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Epidemiological characterization of neglected diseases in the state of Piauí

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Abstract. Neglected diseases are characterized as a group of diseases that contribute to the maintenance of inequality. This study aimed to characterize the epidemiological profile of neglected diseases in the state of Piauí. This was an ecological, exploratory, retrospective, descriptive and quantitative study with data obtained from the Information System for Notifiable Diseases of the Piauí State Department of Health of neglected diseases in the state: Leprosy, Tuberculosis, Visceral Leishmaniasis, Leishmaniasis American cutaneous, Chagas disease and Geohelminthiases. The selection of data took place between 2012 and 2016, except for Geohelminthiases, which followed the Ministry of Health campaign that took place between 2014 and 2016. The organization and data analysis took place using the software Tabwin 4.1.4 and Microsoft Excel. 5251 leprosy cases with a predominance of multibacillary cases (60.22%) were reported. Regarding Tuberculosis, there were 3369 cases with a predominance between 20 and 49 years old (50.73%). Regarding Leishmaniasis, 1052 cases were reported with a predominance of Visceral Leishmaniasis (84.3%) while Chagas' disease, 90 cases were reported. Regarding Geohelminthiasis, 1029 schools and 155,082 students joined the campaign, 77.69% of whom were treated with albendazole. In Piauí, case records of neglected diseases are high, with the need to intensify control actions, which can contribute to an efficient performance of surveillance of these diseases and improvement of the population's quality of life.
Keywords: Neglected diseases; Public health; Epidemiology; Epidemiological surveillance.

Introduction

Neglected infectious diseases are currently characterized by persisting in the poorest and most marginalized communities in the world (PAHO, 2016). According to the goals established by the World Health Organization (WHO), by the year 2030, epidemics of AIDS, tuberculosis, malaria, hepatitis, waterborne diseases, neglected tropical diseases, and other communicable diseases should be fought (WHO, 2018).

According to the WHO, these diseases are defined as neglected, since for many years they received insufficient attention, which culminated in millions of people without access to drug treatment as well as health care. It is estimated that more than 1 billion people suffer from one or more of these diseases and live in potential areas at risk for contamination (PAHO, 2016).

According to the Brazilian Academy of Sciences, the main neglected diseases are: Chagas disease, Sleep Disease, Leishmaniasis, Malaria, Filariasis, Schistosomiasis, soon after, other diseases such as Leprosy, Tuberculosis, Dengue, Yellow Fever, HIV/AIDS, and more recently Askaryosis, Tridriorasis, Ancilostomy, Trachea, Dracunculiasis and Buruli Ulcer were included. Concerning this group of diseases, it is necessary a selection that is susceptible to variations according to the states and municipalities, taking into account predisposing factors, such as climate, environmental and socioeconomic changes (SOUZA, 2010).

About neglected diseases, the state was included in Ordinance No. 181 and was contemplated with the financial resources of the United Nations Development Program (UNDP)/World Bank, where they were classified as the main neglected diseases in the state: Leprosy, Tuberculosis (TB), Chagas Disease, Visceral Leishmaniasis (VL), American Tegumentary Leishmaniasis (LTA) and Geohelminthiasis. The study aimed to characterize the epidemiological profile of the main neglected diseases in the state of Piauí from 2012 to 2016.

Methods

This was an ecological study, of exploratory, retrospective, descriptive and quantitative character, evaluated in the period from 2012 to 2016, carried out through public domain data of the cases of the main neglected diseases in the state of Piauí contained in the Information System of Notifiable Diseases (SINAN) which feeds the Department of Informatics of the Unified Health System (DATASUS).

The research was developed after authorization from the State Department of Health of Piauí (SESAPI)/State Coordination of Epidemiology through the signing of the Institutional Authorization Term (Tai) and the Institution's Consent Form (TCI). This study dispensed with submission to the Research Ethics Committee because it was worked with public domain data, not involving human beings directly or indirectly.

Data collection occurred between August and November 2017, and they were extracted from The State SINAN, with the supervision of the various technical groups responsible for keeping data on the six diseases selected as neglected in the state. As inclusion criteria, disease data were collected in a 5-year spectrum, which included the period from 2012 to 2016 due to the closure and compilation of cases in their respective epidemiological years.

In this work, the variables to be worked on each disease are justified, where the data provided by the institutions and systems responsible for compiling them were taken into account. The variables of this study were specific for each neglected disease: total cases, operational form and recurrent cases in the face of Leprosy; the total number of cases and age group for Tuberculosis; the total number of cases, gender and age group before Leishmaniasis (American and Visceral Tegumentary); and total cases in the face of Chagas disease.

Concerning Geohelminthiases, there is already a national policy aimed at the distribution of drugs directed to the treatment of schoolchildren, which is one of the bottlenecks, because the existing limitation consists only in the performance of treatments, not allowing the confirmation of the diagnosis for effective knowledge of helminths circulating in the country. The campaign in the state was due to the acceptance of the municipalities in the acceptance of the policy made available by the MS, and the period of the survey was carried out in the years 2014 to 2016, where schools and school children worked in this participation.

All data collected were organized through TabWin 4.1.4 and Microsoft Office Excel 2016 software and presented in the form of tables and segmentation into analysis categories. The data were analyzed using descriptive statistics by the Bioestat 5.0 software.

Results and Discussion

In the face of the main neglected diseases in the state of Piauí, leprosy includes leprosy because of the increase in the number of notifications of new cases between 2012 and 2016. In a five-year historical cut, there were a total of 5,251 reported cases state-by-state.

Regarding the number of leprosy cases in the state, there was an increase followed by a decrease over the years, and 2012 totaled 1102 cases (20.99%), 2013 presented 1037 cases (19.75%), especially 2014 with the highest number of cases in the period studied, totaling about 1160 cases (22.09%). On the other hand, there was a sharp drop in cases in the following two years, from 1039 cases (19.79%) in 2015 for a total of 913 cases (17.39%) in 2016.

Based on the operational classification regarding leprosy forms, 2089 cases were reported (39.78%) paucibacillary form against 3162 cases (60.22%) of the multibacillary form, and the predominance of the multibacillary form is notorious. To the number of recurrent cases, in the period from 2012 to 2016, 192 cases were registered.

Regarding Tuberculosis, in the period corresponding to the years 2012 to 2016, a total of 3,369 cases of tuberculosis were recorded in SINAN, with a higher concentration of cases in 2013 (n=731) and a reduction was recorded compared to 2015, the year with the lowest number of cases (n=597). Regarding the age group, there was a predominance between 20 and 49 years with about 50.7% (n=1709) of the registered cases. Attention should be paid to the recording of cases in the age groups 1 to 4 years (n=10) and less than 1 year (n=21), evidencing a shift of cases to the younger age groups since it is uncommon for such age groups. (Table 2).

Regarding Leishmaniasis, according to the analysis of the distribution of cases, 887 cases of Visceral Leishmaniasis (VL) and 165 cases of American Tegumentary Leishmaniasis (ATT) were confirmed. It is observed that males are responsible for the highest percentage of cases recorded in both VL (66.18%) as well as in THE LIN (67.88%) (Table 3).

The data of this research indicate that the cases related to ATL are predominant in the young and elderly adult populations, corresponding to more than 80% of the new confirmed cases. The occurrence of ATL was higher in the age groups between 20 and 34 years, corresponding to 41 cases (24.85%) and it is also noteworthy that the age group from 50 to 64 years concentrated a significant number of cases, about 39 (23.64%).

Also in Table 3, concerning VL, it was identified that so many young adults and children are at higher risk for L. Chagas infection. The most affected age groups were between 20 and 34 years, with 174 cases (19.62%) and 1 to 4 years of age, with 169 cases (19.05%)

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Table 1. Distribution of leprosy cases according to new cases, operational classification, and recurrence cases in the period and 2012 to 2016 in the state of Piauí**.**

Variants	Cases	
Period	N	%
2012	1102	20,99
2013	1037	19,75
2014	1160	22,09
2015	1039	19,79
2016	913	17,39
Total	5251	100
Operational classification		
Paucibacillar	2089	39,78
Multibacillary	3162	60,22
Recurrence cases		
2012	41	21,35
2013	46	23,96
2014	36	18,75
2015	38	19,79
2016	31	16,15
Total	192	100

Table 2. Distribution of tuberculosis cases according to new cases and age group in the period from 2012 to 2016 in the state of Piauí.

Variants	Cases	
Period	N	%
2012	709	21,04
2013	731	21,70
2014	660	19,59
2015	597	17,72
2016	672	19,95
Total	3369	100
Age group		
< 1 year old	21	0,62
1 to 4 years old	10	0,30
5 to 9 years old	20	0,59
10 to 14 years old	51	1,51
15 to 19 years old	159	4,72
20 to 34 years old	818	24,28
35 to 49 years old	891	26,45
50 to 64 years old	795	23,60
65 to 79 years old	472	14,01
Over 80 years old	132	3,92

Table 3. Distribution of cases of tegumentary leishmaniasis and visceral leishmaniasis according to new cases, gender, and age range from 2012 to 2016 in the state of Piauí.

Variants	Tegumentary Leishmaniasis		Visceral Leishmaniasis	
	N	%	N	%
New Cases	165	100	887	100
Gender				
Male	112	67,88	587	66,18
Female	53	32,12	300	33,82
Age group				
<1 year old	3	1,82	74	8,34
1 to 4 years old	6	3,64	169	19,05
5 to 9 years old	5	3,03	62	6,99
10 to 14 years old	6	3,64	40	4,51
15 to 19 years old	8	4,85	39	4,40
20 to 34 years old	41	24,85	174	19,62
35 to 49 years old	37	22,24	142	16,01
50 to 64 years old	39	23,64	119	13,42
65 to 79 years old	15	9,09	58	6,54
> 80 years old	5	3,03	10	1,13

With Chagas disease, in the period under study from 2012 to 2016, there was a record of 90 cases reported in SINAN. The silent areas for the disease in the health regions: Tabuleiro do Alto Parnaíba and Serra da Capivara, totaling 30 municipalities without case records, stand out. Attention should be paid to all municipalities in the state, however, the area of the Cocais territory (22 municipalities), located in the north of the state, should be given a priority due to the greater number of registered cases (Table 4).

Table 4. Distribution of Chagas disease cases by regional health in the period from 2012 to 2016 in the state of Piauí.

Variants	Cases	
Regional Health Center	N	%
Carnaúbais	2	2,22
Chapada das Mangabeiras	1	1,11
Cocais	33	36,67
Entre Rios	5	5,56
Planície Litorânea	7	7,78
Serra da Capivara	0	0
Tabuleiros do Alto do Parnaíba	0	0
Vale do Canindé	8	8,89
Vale dos Guaribas	27	30
Vale dos Rios Piauí e Itarueira	4	4,44
Vale do Sambito	3	3,33
Total	90	100

Regarding geohelminthiasis, the results found of the campaign carried out in the state of Piauí indicated that about acceptability by the 224 municipalities that make up the state only 144 municipalities (64.29%) joined the campaign, and of these, 131 municipalities (90.97%) developed the activities proposed by the Ministry of Health. As for the educational institutions to be worked, it was estimated a total of 2402 schools, however, only 50.33% (1209 schools) developed the activities. Regarding the number of students, a contingent of 329,980 students would be involved in this campaign, however, only 155,082 (47%) of these students were worked and 77.69% of this total were treated with albendazole (Table 5).

Leprosy is currently characterized as a public health problem and thus, for its surveillance, it has become a disease of compulsory notification and mandatory investigation for any state in Brazil (MINISTRY OF HEALTH, 2016). A study conducted in the state of Piauí during the period from 2003 to 2008 showed the endemicity of new leprosy cases, with a total of 10,499 notifications (SOUSA et al., 2012). Thus, making a comparative analysis with the results found in this study, it is observed that the number of leprosy cases in the state of Piauí reduced a total of 50.01% in percentage margins.

Also according to a research conducted in the state of Piauí, it was evidenced that concerning the operational classification of Leprosy, the paucibacillary form presents a higher number

(53.53%) compared to the multibacillary form, in which it differs from the results found in this research (SOUSA et al., 2012). These findings can be justified by low social conditions, unfavorable socioeconomic conditions, lack of basic sanitation, low schooling, unfavorable housing conditions, and the late search of patients for diagnosis, which facilitates the spread of the bacillus (GONÇALVES et al., 2018; Lopes; RANGEL, 2014; CHAVES et al., 2013. Evaluating the frequency of recurrences, all cases of leprosy treated regularly with standardized official regimens that re-present clinical signs and symptoms of the disease (MINISTRY OF HEALTH, 2016). The Ministry of Health predicts an estimate of 10% for cases of 10% abandonment or recurrences (retreatments), thus, data from this study infer that reports of recurrences in the state of Piauí are below the estimated values, corresponding to a total of 3.65% (PICON et al., 2007).

Worldwide, tuberculosis is a public health problem, being the most important cause of death by a single infectious microorganism (WHO, 2019). According to a study conducted in the state of Maranhão, in the period from 2008 to 2014, a total of 12,384 cases of tuberculosis were reported by SINAN, with an alternation between an increase and reduction in cases in the period addressed (ZAGMIGNAN et al., 2014). Thus, the WHO highlights the need for immediate action to eradicate with the tuberculosis epidemic worldwide by the year 2030, in addition to intensifying the active search for these cases, it is essential to seek meaningful solutions through strategies such as vaccination against BCG (Bacillus Calmette-Guéri), adherent to directly observed treatment, singular therapeutic project, nutritional support, and social benefits (WHO, 2018)

Table 5. Distribution of the results of the Ministry of Health's campaign to combat Geohelminties in the State of Piauí. Source: Health Ministry

Variants	Cases	
Municipality	N	%
Municipalities of Adhesion	144	64,29
Municipalities of Adhesion and Carried out the Campaign	1102	20,99
Campaign Results		
Schools in which work have been done	1209	50,33
Students which work has been done	155.082	47
Students treated with Albendazole	120.490	77,69

Regarding the age group, the WHO states that tuberculosis mainly affects adults in the economically productive phase, which corresponds to the age group of 20 to 60 years, thus corroborating the results found in this study, since of the total number of tuberculosis cases, about 74.33% are attributed to this age group (WHO, 2018). Despite the predominance of tuberculosis cases in this risk group, attention is drawn to the cases identified in the age groups of < 1 year to 9 years, where it is observed that most of the signs and symptoms of the disease in this age group are nonspecific, thus hindering the diagnosis, and the disease may occur from asymptomatic to the most severe forms, also justifying the coexistence of this group with cases mainly bacillus where it is evaluated that the search of these patients for health services is being delayed (SANT'ANNA, 2012).

In the state of Piauí, the growth of VL about ATL is evident, which corroborates the findings of a study conducted in this state from 2007 to 2011, where the difference in VL for ATL is 886 cases (BATISTA et al., 2014). Regarding gender, in VL there was a predominance of males, and this fact was attributed to greater exposure to infected phlebotome (BATISTA et al., 2014; REIS et al, 2017). Regarding the age group, authors differed from the results found, being the majority in children under ten years due to the fragility of their immune system, which differs from the evaluation performed in the present study where the predominant group is adults, confirming the findings of research developed in Ceará, where the most affected age group were adults from 20 to 39 years, also highlighting the range of 1 to 4 years (BATISTA et al., 2014; REIS et al, 2017; Cavalcante; VALE, 2014).

The Visceral Leishmaniasis Surveillance and Control Program (PVCLV) established by the MS recommends actions to reduce transmission and morbidity and mortality. These actions have the objective of reducing the transmission force through vector control, canine seroepidemiological surveys with subsequent euthanasia of seropositive dogs, and finally, actions to reduce lethality involving the improvement of procedures for early diagnosis and prompt availability of drugs for treatment (MINISTRY OF HEALTH, 2006).

Regarding the profile of patients with ATL, studies confirm with the results found in this study, and men were the most affected (BATISTA et al., 2014; SAINTS; BINOW; SANTOS, 2016). Regarding age, a similar result was found in the state of Rondônia, and adults aged 21 to 40 years were those who had more cases of the disease, besides, this finding was mainly related to agricultural and livestock work in forests and deforestation areas (SANTOS; BINOW; SANTOS, 2016). Due to the epidemiological characteristics of THE, the DM proposes that control strategies should be flexible

distinct, and appropriate for each region. Thus, it is necessary to describe the cases and the main areas of transmission to adopt measures related to the control of ATL, highlighting the timely diagnosis and appropriate treatment of human cases, as well as educational activities, should be prioritized in all situations (MINISTRY OF HEALTH, 2017).

Chagas disease has become a human health problem, data from the Ministry of Health indicate the record of the capture of more than 770,000 triatomes in the local contexts of households in the country. As for human cases, considering the low coverage of entomological surveillance actions, this record probably comprises less than 10% of triatomes inside or around homes. Also, the DM, among the 62 species distributed in the spaces of the intradomicile and peridomicile in Brazil, stand out as species of epidemiological relevance: Panstrongylus geniculatus, Panstrongylus lutzi, Panstrongylus megistus, Rhodnius nasutus, Rhodnius neglectus, Rhodnius robustus, Rhodnius pictipes, Triatoma infestans, Triatoma brasiliensis, Triatoma maculata, Triatoma pseudomaculata, Triatoma rubrovaria, Triatoma rubrofasciata, Triatoma sordida and Triatoma vitticeps (DIAS et al.,2016)

Research developed in the Southeast region showed that in the state of Minas Gerais, in a period of 6 years (2001 to 2006), 84 cases of Chagas disease were reported, when compared to this research, the growth in the state of Piauí was estimated above 7% (PEREIRA et al., 2017). This is justified because Chagas disease is a zoonosis present in the list of tropical diseases in the Northeast region, due to the differences between regions that reflect on socioeconomic inequalities and access to the health system, risk conditions such as the large concentration of vector species, and their circulation, the existence of low-quality housing to the detriment of precarious environmental sanitation, thus becoming epidemiological importance in the region (BRAZ et al., 2011; PARENTE et al., 2017; SIMÕES et al., 2018).

As an action proposed by the MS regarding Geohelminthiases, the state of Piauí characterized this pathology as a neglected disease, due to a system already established in the state to record cases of diarrhea (MDDA - Monitoring of Acute Diarrheal Diseases), need to know the reality of helminths in this region was selected by the technical area of the state as a priority. At the National level, there is a partnership between the School Health Program with the Municipal Departments of Education, aiming at preventive (collective) treatment in children aged 5 to 14 years (an important risk group for geohelminth infections) because it is in a period of intense physical growth, rapid metabolism and with greater nutritional needs (MINISTRY OF HEALTH, 2012).

For the implementation of the campaign, it is necessary to work on health education and mobilization with the students, for a more effective acceptance of the established proposal. Ensuring this effectiveness, diagnostic kits and medications were distributed for the treatment of geohelminthiasis (albendazole), where this drug is offered by the Ministry of Health to ensure the continuity of the action for this age group, which is in full growth and intellectual physical development and that will guarantee them better-living conditions (MINISTRY OF HEALTH, 2012).

Conclusion

It is evident the advances that have been obtained in recent years in coping with neglected diseases in the state of Piauí and, thus, the research allowed us to visualize an overview of these injuries, thus supporting an expanded discussion and allowing a critical and situational view. As a limitation of the study, there was difficulty in collecting information due to the compilation of data and its variables in the information systems themselves related to SINAN/State.

The following recommendations were made to the State Department of Health of Piauí: (I) more careful investigation concerning the search and records of cases of neglected diseases, with the involvement of Primary Care (PHC) through the Family Health Strategy (ESF), which performs the first reception with users seeking care; (II) intensification and recording of notifications, the performance of active searches, as well as the structuring of services for better adoption of strategies in coping with such injuries; (III) expansion of access to prevention and treatment of these diseases throughout the state.

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