period of 2012-2013.

### DISCUSSION

According to Licia *et al.* [8], the countryside is considered a priority area for the active search for individuals infected with *S. mansoni*, which should be monitored by the Schistosomiasis Control Program.

The higher incidence in males can also be related to access to health services, considering that men generally do not seek preventive actions, corroborating with [6], [8] and [10]. As stated by Mariana *et al.* [11], information about the quantification of infected individuals in this period is fundamental in order to have a correct estimate of the epidemiological oscillation of schistosomiasis.

One of the major reasons for the transmission of schistosomiasis is the inappropriate use of various types of water collections in the different locations investigated [9]. Nevertheless, treatment with molluscicide should only be performed if the environmental impact is negligible, considering that environmentally correct vector control actions may be sufficient in some situations [13].

Thus, *Schistosomiasis mansoni* is directly related to socioeconomic factors, especially in poor regions with a lack of adequate basic sanitation [14], [15]. The contact with contaminated water collections occurs directly, either for labor activities, agriculture, leisure, water wells from rain or through sewage disposal in its vicinity [9], [12], [16].

### CONCLUSIONS

According to the mentioned results, failures can be observed in compliance with the standards recommended by the Ministry of Health for routine activities and schistosomiasis control in the city of Arapiraca - AL, which is working in an incipient manner. Oscillations in the examinations numbers performed annually and understatement in an endemic region delimit epidemiological behavior studies of diseases affecting a particular region. However, it is salutary that the responsible agencies perform detailed analysis of data annually, in order to establish effective alternatives as to reduction of endemic diseases. There is no computerized system for recording and data analysis in the city investigated; in addition there is no partnership between the Zoonosis Control Center and the Basic Health Units, associated with a lack of control after treatment of patients and water collections. Therefore, *Schistosomiasis mansoni* must be seen, not only as a public health problem but as a social issue, a priority of all the governmental sphere, through rural sanitation works, community mobilization and health education.

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