LUMEN ET VIRTUS

ANALYSIS OF THE EPIDEMIOLOGICAL PROFILE OF CONFIRMED CASES OF MENINGITIS IN THE NORTH REGION OF 2018-2023

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Débora Carvalho Ferreira[1], Francy Silva de Carvalho[2], Ellen Sabrinna dos Remédios Passos[3], Ananda Carolina Reis Prestes[4], Gallaiho Kevin Thandas Niemeyer[5], Dangilla Ribeiro dos Santos[6], Joyce Pantoja Braga[7] and Fernando Mendes Paschoal Junior[8]

ABSTRACT

Introduction: Meningitis is an inflammatory process that can be caused by fungi, bacteria, viruses, and infectious agents. It has a high transmissibility that can generate outbreaks. Objective: To evaluate epidemiological data related to confirmed cases of Meningitis in the Northern Region of Brazil from 2018 to 2023. Methodology: This is a cross-sectional, quantitative, descriptive study with data from the Notifiable Diseases Information System (SINAN). Information was collected regarding confirmed cases of meningitis in the Northern Region of the country between January 2018 and December 2023. Results: The study presented 3720 confirmed cases of meningitis, with the highest number of diagnoses in 2018 (22.7%), with the most prevalent age group of 20 to 39 years (34.56%) and brown skin color being the most affected (84.46%). The state with the highest number of cases was Pará (54.34%). In turn, chemocytological diagnosis was the most used (43.84%), with meningitis caused by other bacteria being the most common (21.50%). Conclusion: Therefore, the present study is relevant because it outlines the main epidemiological aspects related to meningitis in the Northern Region of Brazil, as well as pointing to a high mortality rate (20%) of this disease in the territory analyzed. This shows the need to develop strategies to prevent this pathology, in order to avoid deaths and complications.

Keywords: Meningitis. Epidemiological Profile. Northern Region. Confirmed Cases.

[1] Medical Student, Federal University of Pará - UFPA
[2] Medical Student at the Federal University of Pará – UFPA
[3] Medical Student at the Federal University of Pará – UFPA
[4] Medical Student at the State University of Pará – UEPA
[5] Medical Student at the State University of Pará – UEPA
[6] Medical Student at the State University of Pará – UEPA
[7] Medical Student at the Federal University of Pará – UFPA
[8] Doctor in Clinical Neurology from the Federal University of Pará - UFPA

INTRODUCTION

Meningitis consists of an inflammatory process of the meninges, membranes that surround the brain. It can be caused by several etiological agents, such as non-infectious agents, fungi, bacteria and viruses, especially the latter two, as they are the most important from the point of view of public health, due to the magnitude of their occurrence, as well as the potential for outbreaks (Mandell, 2009). In Brazil, the main representatives are: Neisseria meningitidis, Mycobacterium tuberculosis and Haemophilus influenzae (BRASIL, 2017).

On the world stage, this pathology has an estimate of up to 5 million cases per year. At the national level, it is considered endemic, with 393,941 possible cases recorded between 2007 and 2020, of which 265,644 were confirmed (BRASIL, 2021). Also, according to information from the Ministry of Health, the average lethality of affected patients is about 14%, reaching the number of 21.3% in 2020. In turn, the number of deaths in 2023 was 1620 people (BRASIL, 2021).

The clinical picture suggestive of meningitis may be composed of fever, neck stiffness and/or other signs of meningeal irritation, altered level of consciousness and headache. In the face of suspected cases, compulsory notification must be carried out (BRASIL, 2017).

Thus, the present work aims to demonstrate epidemiological data related to confirmed cases of Meningitis in the Northern Region of Brazil, in the period from 2018 to 2023, fostering the importance of planning to reduce outbreaks and reduce the incidence of the pathology in the region presented.

METHODS

This is a cross-sectional, quantitative, descriptive study with data obtained from the Notifiable Information and Diseases System (SINAN), made available by the Department of Informatics of the Unified Health System (DATASUS). Information was collected regarding confirmed cases of meningitis in the northern region of Brazil between January 2018 and December 2023.

The variables considered for analysis corresponded to year, age group, region, state, etiology, diagnostic criteria, race, sex, and disease evolution. There was no exclusion parameter, since the platform already provided the data with the appropriate filtering for the survey in question.

For data tabulation, such as calculations, table constructions and graphs, Microsoft Excel 2021 software was used. In addition, in order to assist in the description and organization of the work, Microsoft Word 2021 was chosen.

Due to the study design, with the use of secondary information, there was no need to submit to the Research Ethics Committee. However, this article was carried out in accordance with the principles established by the Nuremberg Code, the Declaration of Helsinki and Resolution No. 466//2012 of the National Council for Ethics in Research (CONEP).

RESULTS

During the period from 2018 to 2023, 3720 confirmed cases of meningitis were diagnosed in the Northern Region of Brazil. The majority (22.7%) were diagnosed in 2018 (Table 1).

Table 1 - Characterization of confirmed notified cases of meningitis, n=3720. North Region, from 2018 to 2023.

Variable	N	%
Year of Diagnosis		
2018	846	22,7 %
2019	771	20,7%
2020	430	11,5%
2021	420	11,3%
2022	583	15,7%
2023	645	17,3%
Age group		
< 1 year	344	9,24%
1 to 4 years	314	8,44%
5 to 9 years	320	8,6%
10 to 4 years	291	7,82%
15 to 19 years old	257	6,9%
20 to 39 years old	1286	34,56%
40 to 59 years old	713	19,16%
60 to 64 years old	77	2,06%
65 to 69 years old	55	1,47%
70 to 79 years old	53	1,42%
80 e +	10	0,26%
Total	3720	-

Source: Ministry of Health/SVS - Notifiable Diseases Information System - SINAN Net.

Regarding the age group, young adults, between 20 and 39 years of age, had the highest records of confirmed cases (1286), corresponding to 34.56% of the total cases. In second place are adults between 40 and 59 years of age (713), with 19.16%, and children under 1 year of age (344), with approximately 9% of confirmed cases (Table 1).

Table 2 - Number of confirmed notified cases of meningitis in relation to gender, n=3720. North Region, from 2018 to 2023.

Variable	N	%
Gender		
Male	2201	59,16%
Female	1519	40,83%
Total	3720	-

Source: Ministry of Health/SVS - Notifiable Diseases Information System - SINAN Net.

Table 2 shows that the male public had the highest rate of confirmed cases of meningitis in the northern region, with 59.16%, while female patients had approximately 40.83%.

Table 3 - Characterization of confirmed notified cases of meningitis according to race, n=3720. North Region, from 2018 to 2023.

Variable	N	%
Race		
Ign/Branco	126	3,38%
White	286	7,68%
Black	62	1,66%
Yellow	14	0,37%
Brown	3142	84,46%
Indigenous	90	2,41%
Total	3720	-

Source: Ministry of Health/SVS - Notifiable Diseases Information System - SINAN Net.

Regarding race, brown individuals had the highest predominance of confirmed diagnosis of meningitis with about 84.46% of the total, followed by white with 7.68%. Also noteworthy is the involvement of indigenous people, representing 2.42% of the total number of confirmed cases, occupying the fourth place of predominance (Table 3).

Table 4 - Diagnostic criteria of confirmed notified cases of meningitis, n=3720. North Region, from 2018 to 2023.

Variable	N	%
Diagnostic Criteria		
Blank	17	0,45%
Culture	606	16,2%
CIE	3	0,08%
AG. Latex	42	1,12%
Clinical	541	14,54%
Bacterioscopia	212	5,69%
Chemocytology	1631	43,84%
Clinical-epidemiological	48	1,29%
Viral isolation	6	0,16$
PCR - viral	192	5,16%
Another technique	422	11,34%

Total	3720	-

Source: Ministry of Health/SVS - Notifiable Diseases Information System - SINAN Net.

In the table above (4), which reveals the method of analysis of the diagnostic criteria, it can be seen that chemocytological drugs were more pertinent, with approximately 43.84%, followed by culture with 16.2%, clinical with 14.54%, other techniques with 11.34%, bacterioscopy with 5.69%, viral PCR with 5.16%, clinical-epidemiological with 1.29%. On the other hand, the CIE, the Viral Isolation method, Latex Agglutination, had less relevance for the confirmation of the diagnosis with 0.08%, 0.16% and 1.12%, respectively.

Table 5 - Confirmed cases of meningitis according to region of notification in Brazil, from 2018 to 2023.

Variable	N	%
Region		
North	3720	4,8%
Northeast	11717	15,14%
Southeast	41331	53,40%
On	17451	22,54%
Center - West	3170	4,09%
Total	77389	-

Table 5 shows the comparison of disease involvement between the regions of Brazil. It is possible to note that the North region occupies the fourth place, with 3720 (4.8%) records. The most prominent area was the Southeast with 41331 (53.40%) cases, while the smallest corresponded to the Center-West with 3170 (4.09%).

Table 6 - Origin of the cases diagnosed confirmed cases of meningitis, n=3720. North Region, from 2018 to 2023.

Variable	N	%
State		
Stop	2031	54,59%
Amazon	781	20,99%
Rondônia	313	8,40%
Tocantins	247	6,68%
Roraima	164	4,40%
Acre	130	3,50%
Amapá	54	1,44%
Total	3720	-

Source: Ministry of Health/SVS - Notifiable Diseases Information System - SINAN Net.

Regarding the states of the North Region (table 6), Pará had the highest prevalence of cases reported in the study period with 2031 (54.59%). In second place, the state of Amazonas revealed 781 cases (20.99%). Respectively, the states had the number of confirmed cases:

Rondônia with 313 (8.40%), Tocantins with 247 (6.68%), Roraima with 164 (4.40%), Acre with 130 (3.50%) and Amapá with 54 (1.44%).

Table 7 - The etiologic agents present in the confirmed notified cases of meningitis, n=3720. North Region, from 2018 to 2023.

Variable	N	%
Evolution		
Ign/Branco	12	0,32%
MCC	60	1,62%
MM	135	3,62%
MM+MCC	82	2,20%
MTBC	257	6,90%
ME	800	21,50%
MB	852	22,90%
MV	767	20,62%
MOE	514	13,82%
MH	34	0,91%
MP	207	5,57%
Total	3720	-

Legend: MCC = Meningococcemia; MM = Meningococcal Meningitis; CCM + MM = Meningococcemia + Meningococcal; MTBC: Mycobacterium tuberculosis meningitis; MNE: unspecified meningitis; MB = Meningitis by other bacteria; MV = Viral Meningitis; EOM = Meningitis, Other Etiologies; MH = Haemophilus influenzae meningitis; PM = Pneumococcal meningitis. Source: Ministry of Health/SVS - Notifiable Diseases Information System - SINAN Net.

Regarding the etiology of confirmed cases, Table 7 shows that meningitis by other bacteria had a higher incidence with 852 confirmed cases, resulting in approximately 22.9% of the diagnoses, followed by Meningococcal Meningitis by other bacteria with 21.5% of the notified cases and with 20% of the diagnoses there is Viral Meningitis. In addition, Meningococcemia + Meningococcal, Meningococcemia, and Meningitis by H. Influenzae were the ones with the lowest epidemiological index in the scenario, presenting, respectively, 2.20%, 1.62%, and 0.91% of the notified cases.

Table 8 - Evolution of confirmed notified cases of meningitis, n=3720. North Region, from 2018 to 2023.

Variable	N	%
Evolution		
Ign/Branco	295	7,93%
Loud	2656	71,3%
Death from meningitis	565	15,18%
Death from other causes	204	5,48%
Total	3720	-

Source: Ministry of Health/SVS - Notifiable Diseases Information System - SINAN Net.

In the evolution of the cases, it was observed that 2656 of the patients were discharged from hospitalization. However, 565 died from the disease, and 204 died from secondary complications or other causes related to hospitalization (Table 8).

DISCUSSION

From the results obtained, it is noted that the number of notified cases of meningitis oscillated, during the years 2018 to 2023, in the Northern Region of Brazil. Based on this information, it is possible to correlate the interference of the COVID-19 pandemic period, which began in 2019, in the drop in records and subsequent increase, since this scenario required attention to the new disease in evidence, as well as restrictive isolation measures and, above all, the reallocation of resources destined to health (Dal'Negro, 2022).

Regarding the territorial issue, the Southeast is the region that ranks first in the rates of confirmed cases by the pathology addressed. The north, in turn, occupies the fourth position, ahead only of the Center-West, representing one of the regions with the lowest values. It is important to consider that these numbers are not always absolute, as the size of the region and the number of people distributed must be tabulated. Thus, the data obtained may have been influenced by underreporting, as a result, for example, of lack of adherence or lack of knowledge of health professionals for notifications, lack of feedback on the analyzed information, and low perception of the relevance of these diseases submitted to surveillance by health professionals (Emmerick, 2014).

Among the states in the North Region, Pará showed the highest prevalence of confirmed cases. This finding may be related to the low rate of vaccination coverage for Meningococcus C. The state has the second lowest rate of this coverage, compared to the other states in the region. Another factor that corroborates the hypothesis refers to Roraima, which has one of the lowest values of individuals with meningitis and obtains an 88% vaccination coverage rate for Meningococcus C, according to data from the Ministry of Health (DATASUS, 2022).

The vaccine is the most effective form of prevention, and consists of the administration of specific serogroup vaccines. The meningococcal C conjugate vaccine is included in the National Immunization Program (PNI) for children, in two doses and a booster at 12 months (De Andrade et al, 2020). This same vaccine topic can also corroborate the results about the age group, while during the analysis, it was noted that young adults, between 20 and 39 years old, were the most affected by the disease, which can be justified by the end of the immunity period generated by the meningococcal ACWY vaccine, with the addition of the more accentuated exposure of these individuals to agglomerations (Dias et al., 2017).

Bacterial meningitis had the highest prevalence of incidence in the North Region, especially meningococcal meningitis, caused by the bacterium N. meningitidis. This finding contradicts the current literature, which states that the most frequent meningitis is viral

(Gonçalves, 2018). This is possibly due to the difficulty in accurately diagnosing viral etiologies, in addition, these usually have a self-limited course and are less severe than bacterial etiologies, which can lead to underreporting of cases (Dias, 2017).

Most of the reported cases evolved to hospitalization discharge, proving that the effectiveness of early treatment is capable of reducing the duration of symptoms, especially in immunosuppressed patients, increasing the probability of a better prognosis of the disease (BRASIL, 2019).

On the other hand, the lethality observed in the North Region, corresponding to 15%, is associated with complications resulting from the prevalent etiology mentioned, because in cases where there is no adequate management of the patient, without the necessary support measures, there is an increase in mortality rates (Branco, 2007). In addition, early diagnosis, initiation of antibiotics, and transfer to an intensive care unit are essential to improve the survival of these patients (Strelow et al, 2016).

CONCLUSION

From the analysis of the epidemiological profile of the number of cases of meningitis in the Northern Region of Brazil, in the period from 2018 to 2023, it was observed that the most affected age group was young adults between 20 and 39 years old, the brown race was the most affected, males had a higher prevalence than females and the year with the greatest prominence was 2018.

Oscillations were observed in the number of reported cases of meningitis during each year analyzed. The years 2020 and 2021 had fewer records of the disease, which is related to the fact that the COVID-19 Pandemic was in force, which limited data collection and updates on the DATASUS platform, leading to possible underreporting.

The research also showed that the bacterial etiology, more specifically Meningococcal Meningitis, was of greater relevance. In addition, it was noticed that the mortality rate of the pathology was approximately 20% of the hospitalized patients.

Thus, complementary studies are essential, especially in the states of Pará and Amazonas, where cases of the disease are more prevalent. It is important to emphasize the need for improvements in prevention strategies, such as vaccination and early diagnosis, in order to reduce complications and deaths from the pathology. It is also worth noting the training of health professionals to improve the registration of notifications of Meningitis cases, avoiding underreporting.

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