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Schistosomiasis mansoni in families of fishing workers of endemic area of Alagoas[a]

Esquistossomose mansônica em famílias de trabalhadores da pesca de área endêmica de Alagoas

Esquistosomiasis mansónica en familias de trabajadores de la pesca de área endémica de Alagoas

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Abstract

Objective: To analyze the epidemiological and clinical aspects involved in the transmission and manifestation of schistosomiasis in a community of fishermen from the endemic area of Alagoas. **Methods:** Epidemiological, transversal, prospective, descriptive, quantitative study. The coproparasitological survey included 275 family units of fish workers and the epidemiological and clinical ones, those with a positive diagnosis for *S. mansoni*. **Results:** The prevalence of schistosomiasis was 13.9% (fishermen), 2.1% (shellfish) and 2.1% (family members). The occurrence of the infection varied according to gender, age, ethnicity and socioeconomic status. Exposure occurred near the home. Autochthonous and predominant low parasite burden, intestinal clinical presentation, abdominal pain and diarrhea were observed. There were no nutritional and pressure changes associated with parasitosis. Adherence to drug therapy and use of the schistosomicidal drug was feared. **Conclusion:** Fish workers are at high risk for contracting the disease with clinical hepatointestinal manifestation, which requires more intense health actions.

Keywords: Schistosomiasis; Epidemiology; Vulnerable populations.

Resumo

Objetivo: Analisar os aspectos epidemiológicos e clínicos envolvidos na transmissão e manifestação da esquistossomose em uma comunidade de pescadores de área endêmica de Alagoas. **Métodos:** Estudo epidemiológico, transversal, prospectivo, descritivo, quantitativo. O inquérito coproparasitólogico contemplou 275 unidades familiares de trabalhadores da pesca e o epidemiológico e clínico, àqueles com diagnóstico positivo para *S. mansoni*. **Resultados:** A prevalência da esquistossomose foi 13,9% (pescadores), 2,1% (marisqueiras) e 2,1% (familiares). A ocorrência da infecção variou conforme gênero, idade, etnia e condição socioeconômica. A exposição ocorreu próxima ao domicílio. Observou-se autoctonia e predominância de carga parasitária baixa, apresentação clínica intestinal, dor abdominal e diarreia. Não ocorreram alterações nutricionais e pressóricas associadas à parasitose. Houve receio na adesão à terapêutica medicamentosa e ao uso do fármaco esquistossomicida. **Conclusão:** Os trabalhadores da pesca apresentam alto risco para contrair a doença com manifestação clínica hepatointestinal, o que requer ações de saúde mais fortalecidas.

Palavras-chave: Esquistossomose; Epidemiologia; Populações vulneráveis.

Resumen

Objetivo: Analizar los aspectos epidemiológicos y clínicos involucrados en la transmisión y manifestación de la esquistosomiasis en una comunidad de pescadores de área endémica de Alagoas. **Métodos:** Estudio epidemiológico, transversal, prospectivo, descriptivo, cuantitativo. La encuesta coproparasitológica contempló 275 unidades familiares de los trabajadores de la pesca y el epidemiológico y clínico, aquellos con diagnóstico positivo para *S. mansoni*. **Resultados:** La prevalencia de la esquistosomiasis fue 13,9% (pescadores), 2,1% (marisqueras) y 2,1% (familiares). La ocurrencia de la infección varió según el género, edad, etnia y condición socioeconómica. La exposición ocurrió cerca del domicilio. Se observó autoctonía y predominio de carga parasitaria baja, presentación clínica intestinal, dolor abdominal y diarrea. No hubo alteraciones nutricionales y presión arterial asociadas a la parasitosis. Existia el temor de la adhesión a la terapia medicamentosa y al uso de la droga esquistomicida. **Conclusión:** Los trabajadores de la pesca presentan alto riesgo para contraer la enfermedad con manifestación clínica hepatointestinal, lo que requiere acciones de salud más intensas.

Palabras clave: Esquistosomiasis; Epidemiología; Poblaciones vulnerables.

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INTRODUCTION

Parasitic diseases are recognized as a public health problem and thousands of people are affected worldwide, among which the schistosomiasis is distinguished, resulting from a web of relationships between the man, the aquatic environment and the *Schistosoma* sp helminths.[1-3] The schistosomiasis is associated with the disease-impoverishment-poverty cycle[4,5] and its epidemiological profile is determined by environmental, biological, socio-economic and cultural factors of a society[6-8] that interconnected, influence the development and the disease control cycle.

In Brazil, it is estimated that 2.5 to 8 millions of Brazilians are affected by the schistosomiasis mansoni and about 5 millions of persons may be infected, in which the Southeastern and Northeastern are the most affected regions, with the highest prevalence rates in the Northeastern states.[1] The state of Alagoas, situated in Northeast Brazil, provides favorable conditions for the establishment of the schistosomiasis, in view of its environmental aspects, presence of the transmitter molluscs, strong social inequalities and intensive human contact with water collections (*contact standard with water collections*). For this reason, approximately 70% of the municipalities in Alagoas are affected by the spread of the disease,[9,10] including Marechal Deodoro, situated in the transition of risk to the schistosomiasis and prevalence rate of 7.54% between 2010 and 2016.[11]

In this municipality, one of the main source of income and generation of jobs is the fishing[12] and the fishing workers, by having a greater contact with the water, constitute a group of greater vulnerability, exposition and contamination by *S. mansoni*, in addition to being a potential source to the spread of the disease. Thus, the aim of this research was to analyze the epidemiological clinical aspects involved in the transmission and manifestation of the disease in a fishing community from endemic area of the schistosomiasis.

METHODS

Epidemiological, cross-sectional, prospective, descriptive study with a quantitative approach, carried out between June 2016 and March 2017, composed of three evaluation steps: parasitological, epidemiological and clinical that occurred simultaneously during the period, where there has been a hierarchy in steps, as a prerequisite for another.

The municipality investigated is Marechal Deodoro (Latitud: 09042' 37", Longitud 35° 53' 42") located by the right edge of Manguaba lagoon, through which is bathed on the extreme northteastern by the Rio dos Remédios and to the south by the Niquim River, to the east by the Atlantic Ocean and it central portion by the Rios Grande and of the Estiva that fed the Mundaú lagoon. It stands at 19 km to the south-west of Maceió (Capital), to a resident population of 45,995 inhabitants, demographic density of 138,62 inhabitants per km^2 and poverty rate of 64,32%, the economy is based on the productive chain of the chemical and of the plastics production, sugarcane-alcohol companies, shelfish, fishing and tourism.[12]

In this study fishing workers (fishers and shelfish) registered and active in the Fishermen Colony São Pedro (Z-6) and its respective family unit. This population was chosen by having greater risk of contracting schistosomiasis and randomly selected, from a listing provided by the Colony, containing identification data and address.

In the parasitology research, fishing workers and their family unit have participated, excluding non-resident families at home and children aged under or equal 2 years old, following the Schistosomiasis Control Program protocol (PCE) in not including in its coproscopy routine, children in this age group. In the epidemiological and clinical research schistosomiasis-positive individuals have participated.

The method used for the parasitological diagnosis was Kato-Katz and the processing of the fecal material and slide analysis were carried out by the PCE technicians. Cases confirmed by laboratorial criterion had slides containing *S. mansoni* egg(s). The parasite load has been determined by multiplying the number of eggs by the constant 24, (considering that one slide contains 45 g of feces that multiplied by 24, will be a result of approximately 1 g of feces), therefore obtaining eggs for every gram of feces (opg). The individuals we classified[13] with low (to 100 opg) moderate (101 to 400 opg) and high (higher than 400 opg) parasite load.

In the epidemiological research a form validated by Melo *et al.*[14] was applied, containing the following variables: identification, sociodemographic (ethnicity, nationality, income, schooling, water supply and treatment and waste disposal, destination of the trash and housing type), autochthony and risk behavior of schistosomiasis (labor, household and leisure activities and frequency of contact with hydro solutions).

In the clinical evaluation an individual form elaborated by the authors of this research was used, with the following variables: self-reported gastrointestinal symptomatology, nutritional and pressure assessment (body weight), abdominal physical examination with liver assessment (down to the left costal margin) and spleen (left costal margin) and medicinal therapy of schistosomiasis.

The nutritional assessment through the body weight occurred by the Body Mass Index: Weight (measured by the digital balance with capacity of 150Kg) / Height^2 (measured with a meter rule). The participants were classified[15] as low weight (≤ 18.5); eutrophic (≥ 18.5 >25); overweight (≥25<30) and obesity (≥30). In the adolescents aged 10 years old and lower than its classification through the percentile between 5 and 85, being classified into: low weight (>5), eutrophic (≥ 5 <85) and overweight (≥85). For the elderly the classification was: low weight (≤ 22); eutrophic (>22<27), overweight (≥27).

Blood pressure was measured by auscultation, using an aneroid sphygmomanometer tested and calibrated, with width of rubber pouch compatible with the arm circumference.

The systolic and diastolic arterial pressure (PAS/PAD) of the participants in the study were classified[16] in: normal (≤120/ ≤80), pre- hypertension (120 - 139/ 80 - 89), hypertension (≥ 140 /100).

The determination of the clinical schistosomiasis presentation followed the classification of Pessoa and Barros[17] adapted by Barbosa[18]: Intestinal (liver and spleen not palpable), Hepato-intestinal (liver palpable at more than 3 cm from the right costal edge) and Hepatosplenic (spleen not palpable with normal or increased consistency).

The collection of fecal samples was conducted in the households of the participants in the study, during the morning period with a mean time of 2 hours, in collectors previously identified, stored in styrofoam boxes and sent to the Health Surveillance laboratory of the municipality examined. Over the 24-hour period before the feces collection, the individuals were registered by means of a form of daily records for coproscopy, used by the PCE during the coproscopic census.

The epidemiological and clinical data collection occurred in a reserved place at home or in the fishermen colony, with an average duration of 30 to 40 minutes. In order to avoid information bias in epidemiological data collection, the relatives investigated were not interviewed regarding family income and questions related to environment sanitation, whose information was gathered in the interview of the fishing workers (family head).

The population registered and active in the Fishermen Colony São Pedro (Z-6) is composed of 669 fishing workers and 939 relatives. The obtainment of the sample of 275 individuals, between fishermen and shelfish, considered the Barbetta calculation[19] with the addition of 10% for possible losses (n = 669x400/669+400 = 250 + 10%). From the total of the fishing workers, 86.5% (n = 238) and 54.5% (n = 512) of the relatives agreed to cooperate in the study.

The endpoint of the study corresponded to the identification of the individuals infected by the *S. mansoni,* being this the dependent variable, and of the epidemiological and clinical data, to the dependent variable, and the epidemiological and clinical data, to the independent variable. Eligibility criteria were: to be fishing worker registered in the Fishermen Colony and be developing fishing activities.

The study was approved by the Ethics Research Committee of the Tiradentes University/UNIT: CAAE 557773216.3.0000.5371; Protocol 1.585.464, approved on 09 June 2016. All the participants signed the Consent Form for the research, the respect to the autonomy and anonymity were preserved in all phases.

The statistical observations were conducted using the SPSS version 16.0 statistical software (Statistical Package for the Social Sciences Inc., Chicago, IL, EUA), and adopted a 95% confidence level. The used statistics was descriptive (percentage and average), hazard ratio (*Odds Ratio*) in order to identify the schistosomiasis occurrence among the assessed and the Pearson chi-squared test, in order to verify the association or not among the analyzed variable. The differences were considered significant when *p* value was less than 0.05.

RESULTS

Of the 750 individuals that provided fecal material for the stool test (238 fishing workers and 512 relatives), the general prevalence of schistosomiasis was 18%, being 15.9% between the fishing workers (fisherman 13.8% and selfish 2.1%) and 2.1% among the relatives. More than half (57.9%) of these bearers of the infection originate from the rural environment and live in Marechal Deodoro, since his birth.

Approximately 65.8%, of these workers use the hydro collections solely for the labor activity (OR= 0.6 IC 95% = 0.46 - 0.79) and 34.2% associate labor activities and leisure. The fishermen has a relative risk 3.6 times higher of getting infected with the parasite, for displaying high frequency of contact with the hydro collections, behavior strongly associated with the schistosomiais (Table 1).

Table 1. Contact frequency of the fishing workers with the hydro collections. Marechal Deodoro, Alagoas, Brazil. 2016-2017.

Frequency	Fisherman		Selfish		χ^2 *(*p*-value)
	n	%	n	%	0.00
Daily	28	73.6	1	2.6	
Weekly	5	13.2	1	2.6	
Fortnightly	-	-	3	8	
Total	33	86.8	5	13.2	

* Pearson chi-squared test of association

The socio-demographical characteristics of the individuals parasitized by *S. mansoni* are described in the Table 2 and Pearson correlation did not indicate statistically significant association among the variables analyzed ($p > 0.05$).

The cases confirmed of the schistosomiasis infection are autochtony, occurring in the three ethnic groups, in which black and brown individuals had the higher frequencies. Among the fishing workers, the adults (29 to 49 years) and elderly (more than 60 years) were the most affected and, among the relatives inverse condition was found, and adolescents and it was more prevailed between adolescents and young adults (10 to 28 years).

Approximately 51.5% of the fishermen and 20% of the selfish are assisted by the minimum income social program of the federal government "Family Allowance", earning a family income under one minimum wage (R$ 937.00). Regarding the schooling, the schistosomiasis is prevalent in those who cannot read or write (illiterates) and among those who have few years of schooling (incomplete basic school).

Regarding the basic infra structure and habitation conditions, the access to water and energy are derived from the public service. The most fishing (97%) does not carry out any prior treatment of the drinking water, and, among those who use

Table 2. Socio-demographical characteristics of the bearers of schistosomiasis infection, Marechal Deodoro, Alagoas, Brazil. 2016-2017.

	Fishing workers				χ^2 *(*p*-value)	Family	
	Fishermen		Selfish				
	n	%	n	%	$p < 0.05$	n	%
Autochtony							
Yes	33	100	5	100		11	100
No	-		-	-		-	-
Ethnicity							
Black	6	18.1	-	-		2	18.2
White	8	24.3	2	40	$p = 0.516$	-	-
Brown	19	57.6	3	60		9	81.8
Age (years)							
10 to 17	-	-	-	-		5	45.5
18 to 28	3	9.1	-	-		4	36.4
29 to 39	10	30.3	2	40	$p = 0.061$	2	18.1
40 to 49	9	27.3	1	20		-	-
50 to 59	5	15.1	-	-		-	-
+ 60	6	18.1	2	40			
Family income						NA**	
Without Income	1	3.0	-	-			
< 1SM***	22	66.7	3	60	$p = 0.085$		
Between 1 and 2 SM	10	30.3	2	40			
Family Allowance						NA	
Yes	17	51.5	1	20			
No	16	48.5	4	80			
Schooling							
Illiterate	17	51.5	2	40		1	9.1
Incomplete Basic School	15	45.5	2	40	$p = 0.365$	10	90,9
Complete Basic School	1	3.0	1	20		-	-
Provision (water)							
Public	33	100	5	100		NA	
Water (consumption)							
Without treatment	32	97	5	100	$p = 0.781$	NA	
Filtration	1	3.0	-				
Energy (public)							
Yes	33	100	5	100			
Destination of thash							
Septic Tank	21	63.6	3	60	$p = 0.702$	NA	
River	9	27.3	2	40			
Lagoon	3	9.1	-				
Type of house							
Brick (adobe)	32	97	5	100	$p = 0.693$	NA	
Canvas	1	3,0	-				

* Pearson chi-squared test; (-) Non existing data; ** NA (Not Applicable); *** Minimum Wage.

the filtration, there is no habit of changing periodically the filter. The predominant profile of the houses is brick adobe, and the domestic waste are directed into the septic fossa (63.6%), while the remainder is directed into the lagoon Mundaú and rivers that border the residences (Table 2).

The parasitic load observed in this study, irrespectively of the labor category regarding the fishing, was 1 to 13 eggs per blades ($\overline{X} = 3.45 \pm 3.28$), while the mean of eggs per gram of feces was 82.1 ± 79.2. The results of the clinical evaluation (Table 3) showed that the bearers of *S. mansoni* had light to moderate infection, in which the low parasitic load is the predominant (until 100 opg) among fishermen (78.8%), selfish (80%) and relatives (72.7%), without significant differences ($p > 0.05$).

At physical abdomen examination, the liver was impalpable in the selfish (100%) and in the relatives (100%), although palpable in 9.1% of the fishermen, with normal consistence and of smooth surface, while the spleen was impalpable in the individuals examined. Regarding the clinical presentation of schistosomiasis, the intestinal form prevailed in the evaluated, and the hepatointestinal form affected a small number of fishermen (9.1%), without statistically significant association with the labor activity. In this study, cases of hepatosplenic form were not observed (Table 3).

Abdominal pain and diarrhea were the most referred digestive symptoms. The pain was showed with different variations, of light to moderate intensity, being, sometimes, felt with predominance of the colic-type (Table 4).

The diarrhea was present with light to moderate intensity, however the light is the most prevalent between the selfish and the relatives and, the moderate, among the fishermen. Small amounts of blood around the feces (rectal bleeding) was a little mentioned clinical by the evaluated and of rare occurrence. There was no reports of dark and fetid feces (melena).

Regarding the classification of pressure levels, the hypertension was more frequent among the fishermen (45.5%), while the condition of pre-hypertensive prevailed in the selfish (80%) and the normotensive in the relatives (63.6%). Regarding the classification of the nutritional condition, 36.4% of the fishermen showed overweight, 40% of the selfish obesity and 45.5% of the relatives, the thinness (Table 5).

Table 3. Clinical characteristics of the bearers of *S. mansoni*. Marechal Deodoro, Alagoas, Brazil. 2016-2017.

Clinical Variables	Fishing Workers				χ^2 *(*p*-value)	Family	
	Fishermen		Selfish				
	n	%	n	%	$p < 0.05$	n	%
Infection intensity							
Light (until 100/opg)	26	78.8	4	80		8	72.7
Moderate (101 to 400/opg)	7	21.2	1	20	$p = 0.951$	3	27.3
Abdomen (observation)							
No alterations	33	100	5	100		11	100
Abdomen (palpation)							
Pain (absent)	33	100	5	100		11	100
Liver							
Palpable	3	9.1	-	-		-	-
Impalpable	30	90.9	5	100		11	100
Liver (Consistence)							
Normal (Flaccid)	3	100	-	-		-	-
Liver (Surface)							
Smooth	3	100	-	-		-	-
Spleen							
Impalpable	33	100	5	100		11	100
Clinical Form							
Intestinal	30	90.9	5	100	$p = 0.482$	11	100
Hepatointestinal	3	9.1	-	-		-	-

* Pearson chi-squared test of association

Table 4. Simptomatology of self-referred *S. mansoni* infection by bearers, Marechal Deodoro, Alagoas, Brazil. 2016-2017.

	Fishing workers					
	Fishermen		Selfish		Family	
	n	%	n	%	n	%
Abdominal pain						
Yes	16	48.5	4	80	8	72.7
No	17	51,5	1	20	3	27,3
Pain (Intensity)						
Light	6	37.5	2	50	6	75
Moderate	5	31.2	2	50	1	12.5
Intense	5	31.2	-	-	1	12.5
Pain (Frequency)						
Always	3	18.7	1	25	1	12.5
Sometimes	13	81.3	3	75	7	87.5
Pain (Type)						
Sharp	5	31.3	-		2	25
Colic	11	68.7	4	100	6	75
Diarrhea						
Yes	13	39.4	4	80	3	27.3
No	20	60.6	1	20	8	72.7
Diarrhea (Intensity)						
Light	6	46.2	4	80	3	100
Moderate	7	53.8	1	20	-	-
Diarrhea (Frequency)						
Always	1	7.7	1	20	-	-
Sometimes	12	92.3	4	80	3	100
Rectal bleeding						
Yes	7	21.2	1	20	1	9.1
No	26	78.8	4	80	10	90.9
Rectal bleeding (Intensity)						
Light	7	100	1	100	1	100
Rectal bleeding (Frequency)						
Rarely	7	100	1	100	1	100

DISCUSSION

The municipality study object is endemic for schistosomiais, as it presents environmental scenario favorable to infection of the host mollusc *Biomphalaria glabrata* and the human infection, by cercariae of *S. mansoni*. The positive cases analyzed are authocthonous, indicating that the exposition occurred in the investigation location. These individuals, due to not exhibit the clinical manifestation of the disease in the acute phase,[20] evolve to the chronic forms of the disease, configuring in a challenge for the public health and parasitic infection control.

The fishing environment gathered desirable characteristics for *S. mansoni* contamination, due to have inefficiency of basic sanitation and represent the final disposition of the domestic effluents, constituting spaces of occupational risks,[21] by the exposition to transmissible infections, such as the schistosomiasis.

The fishing activity can be used as an indicator to increase the prevalence of infection.[22] The male fishing workers were the most affected, corroborating the recognized high frequency of the schistosomiasis infection among the men,[23-30] since in this occupation there is a gender influence[31,32] due to the social

Table 5. Classification of blood pressure, nutritional and adherence to drug therapy of individuals infected by *S. mansoni*. Marechal Deodoro Municipality, Alagoas, Brazil. 2016-2017.

	Fishing workers					
	Fishermen		Selfish		Family	
	n	%	n	%	n	%
Blood Pressure						
Normotensive	7	21.2	-	-	7	63.6
Pre-hipertensive	10	30.3	4	80	3	27.3
Hipertensive	16	48.5	1	20	1	9.1
Nutritional Condition						
Eutrophic	14	42.4	2	40	3	27.2
Malnutrition	-	-	-	-	5	45.5
Overweight	12	36.4	1	20	2	18.2
Obesity	7	21.2	2	40	1	9.1
Chemotherapy (Previous)						
Yes	10	30.3	1	20	2	18.2
No	23	69.7	4	80	9	81.8
Chemotherapy (Current)						
Yes	30	90.9	5	100	11	100
No	3	9.1	-	-	-	-

division of labor: fishermen are more exposed because develop activities with parts of its body in the water, different from the work conditions in the selfish, in which the selfish reception and processing reduce the water contact and exposition.

The fishing work division and the risk of *S. mansoni* infection is documented by several authors,[33] which observed that the prevalence of infection is more increased among the fisherman, specially, those who fished on foot compared with those who practiced the boat fishing, in which are present the women, who were less affected by this helminthiasis.

Increased occurrences of this parasitosis in adults were also observed in a community where the fishing activity is predominant.[26] In the relatives the disease occurrence between adolescents and young adults is justified by the behavioral aspect of the age (swimming/ fishing), and similar trends were observed in a municipality rich in water sources and endemic for the schistosomiasis.[28] Specifically in this study, the prevalence among the adolescents can be attributed to the follow-up in the fishing activity of the relatives. The family occupation can interfere in the epidemiology of this parasitosis.[34]

The schistosomiasis was more prevalent between blacks and browns, this trend was found in individuals infected with *S. mansoni.*[14,28] The key element for the occurrence of this infection is not the ethnicity but the socio-economic factor: individuals of this ethnical group m more devoid of income and years of study and reside in places with environmental insalubrity. The deficiency of basic sanitation and the risk of infection have been documented by several authors[35-38] as well as the adequate sanitation and lesser chances of acquiring the infection by this parasite.[39]

The relation between low level of schooling and schistosomiasis are reported in several studies.[3,22,40] The instruction level is an important factor in the control of this parasitosis, because the access to information promotes the empowerment of the population, adherence to health care, behavioral change and consequent reduction of the prevalence rates. On the other hand, individuals less educated are less prone to orientations for prevention of the disease and health promotion, thus, the education and the health embrace the health-falling ill-healing process, impede the occurrence or complications of the disease.[41]

The low parasite load and the light intensity of infection, predominant among the investigated, are common characteristics found in endemic for the schistosomiasis, arisen from the successive reinfections and treatments with the Praziquantel, drug that has the capacity to reduce the parasite load and the production of eggs of *S. mansoni.*[42] Such individuals, are in general asymptomatic and can be held responsible by the maintenance of the outbreaks of the disease.[27]

The more accentuated intestinal disturbances, as abdominal pain and dirrhea may suggest the chronic form of schistosomiasis,[20,43,44] specifically of type intestinal[5] and, the presence of blood feces and melena, can be associated with hepatointestinal or hepatosplenic forms of the disease.[44,45] These events, with the exception of melena, were symptons commonly found in fishermen and his relatives infected with *S. mansoni*.[26]

The description of the abdominal sharp pain, attributed to the "worm pinching the abdome", have been reported by other investigators.[14] This sensorial perception of pain reveals the interpretative model of the disease, especially of the parasite in the human organism, under a popular conception, linked to sociocultural conditions, in the time and space established, where the (re) significations of the health-disease are built and shared.[46]

The alterations of the pressure levels and of the weight in the individuals in this research are not attributed to the infection of *S. mansoni*, although the malnutrition has, as one of its causes the schistosomiasis, by causing alterations in the digestion and absorption of nutrients, with negative consequences for the organism over the long term,[47,48] specially in children, enabling outbreaks of other infections and debilitating the organism.

The adherence rate to the drug treatment in this research was satisfactory, above the rate advised by the (80%) Ministry of Health even having initially aversion to the use of the Praziquantel drug due to its side effects (headache, vomiting, diarrhea, fever, muscular and articular pain, among others), condition also reported in fishermen population resident in endemic areas for the schistosomiasis in the African continent.[49] The reluctance to the use of Praziquantel may be related to the sharing, in the community under study in Alagoas, of the sensations and experiences lived by individuals who adhered and were in drug treatment, provoking in those who did not adhere to the chemotherapy *a ripple effect* of fear to the anti-parasite drug.

The limitation of this study refers to the low sensibility of the diagnosis method and to the need for complementary exams, such as, the imaging method, in order to define with greater precision, the chronic stage of schistosomiasis. These aspects do not interfere in its relevance and scientificity, with the possibility of being used as a basis for the epidemiological and clinical research of the disease in other endemic localities.

FINAL CONSIDERATIONS AND IMPLICATIONS FOR PRACTICE

The unfavorable scenario of the municipality under study, with precariousness of basic sanitation, education, housing and income, reiterates that the disease prevail under conditions of socio-economic vulnerability. These conditions should be considered in the dynamics of the transmission of disease, since the organization of the geographic space and its presentation are determinants and conditionings for the maintenance, propagation and transmission of schistosomiasis.

The labor environment of the fishing workers is favorable to the contamination by *S. mansoni* and other pathogenic microorganisms causing waterborne diseases. The behavior and the frequency of contact of the fishermen with the water, due to the labor activity or of the leisure, lead him to greater exposition to the parasite. However, both the fishermen and the selfish are population of risk for the schistosomiasis, and as such, should be always investigated and monitored, by be considered signaling factors for the disease.

The authocthony of the cases confirmed constitutes an alert so that the control measures can be performed, in order to reduce the risk, the prevalence and the infection transmission dos. Therefore, it is necessary to set up effective public health policies, housing and infrastructure, to enable the population of this municipality to achieve dignified and appropriate life conditions for his survival, determinants for the control and the reduction of the schistosomiasis prevalence.

The empowerment of the population about the disease contributes to the adherence to the health protection measures and interfere in the health-disease-healing process. The fear with regard to the Praziquantel use should be addressed by the health professionals, through myths and trues about its adverse effects, providing safety to the drug treatment.

From the epidemiological perspective, the predominance of the intestinal clinical form can be attributed to the actions of the PCE of the municipality of Marechal Deodoro, with weekly routine of coproscopy, early diagnosis and timely intervention, referring the positive cases to the Basic Unit of Health for the effective treatment. Despite the actions instituted by the PCE it is essential that partnerships between the health surveillance and the municipality basic health care be strengthened for effective management of the schistosomiasis.

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