

EVALUATION OF THE VISCERAL LEISHMANIASIS SURVEILLANCE SYSTEM IN PARAÍBA

*AValiação do Sistema de Vigilância da Leishmaniose Visceral na
Paraíba*

*EVALUACIÓN DEL SISTEMA DE VIGILANCIA DE LEISHMANIASIS VISCERAL EN
PARAÍBA*

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ABSTRACT

To evaluate the Human Visceral Leishmaniasis Epidemiological Surveillance System (SV-LVH) in the state of Paraíba. This descriptive and retrospective evaluative study assessed qualitative and quantitative attributes of data available in Sinan (2018-2022), based on guidelines from the *Centers for Disease Control and Prevention* (CDC). The data quality assessment considered 615 reported suspected cases. The gender variable obtained 100% completeness, with occupation (21.9%), education (67.1%) and HIV co-infection (68.4%) having the lowest percentages. Only 1.6% of the cases presented inconsistency. Of the 195 confirmed cases, 69.2% were male, 79.0% were brown, 22.1% were between 35 and 49 years old, 26.2% had incomplete elementary education and 6.2% were illiterate. The system was representative over time, geographically and in terms of individual characteristics. It can be concluded that the SV-LVH was classified with concepts that ranged from regular to excellent, covering the period and criteria established for completeness, consistency and representativeness.

Keywords: *Visceral Leishmaniasis; Health Information Systems; Health Surveillance System.*

RESUMO

Avaliar o Sistema de Vigilância Epidemiológica da Leishmaniose Visceral Humana (SV-LVH) no estado da Paraíba. Estudo avaliativo descritivo e retrospectivo, que avaliou atributos qualitativos e quantitativos dos dados disponíveis no Sinan (2018-2022), com base em diretrizes do *Centers for Disease Control and Prevention* (CDC). A avaliação da qualidade dos dados considerou 615 casos suspeitos notificados. A variável sexo obteve 100% de completitude, tendo ocupação (21,9%), escolaridade (67,1%) e coinfeção HIV (68,4%) os menores percentuais. Apenas 1,6% dos casos apresentaram inconsistência. Dos 195 casos confirmados, 69,2% eram do sexo masculino, 79,0% da raça/cor parda, 22,1% tinham de 35 a 49 anos, 26,2% com ensino fundamental incompleto e 6,2% eram analfabetos. O sistema apresentou-se representativo ao longo do tempo, geograficamente e nas características ligadas ao indivíduo. Pode-se concluir, que o SV-LVH foi classificado com conceitos que variaram de regular a excelente, compreendendo o período e critérios estabelecidos para completitude, consistência e representatividade.

Descritores: *Leishmaniose Visceral; Sistemas de Informação em Saúde; Sistema de Vigilância em Saúde.*

RESUMEN

Evaluar el Sistema de Vigilancia Epidemiológica de la Leishmaniasis Visceral Humana (SV-LVH) en el estado de Paraíba. Estudio evaluativo descriptivo y retrospectivo, que evaluó los atributos cualitativos y cuantitativos de los datos disponibles en Sinan (2018-2022), con base en las pautas de los Centers for Disease Control and Prevention (CDC). La evaluación de la calidad de los datos consideró 615 casos sospechosos notificados. La variable género obtuvo 100% de completitud, siendo la ocupación (21,9%), la educación (67,1%) y la coinfección por HIV (68,4%) las que presentaron los porcentajes más bajos. Sólo el 1,6% de los casos mostraron inconsistencia. De los 195 casos confirmados, el 69,2% eran hombres, el 79,0% eran de raza mixta/color, el 22,1% tenían entre 35 y 49 años, el 26,2% tenían educación primaria incompleta y el 6,2% eran analfabetos. El sistema fue representativo en el tiempo, geográficamente y en términos de características vinculadas al individuo. Se puede concluir que la SV-LVH fue clasificada con conceptos que variaron de regular a excelente, comprendiendo el periodo y criterios establecidos de completitud, consistencia y representatividad.

Descriptores: *Leishmaniasis Visceral; Sistemas de Información en Salud; Sistema de Vigilancia Sanitaria*

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INTRODUCTION

Visceral Leishmaniasis (VL) is a chronic and systemic disease caused by protozoa of the genus *Leishmania*. In the Americas, *L. infantum* is the species most commonly involved in VL cases. It is transmitted by the bite of infected female sand flies, with *Lutzomyia longipalpis* (mosquito-palha, asa-dura, tatuquiras, birigui, among others) being the main transmitting species. Its most common source of urban infection is the dog (*Canis familiaris*). In wild areas, the main reservoirs are some species of foxes (*Dusicyon vetulus* and *Cerdocyon thous*) and marsupials (*Didelphis albiventris*)¹.

The infected individual may present with long-lasting fever, weight loss, asthenia, weakness, hepatosplenomegaly, lymphadenomegaly, anemia, among other signs and symptoms, and may progress to death in more than 90% of cases if left untreated^{2,3}. The diagnostic is confirmed by means of parasitological laboratory tests, such as direct examination, or immunological tests, such as rapid immunochromatographic tests, indirect immunofluorescence reaction (IFAT) and enzyme-linked immunosorbent assay (ELISA). The medications used to treat VL in Brazil are meglumine antimoniate and amphotericin B^{4,5}.

The territorial distribution of Human Visceral Leishmaniasis (HVL) is broad, occurring in tropical and subtropical areas, with a worldwide incidence of approximately 50,000 new cases per year⁶. Brazil accounts for approximately 90% of the notifications occurring in Latin America, with an annual average of approximately 3,500 reported cases and an incidence of 2 cases per 100,000 inhabitants⁷. In Paraíba (PB), a federative unit located in the Northeast region of Brazil, HVL is endemic, with evident dissemination throughout the territory⁸. Of the 223 municipalities that make up the state, 60.5% recorded transmission of the disease between 2007 and 2022⁹.

HVL is subject to mandatory reporting, according to the GM/MS Consolidation Ordinance No. 4, of September 28, 2017, included in the National List of Compulsory Notification of Diseases, Injuries and Public Health Events (LNNC)¹⁰. Any individual whether present or not in a transmission area, who presents signs of fever for more than seven days and splenomegaly, must be considered and reported as a suspected case of VL, if differential diagnoses are ruled out⁴. The case must be reported and investigated through the VL Investigation Form of the Notifiable Injuries Information System (Sinan)¹¹.

The Human Visceral Leishmaniasis Epidemiological Surveillance System (HVL-SS) aims to reduce the lethality and morbidity of cases in humans through early diagnosis and treatment, by reducing the risk of transmission, by controlling the reservoir population, limiting the contact of the transmitting agent with susceptible hosts and by promoting health education and social mobilization actions⁵.

The data on the main epidemiological and operational indicators used for the dynamic diagnosis of an event in the population are obtained mainly from notifications of diseases and injuries that appear in the LNNC¹². However, for the information to be relevant to health surveillance actions, it is essential to carry out periodic assessments of the Health Surveillance Systems (HSS), regularly ensuring the quality of the data, the identification of disease trends in specific populations and the recognizing improvements and challenges in their organization and functioning^{13,14}.

Therefore, since it is a disease of importance to public health, and given the scarcity of studies that seek to qualify HSS in the state, the objective was to evaluate HVL-SS in Paraíba, as well as to propose recommendations that contribute to its improvement, in order to guarantee its effectiveness in preventing the disease at municipal and state levels, and so that the data can effectively support epidemiological analyses and decision-making.

METHODS

This is a descriptive and retrospective evaluative study, in which attributes of HVL-SS were evaluated based on data from the information system used in the state of Paraíba, with evaluation criteria based on Updated Guidelines for Evaluating Public Health Surveillance Systems: Recommendations from the Guidelines Working Group, proposed by the Centers for Disease Control and Prevention (CDC)¹⁵.

The study included secondary data from records of notifications of suspected and confirmed cases of VL, of individuals of all age groups, from 2018 to 2022, available in the information system (Sinan) of the Secretariat for Health and Environmental Surveillance of the Ministry of Health (SVSA/MS), through file transfer on the website of the Department of Information and Informatics of the Unified Health System (DATASUS).

The database was accessed on August 13, 2024. The information contained in the download file was expanded and converted using the Tabwin® program. The general data in the conversion file were filtered by location and period and statistically analyzed using the Epi Info™ software. Tables, graphs and maps were constructed using Microsoft Excel® and the QGIS program.

For the HSS evaluation, the attributes were classified as qualitative (data quality) and quantitative (representativeness). Data quality was assessed through completeness, which refers to the percentage of complete information recorded, and consistency, which defines the validity of the data recorded in the system¹⁵.

Data completeness was assessed by considering the percentage of fields that were not filled in (blank) or ignored in relation to the total number of records. The variables were classified based on the average percentages obtained from 2018 to 2022. Consistency was analyzed by listing plausibility criteria in the responses recorded, considering the proportion of inconsistent records in relation to the total¹⁶. The observations and the type of filling in of the variable field are included in the Sinan Net data dictionary¹⁷.

Representativeness describes the occurrence of an event over time and its distribution in the population according to the criteria of place and person, reflecting the real occurrence and magnitude of a disease or injury in a given population¹⁵. To evaluate the attribute, the categories time, person and place were classified as having satisfactory or unsatisfactory representativeness. The evaluation parameters are described in Box 1.

Box 1 – Variables and parameters used to assess the completeness, consistency and representativeness of the HVL database, Paraíba, 2018-2022.

Completeness			
Variables		Filling	Parameter
Sex		Mandatory	Excellent (≥95%) Good (≥90 and ≤94%) Regular (≥70 and ≤89%) Bad (≥50 and ≤69%) Very bad (≤49%)
Pregnant		Mandatory	
Race/Color		Essential	
Education		Essential	
Occupation		Essential	
HIV co-infection		Mandatory	
Parasitological Diagnosis		Mandatory	
Immunological Diagnosis		Mandatory	
Input Type		Mandatory	
Date of Treatment		Essential	
Initial Drug Administered		Essential	
Final Classification		Mandatory	
Evolution		Essential	
Consistency			
Variables		Observation	Parameter
Date of notification < date of first symptoms		The date of notification must be greater than the date of the first symptoms.	Excellent (≤10%) Regular (>10 and ≤30%) Bad (>30%)
Closing date < notification date		The closing date must be greater than the notification date.	
Typing date < notification date		The typing date must be greater than the notification date.	
Date of investigation < date of notification		The date of investigation must be greater than or equal to the date of notification.	
Date of start of treatment < date of notification		The date of commencement of treatment must be greater than the date of notification.	
Representation			
Categories	Assessment	Parameter	Final Classification
Time	Comparison of the prevalence rate of HVL with previous years available in the literature.	Satisfactory or Unsatisfactory	Three satisfactory categories = high representation; two satisfactory categories = regular representation; one satisfactory category = low representation.
Person	Analysis of confirmed cases by sex, race/color, age group and education, based on corroboration with other studies.	A Percentage Variation (VP) ≤10% is considered satisfactory.	
Place	Mapping of VL cases by municipality of residence.	Satisfactory or Unsatisfactory	

Source: Adapted from CDC¹⁵; Tourinho et al.¹⁶; Brasil¹⁷; Pacheco¹⁸.

The study used official and anonymized public databases, exempt from submission to the Ethics Committee, in accordance with CNS Resolution No. 466, of December 12, 2012.

RESULTS

DATA COMPLETENESS

The assessment of the data quality attribute considered 615 reported cases of HVL. At least one variable (sex) obtained 100% completeness. The variables of occupation (21.9%), education (67.1%) and HIV co-infection (68.4%) presented the lowest percentages. Of the seven mandatory variables, only one (sex) obtained an excellent rating, four of them (pregnant woman, parasitological diagnosis, immunological diagnosis and final classification) were classified as good and two with regular (type of entry) and bad (HIV co-infection) ratings. Of the essential fields, only one (race/color) received a good rating, the others had ratings ranging from very bad to regular (Table 1).

Table 1 – Assessment of completeness of variables in the HVL database, Paraíba, 2018–2022. N=615

Variables	2018		2019		2020		2021		2022		Average	Concept
	N	%	N	%	N	%	N	%	N	%		
Sex	100	100	142	100	95	100	131	100	147	100	100	Excellent
Pregnant	35	97.1	55	90.9	39	94.9	52	96.2	59	81.4	92.1	Good
Race/Color	100	94.0	142	95.8	95	97.9	131	94.7	147	85.7	93.6	Good
Education	100	79.0	142	73.2	95	62.1	131	68.7	147	52.4	67.1	Bad
Occupation	100	38.0	142	26.1	95	16.8	131	14.5	147	14.3	21.9	Very bad
HIV co-infection	100	66.0	142	66.2	95	84.2	131	71.8	147	53.7	68.4	Bad
Parasitological Diagnosis	100	84.0	142	87.3	95	90.5	131	99.2	147	95.2	91.2	Good
Immunological Diagnosis	100	84.0	142	87.3	95	90.5	131	99.2	147	95.2	91.2	Good
Input Type	100	75.0	142	79.6	95	81.1	131	77.1	147	55.8	73.7	Regular
Date of Treatment	47	87.2	46	82.6	27	81.5	28	85.7	45	86.7	84.7	Regular
Initial Drug Administered	47	89.4	46	80.4	27	85.2	28	78.6	45	80.0	82.7	Regular
Final Classification	100	82.0	142	85.2	95	92.6	131	97.7	147	94.6	90.4	Good
Evolution	100	66.0	142	53.5	95	69.5	131	80.9	147	86.4	71.3	Regular
Total	100	80.1	142	77.5	95	90.5	131	81.9	147	75.5	79.1	Regular

Source: Sinan Net/DATASUS/SVSA/MS, Modality: Final Data.

DATA CONSISTENCY

The assessment of inconsistencies in filling out the HVL-SS fields showed that only 1.6% of the cases presented inconsistent data on the dates of investigation and notification. All variables analyzed obtained an excellent rating (Table 2).

Table 2 – Assessment of inconsistency of variables in the HVL database, Paraíba, 2018–2022. N=615

Variables	2018	2019	2020	2021	2022	Average	Concept
	8		0			e	

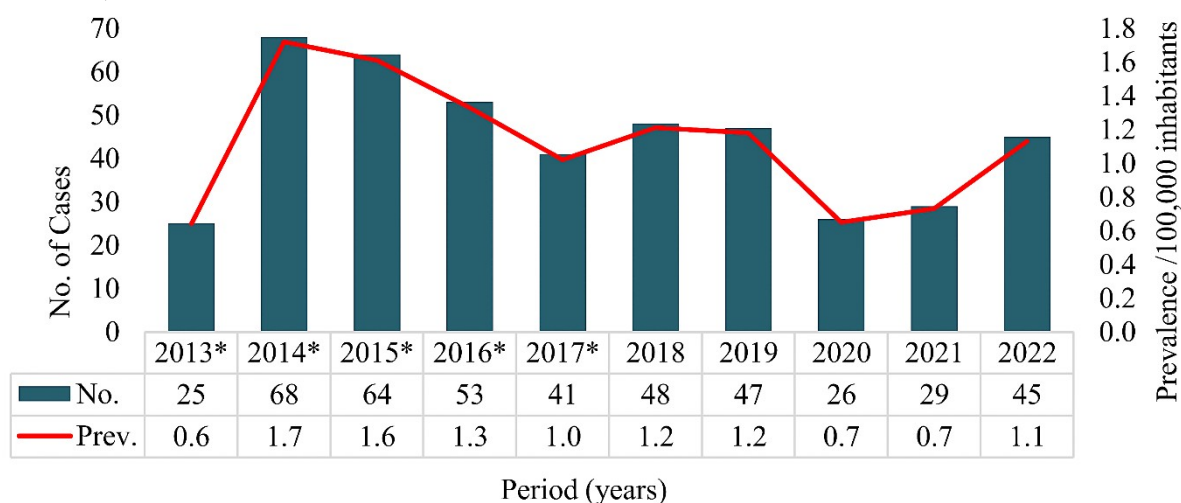
	%	%	%	%	%	
Date of notification < date of first symptoms	0.0	0.0	0.0	0.0	0.0	Excellent
Closing date < notification date	0.0	0.0	0.0	0.0	0.0	Excellent
Typing date < notification date	0.0	0.0	0.0	0.0	0.0	Excellent
Date of investigation < date of notification	8.0	0.0	0.0	0.0	0.0	Excellent
Date of start of treatment < date of notification	0.0	0.0	0.0	0.0	0.0	Excellent
Total	1.6	0.0	0.0	0.0	0.0	Excellent

Source: Sinan Net/DATASUS/SVSA/MS, Modality: Final Data.

REPRESENTATIVENESS

The distribution of confirmed cases of HVL and the prevalence rate per 100,000 inhabitants are shown in Figure 1. The data demonstrate a low variation in the prevalence rate over the years 2018 to 2022 compared to the period 2013 to 2017⁸. Therefore, the representativeness of the time category was classified as satisfactory.

Figure 1 – Distribution of confirmed cases and prevalence rate of HVL (per 100,000 inhabitants), Paraíba, 2013-2022. N=446



*Data according to Araújo et al. (2013 to 2017)⁸. **Source:** Sinan Net/DATASUS/SVSA/MS, Modality: Final Data.

Regarding the sociodemographic profile of confirmed cases of HVL (Table 3), the data demonstrated satisfactory representation for the gender variable, with 69.2% of cases occurring in males, for the brown race/skin color (79.0%) and age group of 35 to 49 years (22.1%), followed by 1 to 4 years (20.0%). Regarding the level of education, 26.2% did not complete elementary school, 6.2% were illiterate and only 5.1% completed high school. The data evaluated showed satisfactory representation.

Table 3 – Assessment of the representativeness of confirmed cases of HVL in the state of Paraíba compared with the epidemiological profile of cases in states bordering the territory. N=195

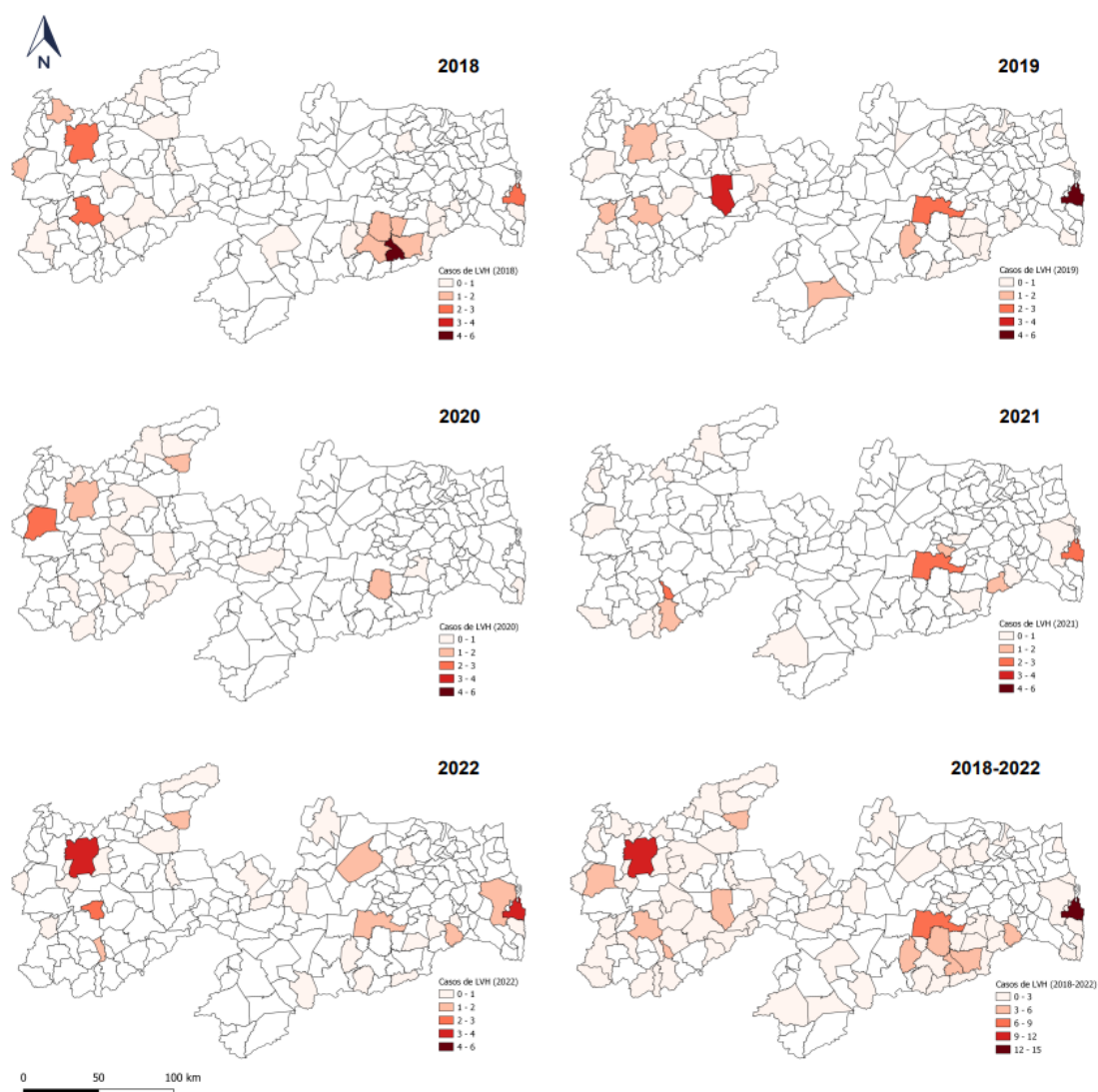
Variables	Paraíba (2018 to 2022)	Ceará (2007 to 2022) ¹⁹	Pernambuco (2018 to	Rio Grande do Norte	Assessment rating
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					2022) ²⁰		(2010 to 2017) ²¹		
Sex	N	%	N	%	N	%	N	%	
Masculine	135	69.2	4,684	67.6	447	63.8	351	65.5	Satisfactory
Feminine	60	30.8	2,242	32.4	224	31.9	184	34.4	
Ign/White	0	0.0	0	0.0	30	4.3	0	0.0	
Race/color									
White	21	10.8	490	7.1	86	12.3	82	15.3	Satisfactory
Black	10	5.1	164	2.4	38	5.4	36	6.7	
Yellow	1	0.5	27	0.4	2	0.3	1	0.2	
Brown	154	79.0	5,811	83.9	520	74.2	390	72.9	
Indigenous	0	0.0	32	0.5	7	1.0	1	0.2	
Ign/White	9	4.6	402	5.8	48	6.8	25	4.7	
Age range									
<1 year old	10	5.1	551	8.0	-	-	-	-	Satisfactory
1 to 4 years old	39	20.0	1,460	21.1	-	-	-	-	
5 to 9 years old	9	4.6	495	7.1	-	-	-	-	
10 to 14 years old	17	8.7	313	4.5	-	-	-	-	
15 to 19 years old	13	6.7	364	5.3	-	-	-	-	
20 to 34 years old	24	12.3	1,243	17.9	-	-	-	-	
35 to 49 years old	43	22.1	1,298	18.7	-	-	-	-	
50 to 64 years old	21	10.8	771	11.1	-	-	-	-	
65 to 79 years old	17	8.7	334	4.8	-	-	-	-	
80+ years old	2	1.0	97	1.4	-	-	-	-	
Ign/White	0	0.0	0	0.0	-	-	-	-	
Education									
Illiterate	12	6.2	178	2.6	46	6.6	33	6.2	Satisfactory
IE	51	26.2	1,160	16.7	176	25.1	145	27.1	
CE	7	3.6	395	5.7	25	3.6	36	6.7	
IMS	6	3.1	200	2.9	23	3.3	15	2.8	
CMS	10	5.1	296	4.3	46	6.5	40	7.5	
IHE	1	0.5	25	0.4	0	0.0	1	0.2	
CHE	0	0.0	42	0.6	5	0.7	-	-	
Not applicable	52	26.7	2,256	32.6	183	26.1	151	28.2	
Ign/White	56	28.7	2,374	34.3	197	28.1	114	21.3	
Total	195	100.0	6,926	100.0	701	100.0	535	100.0	

IE – Incomplete Elementary; CE – Complete Elementary; IMS – Incomplete Middle School; CMS – Complete Middle School; IHE – Incomplete Higher Education; CHE – Complete Higher Education; Ign – Ignored. **Source:** Sinan Net/DATASUS/SVSA/MS, Modality: Final Data.

The HVL surveillance system is decentralized and has been present in Paraíba's municipalities from 2018 to 2022, as demonstrated by the distribution of confirmed cases by municipality of residence (Figure 2). Therefore, the representativeness by location was assessed as satisfactory. The final assessment of the representativeness of HVL-SS, encompassing the three components, was classified as highly representative.

Figure 2 – Distribution of HVL cases by municipality of residence, Paraíba, 2018-2022. N=195



Source: Sinan Net/DATASUS/SVSA/MS, Modality: Final Data.

DISCUSSION

The operationalization of HVL-SS is a determining factor for the surveillance and control of cases of the disease. However, in order to ensure the availability of continuous, systematic and high-quality information, which is necessary for the analysis of the local, municipal, state and national health situation, SVSA/MS defines that it is essential that analyses of the quality of data in the HSS databases be carried out periodically^{12,22}.

When analyzing the percentage of mandatory and essential fields that were blank and/or had missing information on the VL investigation form, we can see that the variables that presented data completeness greater than or equal to 90% (sex, pregnant woman, race/color, parasitological diagnosis, immunological diagnosis, and final classification) also had similar results in studies carried out in other states in northeastern Brazil. In Ceará (CE), from 2007 to 2022, the variables sex and final

classification had excellent completion rates, with completeness $\geq 95\%$ ²³. In the state of Rio Grande do Norte (RN), from 2016 to 2020, the fields pregnant woman and race/color obtained, respectively, 96.6 and 92.5% completion rates, with parasitological diagnosis (86.0%), immunological diagnosis (86.0%), and initial drug administered (73.3%) presenting lower data than the current study. The field of education, classified as bad in the HVL-SS assessment of PB, demonstrated 77.9% completeness in RN²⁴.

Even though the quality of the data presented variables with completeness classified as bad (HIV co-infection) and very bad (occupation), it was observed that the completion of the data was consistent and evaluated with an excellent concept. The irregular completion of some variables and the fields left blank and/or ignored may be associated with human error, since the quality of the completion of the notification and investigation form may be impaired, for example, by resistance on the part of professionals, due to not recognizing the relevance of entering the data in its entirety in Sinan Net or due to lack of knowledge and technical training to perform the task¹³.

The system data demonstrated accuracy in representatively describing the characteristics linked to person, time, and place, with a percentage variation of less than 9.5% compared to data from CE (2017 to 2022)¹⁹, Pernambuco (PE) (2018 to 2022)²⁰ and RN (2010 to 2017)²¹. The highest proportion of the disease was observed in males, as well as its predominance in the child population (1 to 4 years old) and adult population aged 35 to 49 years old, in addition to the majority of individuals had low levels of education (incomplete/complete elementary school and incomplete high school), corroborating the results of the epidemiological profile of VL in PB in the years 2012 to 2022, with the highest percentage of cases occurring in males (65.9%) and in individuals with low levels education (70.1%)²².

Given the lack of a completely perfect HSS, it is necessary to make compensations to promote the best use of public resources, and each of its components must be evaluated appropriately, ensuring that they adapt to the emergence of new definitions of cases and public health events, in order to guarantee standards for data collection, sharing and confidentiality, in addition to the current requirements for patient protection and privacy and system security¹⁵.

Considering the results of the research, some recommendations can be adopted to allow the improvement of the HVL-SS. Health managers and professionals are recommended to: review the current version of Health Surveillance Guide of the SVSA/MS, with emphasis on aspects of VL surveillance; strictly follow the instructions for notification, investigation, diagnosis, treatment and closure of cases, and not ignore or allow the filling of variable fields; analyze the data of epidemiological indicators and periodically disclose the results produced by the municipal and/or state surveillance system; promote health education actions on leishmaniasis external to the population; and participate in continuing education activities.

The study presented some limitations, such as the impossibility of evaluating the system base through another data source, in addition to the low number of studies available in the literature that evaluate the HSS of VL, making it difficult to obtain the information necessary to contribute to the evaluation of attributes.

CONCLUSION

It can be concluded that the HVL-SS in the state of Paraíba, covering the period and attributes evaluated, was classified with regular data completeness and excellent consistency (data quality). Despite the low completeness of some variables, which affects the quality of some information, the evaluation resulted in satisfactory data with concepts that ranged from good to excellent. The surveillance system was representative over time, geographically and in the characteristics linked to the individual, allowing municipal and state epidemiological surveillance to know the magnitude of the occurrence of cases, as well as monitor the trends of morbidity and mortality and readjustment of the measures of control and prevention of the disease in a given group of the population. Therefore, the system is able to meet the criteria for monitoring and evaluating VL in the municipalities of Paraíba.

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