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Original Article

# Epidemiological profile of hepatitis B in Alagoas during 2010-2020

## *Perfil epidemiológico da hepatite B em Alagoas no período de 2010-2020*

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**ABSTRACT:** *Introduction*: More than 13500 people in Brazil were infected with the Hepatitis B virus in 2019. It is known that its prevalence is not evenly distributed, varying according to the region of the country, socioeconomic level and vulnerability of the population. The state of Alagoas was home to approximately 10.83% of Hepatitis B cases in the Northeast region during 2010-2020. However, the literature lacks information about the epidemiological profile of the disease in the state. *Objectives*: To evaluate the prevalence and factors associated with Hepatitis B in the state of Alagoas during 2010-2020. *Methods*: This is a cross-sectional study with analysis of secondary data from the Health State Department of Alagoas, during 2010-2020. The variables analyzed were: notified cases and deaths due to hepatitis B, gender, age, skin color, mode of transmission and level of education. Prevalence, mortality and lethality rates were calculated. Descriptive statistics were used, with calculations of mean and standard deviation, absolute and relative frequencies. *Results*: A total of 1420 cases of Hepatitis B were reported in the state of Alagoas from 2010 to 2019, highlighting the last year mentioned, responsible for 18.23% of cases. In 2020, 102 cases were reported, with the most reported month being February, with 19.60% of cases, and the lowest, May and June, with 1.96% each. The most affected population was female, aged 20-39 years old, with incomplete primary schooling and form of sexual transmission. *Conclusions*: Hepatitis B cases in Alagoas grew non-linearly in the period of 2010-2019. However, in 2020, marked by the Sars-Cov-2 pandemic, there was a drop in the number of cases, which may have been caused by improvements in public policies or by underreporting of cases.

**Keywords:** Hepatitis B; Epidemiology; Sexual transmission; Sexually transmitted infections.

**RESUMO:** *Introdução*: Mais de 13.500 pessoas no Brasil foram infectadas com o vírus da Hepatite B em 2019. Sabe-se que sua prevalência não é uniformemente distribuída, variando de acordo com a região do país, nível socioeconômico e vulnerabilidade da população. O estado de Alagoas abrigou cerca de 10,83% dos casos de Hepatite B da região Nordeste durante o período de 2010-2020, porém, a literatura carece de informações acerca

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do perfil epidemiológico da doença no estado. *Objetivos*: Avaliar a prevalência e fatores associados à Hepatite B no estado de Alagoas no período de 2010-2020. *Métodos*: Trata-se de um estudo de corte transversal com análise de dados secundários da Secretaria do Estado de Saúde de Alagoas, no período de 2010-2020. As variáveis analisadas foram: casos notificados e óbitos por hepatite B, sexo, idade, cor, forma de transmissão e nível de escolaridade. Foram calculadas as taxas de prevalência, mortalidade e letalidade. Utilizou-se estatística descritiva, com cálculos de média e desvio padrão, frequências absolutas e relativas. *Resultados*: 1.420 casos de Hepatite B foram notificados no estado de Alagoas durante o período de 2010 a 2019, tendo como destaque o último ano citado, responsável por 18,23% dos casos. No ano de 2020, foram notificados 102 casos, com o mês de maior notificação sendo fevereiro, com 19,60% dos casos e, os de menor, maio e junho, com 1,96% cada. A população mais afetada foi do sexo feminino, faixa etária de 20-39 anos, nível de escolaridade fundamental incompleto e forma de transmissão sexual. *Conclusões*: Os casos da Hepatite B em Alagoas cresceram de forma não linear no período de 2010-2019. Entretanto, no ano de 2020, marcado pela pandemia do Sars-Cov-2, houve queda no número de casos, o que pode ter sido causado por melhora nas políticas públicas ou por subnotificação dos casos.

**Palavras-chave:** Hepatite B; Epidemiologia; Transmissão sexual; Infecção sexualmente transmissível.

## INTRODUCTION

Hepatitis B is an inflammation of the liver caused by a circulating double-stranded DNA hepatotropic virus surrounded by an envelope, belonging to the Hepadnaviridae family. The natural history of hepatitis B virus (HBV) infection is complex and variable, influenced by age at infection, the level of HBV replication and the immune status of the host[1].

Globally, 2019 reached the mark of approximately 296 million people chronically infected and 820000 deaths caused by HBV, mainly due to cirrhosis or hepatocellular carcinoma[2]. In Brazil, Hepatitis B cases totaled 13971 in 2020, down from 14 686 in the previous year. In the regional distribution, the South registered the highest number of people with the disease (4529), followed by the Southeast (3867), North (2471), Northeast (2021) and Midwest (1081)[3]. According to data provided by the Notifiable Disease Information System (SINAN) of the Ministry of Health[3], the state of Alagoas was home to approximately 10.83% of cases of Hepatitis B in the Northeast from 2010 to 2020.

It is known that, in Brazil, in general, hepatitis B is considered a low-prevalence endemic disease, since it represents less than 1% of cases in the population. However, this varies by geographic area. This time, the South Region appears as an area of low endemicity (prevalence < 2%) and the Midwest, Northeast and Southeast as areas of intermediate endemicity (prevalence 2-7%). The Legal Amazon, the state of Espirito Santo and the west of the state of Santa Catarina are considered highly endemic (prevalence > 7%)[4].

With regard to the forms of transmission, it is known that they vary according to the different regions. Vertical transmission is the main form in areas of high prevalence. In areas of intermediate prevalence, mainly in childhood, horizontal transmission is dominant, while sexual transmission and through injecting drug use is the most frequent in areas of low prevalence of Hepatitis B[4].

The dynamics of contagion in Alagoas, based on regionality, demonstrates the concentration of cases in cities with averages below the national level in social issues such as education, infrastructure and basic sanitation[5].

It is known that the earlier the disease is diagnosed and treated, the better the prognosis, significantly reducing the risk of death from liver cirrhosis and hepatocellular carcinoma. For these reasons, prenatal screening, using HBsAg, anti-HBc and anti-HBs serologies in the pregnant woman and her partner, is very important, as it aims to reduce the risk of acute infection during pregnancy, as well as to enable the immunization of seronegative. In addition, testing for sexually transmitted infections such as HIV, syphilis and hepatitis C should also be prioritized, as it is known that co-infection is common in vulnerable groups, so that users of illicit drugs and people who practice unprotected sexual activity are advised to screening, immunoprophylaxis and use of condoms[6,7].

Acute HBV infection is characterized by the presence of antibodies against the virus surface antigen (HBsAg) and immunoglobulin M (IgM) against the core antigen (HBcAg). In the initial phase of infection, patients are also seropositive for the “e” antigen (HBeAg), while chronic infection is characterized by the presence of HBsAg for more than six months, its persistence being the main risk marker for complications of liver disease[8].

Cases of infection by HBV can be associated with clinical pictures of cirrhosis and liver cancer, eventually detected with co-infection by the hepatitis C virus (HCV) and HIV. It is necessary to understand the epidemiology of viral hepatitis, correlating the disease’s biological and socioeconomic risk factors[7].

Vaccination is the main preventive measure against hepatitis B, being extremely effective and safe. Pregnancy and lactation are not contraindications for immunization. The vaccine was gradually introduced in Brazil, included in the national immunization program (NIP) in 1998 and expanded to all age groups in 2016. Three doses of vaccine against hepatitis B induce protective antibody titers (anti-HBs greater than or equal to 10 IU/ml) in more than 90% of healthy adults and young people, and in more than 95% of infants, children and adolescents[9].

Despite this, adherence to vaccination in the adult population is still low, the so-called vaccine hesitancy[10]. In addition, it is possible to infer that, with advancing age, there is a depreciation of immunity and the body’s response to the vaccine will be impaired, which can be considered a

real problem for the immunization process[8,11].

In this context, Brazil still has a significant number of cases of the disease, and epidemiological data on Hepatitis B in the state of Alagoas are still scarce in the literature. The aim of this study is to obtain information about Hepatitis B in the state of Alagoas to assist in the development of public policies to optimize the recognition and treatment of the groups most affected by the disease.

## METHODOLOGY

This is a cross-sectional study, with secondary data analysis provided by the Health State Secretariat of Alagoas (Sesau), for information related to the State of Alagoas, located in the northeast region of Brazil. The database of the Ministry of Health (MH) -Epidemiological Bulletins of Viral Hepatitis -as well as data from the Brazilian Institute of Geography and Statistics (IBGE) to perform prevalence and mortality calculations. The data available from 2010 to 2020 were considered.

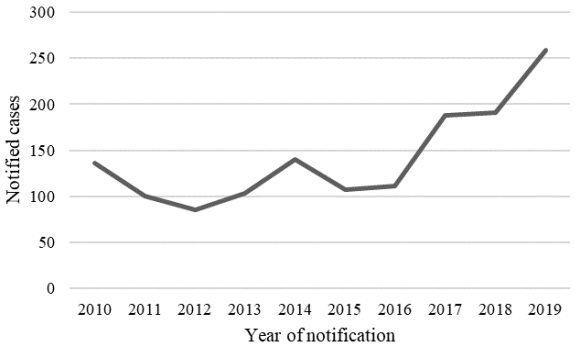
Initially, hepatitis B cases were analyzed during 2010-2019 and, later, 2020 was analyzed separately, in order to evaluate the distribution of the number of cases during the months marked by the first year of the Covid Pandemic 19.

The variables analyzed were: reported cases and number of deaths by hepatitis B, gender, age, form of transmission, level of education. In addition, prevalence, mortality and lethality rates of the disease were calculated. The prevalence calculation was determined based on the number of reported cases of hepatitis B divided by the number of inhabitants of Alagoas. The mortality rate was given by the number of deaths by the disease divided by the number of inhabitants of Alagoas. Finally, the lethality rate was calculated considering the number of deaths by the disease divided by the number of confirmed cases.

The data collected were tabulated in the Microsoft Excel tool (2019 version). Data analysis was performed by descriptive statistics, medium calculations and standard deviation, absolute and relative frequencies. The process of collection, tabulation and data analysis occurred from April to June 2021.

## RESULTS

In Figure 1, it is observed that a total of 1420 cases of hepatitis B were reported in the state of Alagoas from 2010 to 2019. The lowest number was found in 2012, with 85 (5.98%) recorded cases, obtaining a Prevalence rate of 2.6 per 100000 inhabitants. At the same time, the highest number occurred in 2019, totaling 259 (18.23%) confirmed cases of the disease, with a prevalence rate of 7.7 per 100000 inhabitants.




**Source**: Author's own elaboration.

**Figure 1.** Annual Hepatitis B reported cases in the state of Alagoas from 2010 to 2019.

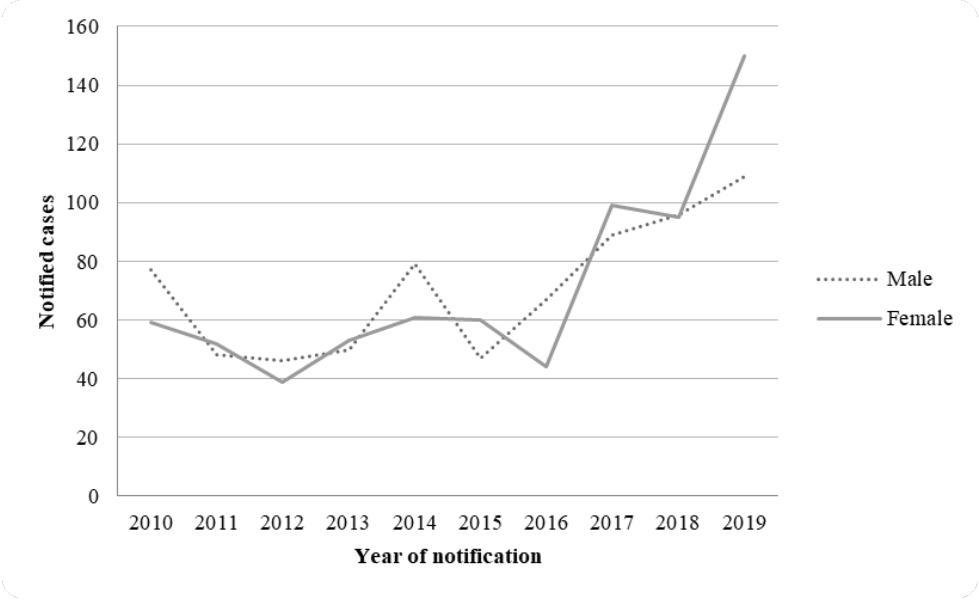
In Table 1, there is greater involvement in individuals belonging to the age group of 20 to 39 years old, totaling 691 (48.66%) cases. Regarding this age group, the year that presented the highest number of recorded cases was 2019, with 116 (16.78%) cases, while the year of lowest notification was 2015, with 43 (6.22%) cases. Individuals over 80 years old represented 5 cases (0.35%). The age group between 40 and 59 years old occupies the second position in number of cases, corresponding to 496 (34.92%). Still regarding this age group, it is observed that in 2019 there were the largest number of cases, with 103 notified cases (20.76%), and that in 2011 and 2012, the smallest numbers were obtained, with 27 (5.44%) cases of the disease registered each year.

**Table 1.** Annual hepatitis B reported cases in the state of Alagoas according to age during the 2010-2019 period.

| Notification year | < 1 years old | 1 to 19 years old | 20-39 years old | 40-59 years old | 60-79 years old | 80 years old |
|---|---|---|---|---|---|---|
| **2010** | 1 | 9 | 78 | 38 | 10 | 0 |
| **2011** | 0 | 5 | 61 | 27 | 7 | 0 |
| **2012** | 0 | 1 | 50 | 27 | 7 | 0 |
| **2013** | 0 | 6 | 51 | 35 | 9 | 2 |
| **2014** | 2 | 15 | 66 | 40 | 16 | 1 |
| **2015** | 1 | 13 | 43 | 42 | 8 | 0 |
| **2016** | 0 | 6 | 55 | 34 | 16 | 0 |
| **2017** | 1 | 7 | 86 | 70 | 23 | 1 |
| **2018** | 0 | 3 | 85 | 80 | 22 | 1 |
| **2019** | 0 | 5 | 116 | 103 | 35 | 0 |
| **Total** | 5 | 70 | 691 | 496 | 153 | 5 |

**Source:** Author's own elaboration.

Regarding cases notified by gender in Alagoas, according to the data described in Figure 2, it is noted that the total of cases observed in women between 2010 and 2019 was 712 (50.14%), while in men was 708 (49.85%). Both genders showed an increase in the number of cases in 2017, 2018 and 2019. The largest number of cases for men were reached in 2019, with 109 (15.39%) notifications. In women, the largest number of notifications occurred in the same year with 150 cases, corresponding to 21.06% of the total.




**Source:** Author's own elaboration.

**Figure 2:** Annual Hepatitis B reported cases in the state of Alagoas according to gender during the 2010-2019 period.

Regarding race/skin color, most individuals with the disease were brown, with a total of 984 (69.29%) cases, while less people reported being indigenous, with only 3 (0.21%) cases.

Table 2 describes the forms of transmission of hepatitis B between 2010 and 2019. The indefinite form of contagion was the most prevalent, corresponding to 1102 (77.6%) of the total of 1420 cases of the period. Sexual transmission presented the largest number of cases, totaling 274 (19.29%), with higher notification rate in 2018, with 38 (13.86%) cases of infection and the lowest in 2016 with 13 (4.74%) notifications.

**Table 2.** Hepatitis B transmission forms notified in the state of Alagoas during 2010-2019.

| Notification year | Sexual | Transfusion | Use of drugs | Vertical | Work accident | Surgical treatment | Dental treatment | Undefined |
|---|---|---|---|---|---|---|---|---|
| **2010** | 30 | 1 | 1 | 1 | 0 | 1 | 1 | 101 |
| **2011** | 26 | 1 | 0 | 2 | 1 | 0 | 0 | 70 |
| **2012** | 29 | 2 | 0 | 0 | 0 | 1 | 0 | 53 |
| **2013** | 28 | 2 | 0 | 2 | 0 | 0 | 0 | 71 |
| **2014** | 27 | 1 | 0 | 0 | 1 | 0 | 1 | 110 |
| **2015** | 28 | 1 | 0 | 0 | 1 | 0 | 2 | 75 |
| **2016** | 13 | 0 | 1 | 0 | 0 | 0 | 1 | 96 |
| **2017** | 26 | 0 | 1 | 4 | 0 | 0 | 3 | 154 |
| **2018** | 38 | 2 | 0 | 1 | 0 | 2 | 1 | 147 |
| **2019** | 29 | 1 | 0 | 1 | 2 | 1 | 0 | 225 |
| **Total** | 274 | 11 | 3 | 11 | 5 | 5 | 9 | 1102 |

**Source:** Author's own elaboration.

Regarding the level of education, 437 (30.77%) individuals did not report the degree of education. Individuals with incomplete elementary school level corresponded to 481 (33.87%) cases and 723 (50.91%) infected with the VHB did not refer to complete education.

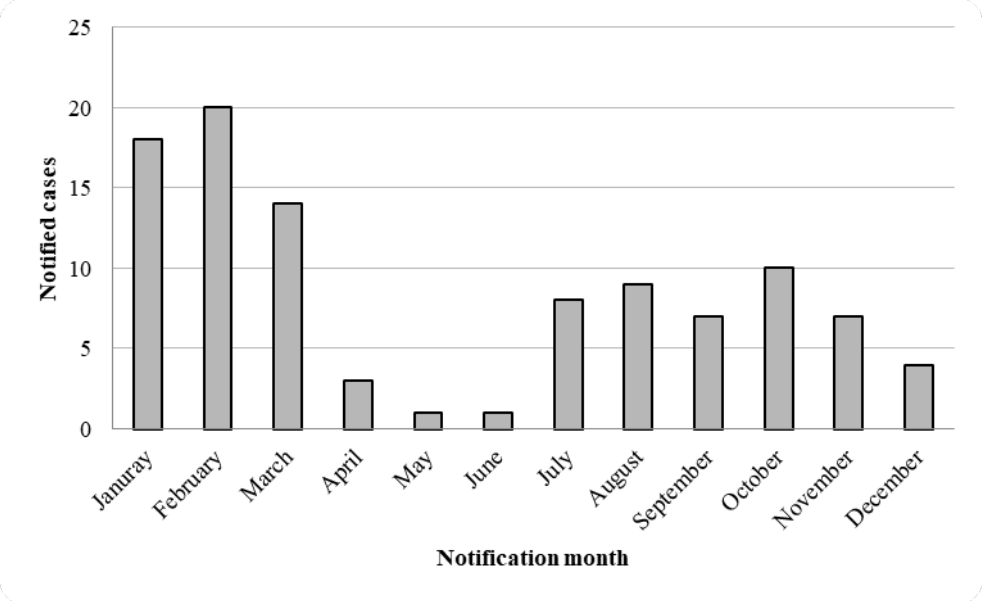
The number of hepatitis B deaths in Alagoas from 2010 to 2019 totaled 41, obtaining a lethality rate of 2.8%. In addition, the disease mortality rate was higher in 2011 (1.9 per 1000000 inhabitants), while the lowest rate occurred in 2014 and 2019 (0.6 per 1000000 inhabitants), according to described in Table 3.

Figure 3 portrays the notified cases according to the month of notification in the state of Alagoas during 2020 in isolation. There was a total of 102 cases notified during the year. The month with the highest number of notifications was February, registering 20 cases (19.6%). In subsequent months, there was a reduction in the number of notifications. May and June presented the registration of one case each, corresponding to 1.96% of the notifications.

**Table 3.** Mortality and lethality rate by hepatitis B in the state of Alagoas during the period 2010-2019.

| Year | **Mortality rate** (by 1000 000 inhabitants) | **Lethality rate** (%) |
|---|---|---|
| 2010 | 1.2 | 2.9 |
| 2011 | 1.9 | 6 |
| 2012 | 0.9 | 3.5 |
| 2013 | 1.8 | 5.8 |
| 2014 | 0.6 | 1.4 |
| 2015 | 0.9 | 2.8 |
| 2016 | 1.7 | 5.4 |
| 2017 | 1.4 | 2.6 |
| 2018 | 1.2 | 2.1 |
| 2019 | 0.6 | 0.8 |

**Source:** Author's own elaboration.




**Source:** Author's own elaboration.

**Figure 3.** Monthly hepatitis b notified cases in the state of Alagoas, during 2020.

## DISCUSSION

Hepatitis B virus infection is a public health problem in Brazil and worldwide. Although Brazil has a low prevalence of VHB infection, it has the second largest population of individuals with positive HBsAg from the American continent. The exclusionary urbanization process contributes to a difficulty in accessing quality information, which defines the epidemiology standards of this population vulnerable[12].

From 2000 to 2021, a total of 264640 confirmed cases of hepatitis B were reported in Brazil, 10.7% in the northeast region[13]. This study demonstrated significant prevalence of hepatitis B in the state of Alagoas over the past decade. The data warns of the need to control and identify disease specificities in the state, aiming at the promotion of useful information for prophylaxis and seeking attention to specialized health.

In the states of the Northeast region, although sociodemographic indices are low compared to other regions, cases and deaths notified by hepatitis B are higher in the states of Alagoas, Sergipe, Bahia and Maranhão, which reveals the multidisciplinary and sociodemographic character of hepatitis B. The level of education, marital status and housing zoning, the presence of population in an area difficult to access vaccination and treatment, as well

as the large migratory flow, justify this concentration[10].

For Barbosa et al.[14], having sexual contact with different partners and frequently during the period of one year is an increase in vulnerability to virus transmission. Thus, the importance of health education and vaccination programs for this group highlight, in order to prevent the transmission of the VHB. In urban areas with higher population concentration, some part of the population does not make regular use of condoms, so it can be supposed that the sexual transmission of this infection is responsible for a significant number of cases[10].

In addition, the expansion of the distribution of the Rapid Test to VHB from 2011 by the Ministry of Health and the improvement of patient care diagnosed throughout the national territory may somehow have contributed to the increase in the number of reported cases[10].

The study of sexually transmitted infections brings up the ideal of proprioception and care for individual health, in which the possibility of transmitting and contaminating with some pathogen by self -declared irresponsibility should be taken into account. Hepatitis B virus infections are prevalent around the world, especially in the most vulnerable populations compared to the general population. Therefore, the socioeconomic vulnerability of the population relates directly to the education degree of individuals affected by the disease[14]. In Alagoas, it was seen that from 2010 to 2019 most of those infected did not have complete education, and more than 30% did not report the degree of education, which emphasizes the role of education in combating this disease.

Sanson et al.[15] shows hepatitis B as a prevalent infectious disease that may end up being neglected and little diagnosed. This study identified hepatitis B as the most prevalent in females between 25 and 39 years old, which is a group of women of reproductive age. This scenario may be a reflection of the sexually transmitted disease screening program instituted in prenatal care, which allows women to have more health care and disease prevention due to the active search that occurs in this population[16].

Similarly, Alagoas state data provided by Sesau show more cases in women and aged 20 to 39 years old, which is reflected in the occurrence of 12 cases of vertical transmission from 2010 to 2019. In Salvador, a higher concentration of the disease was also observed in the female population of a similar age group, from 20 to 49 years old[12].

According to Sanson et al.[15], the vertical transmission rate is a key parameter for assessing hepatitis B control, since there is a risk of 90% transmission if the newborn of Mother infected by the VHB does not receive active and passive prophylaxis in the first hours after delivery. Government responsibility is emphasized to ensure access to the vaccine and immunoglobulin for neonates in the national territory.

With regard to pregnant women, if there is no proof of complete vaccination for the disease, the VHB infection should be traced from the HBsAg research for all during the first trimester of pregnancy or, if the beginning of prenatal care is late, as soon as it starts. Pregnant women who did not have a proper prenatal care and did not have proof of complete vaccination for hepatitis B should conduct the HBsAg research at the time of hospital admission to childbirth[9].

Vaccination against hepatitis B indicated for pregnant women consists of the administration of three doses since the first trimester. This scheme should be provided to all pregnant women without vaccination history or incomplete vaccination. Pregnant women not protected by the vaccine and who meet the VHB at any time of pregnancy, regardless of the form of contact, should receive the vaccination scheme added to immunoglobulin[9]. As vertical transmission can occur by contact of maternal fluids with the fetus, an effective maternal and fetal vaccination process, as well as an effective prenatal, will significantly reduce risks[16].

It can be seen that the most affected race in the state of Alagoas was the brown with more than 50% of those affected by hepatitis B, which corroborates the study conducted in Bahia by Oliveira et al. (2022)[17], in which about 60% of the people affected by this virus called themselves brown, likely a reflection of the high degree of miscegenation in the region.

For adults with immunoactive chronic hepatitis B, antiviral therapy is recommended to decrease the risk of liver-related complications. In immunotolerant adults with chronic hepatitis B, antiviral therapy has no significant effects. It is recommended that hepatic enzyme levels and DNA of the VHB are monitored at least every 6 months to evaluate the possible transition to chronic immunoactive or immunoinative disease and indicate drug treatment when necessary[18,19].

Hepatitis B is the second largest cause of deaths among viral hepatitis13. In this study, there was a lethality rate of 2.8% in Alagoas over a decade. In this context, according to the research by Bixler et al. (2019)[20], compared to the general population, patients with hepatitis B died at higher rates for general causes and liver causes. A significant effect of VHB on the mortality of people living with this chronic infection may be suggested. Hepatitis B is associated with premature death and high rates of death by different causes and liver-related accruals, including hepatocellular carcinoma. HIV coinfection also gives an increased risk of death, especially in cirrhotic patients[20].

The factors of identification of the clinical picture, testing and confirmation of the diagnosis may result in an increase in confirmed cases over the years, as previously reported[21]. However, 2020 was strongly marked by the COVID-19 pandemic, which began in March of the same year, demonstrating a significant reduction in the number of notifications in the state of Alagoas this year, justified by the social isolation recommended to the population, fear of

seeking health services and contracting an infection through the Sars-Cov-2 virus and the understanding of cases[22]. Study conducted by Piauisense et al.[23] also demonstrated health system deficiency in relation to epidemiological surveillance, effective prevention and treatment of VHB infection in 2020.

This study had as its main limitation the understanding of hepatitis B cases, especially during 2020 with the COVID-19 pandemic, which makes a more reliable analysis of the real spread in the state during this period. In addition, data on Hepatitis B cases were not described in pregnant women, due to difficulty in acquiring them, and further studies are required to include this population, including directly linked cases of vertical transmission.

## CONCLUSION

The number of reported cases of hepatitis B in Alagoas grew nonlinearly over the years from 2010 to 2019, especially the last year analyzed, corroborating the reflection of the problems that act as social determinants of the affected population. While the year 2020, intensely marked by the COVID-19 pandemic, presented a drop in the number of cases, which needs a thorough assessment, as it may have been caused by improvement in public policies or under reporting cases due to the pandemic. Regarding social determinants, it is observed that women had more notifications, the most prevalent form of transmission was the sexual way and level of education that stood out in the population analyzed was incomplete elementary school, which demonstrates the impact of education on the process of dissemination of the disease, especially sex education. It is noteworthy that studies on hepatitis B in the state of Alagoas are scarce and the importance of further studies related to the epidemiological profile of the disease in the state is emphasized.

**Authors' contribution:** *Araujo IM* - was responsible for coordinating the team and distribution of functions, tabulation and data analysis, literature review, making figures and co-participation in all stages of the article. *Dos Anjos TM* - participated in the tabulation and data analysis, review of the written literature of the discussion and co-participation in all stages of the article. *Lemos DA* - contributed to the tabulation and data analysis, literature review, discussion and co-participation in all stages of the article. *Amaral MA* - participated in the review of literature, discussion and co-participation in all stages of the article. *Tavares MMA* - wrote the request for data to the State Health Department of Alagoas, wrote the results and provided co-participation in all stages of the article. *Medeiros ALP* - contributed to the request for data to the State Health Department of Alagoas, writing of results and co-participation in all stages of the article. *Carnaúba ATL* - had its participation in correction and guidance throughout the elaborative process, as well as in answering questions before, during and after the process of construction of the scientific article.

## REFERENCES

1. Yuen MF, Chen DS, Dusheiko GM, Janssen HLA, Lau DTY, Locarnini SAL, et al. Hepatitis B virus infection. Nature Rev Dis Primers. 2018;4(1):1-20. doi: https://doi.org/10.1038/nrdp.2018.35
2. Principais temas apresentados no Congresso Europeu de Fígado – ILC 2019. Disponível em: https://hepato.com/2019/04/16/principais-temas-apresentados-no-congresso-europeu-de-figado-ilc-2019/.
3. Brasil. Ministério da Saúde. Boletim epidemiológico. Brasília; 2020. Disponível em: https://bvsms.saude.gov.br/bvs/boletim_epidemiologico/hepatites_virais_2020.pdf
4. European Association for the Study of the Liver (EASL). Diretrizes de Prática Clínica da EASL 2017 sobre o manejo da infecção pelo vírus da hepatite B. Rev Hepatol. 2017;67(2):370-398. doi: https://doi.org/10.1016/j.jhep.2017.03.021
5. Silva AP, Silva AP, Souza LML, Peixoto NO, Gonçalves EC, Júnior JLFGV. Incidence of viral hepatitis in Brazil from 2009 to 2018: an epidemiological study of confirmed cases of viral hepatitis. Rev Soc Bras Med Trop. 2021;54. doi: https://doi.org/10.1590/0037-8682-0089-2020
6. Richmond JA, Sasadeusz J, temple-smith M. The role of primary health Care in Hepatitis B Testing and Management: a case study. J Commun Health. 2018;43(1):38-47. doi: https://doi.org/10.1007/s10900-017-0385-9
7. Duarte G, Pezzuto P, Barros TD, Junior GM, Martínez-Espinosa FE. Protocolo Brasileiro para Infecções Sexualmente Transmissíveis 2020: hepatites virais. Epidemiol Serviços Saúde. 2021;30(1). doi: https://doi.org/10.1590/S1679-4974202100016.esp1
8. Brandt FP, Júnior VS, Yamada R, Wendt GW, Ferreto LED. Caracterização epidemiológica da hepatite B em idosos. Rev Bras Geriatr Gerontol. 2020;23(4). doi: https://doi.org/10.1590/1981-22562020023.200119
9. Protocolo Clínico e Diretrizes Terapêuticas para Atenção Integral às Pessoas com Infecções Sexualmente Transmissíveis (IST). Disponível em: https://www.gov.br/aids/pt-br/centrais-de-conteudo/pcdts/2022/ist/pcdt-ist-2022_isbn-1.pdf/view.
10. Vivaldini SM, Pinto FKA, Kohiyama IM, Almeida EC, Santos AF, Ribeiro RA*, et al.* Exploratory spatial analysis of HBV cases in Brazil between 2005 and 2017. Rev Bras Epidemiol (São Paulo). 2019;22(1). doi: https://doi.org/10.1590/1980-549720190007.supl.1
11. De Paula AS, Araujo IM, Costa AMB, Sobrinho CMTR, Figueira JRR, Gonçalves MR, et al. Immunoprophylaxis reduction effectiveness in elderly determined by immune response senescence. J Bio Innov. 2021;10(2):620-638. doi: https://doi.org/10.46344/JBINO.2021.v10i02.25
12. Martins MF, Veras RM, Costa EAM. Hepatitis B in the City of Salvador, Bahia, Brazil: Epidemiological Pattern and Association of Sociodemographic Variables. Rev

Bras Ciên Saúde. 2016;20(3):189-196. doi:10.4034/RBCS.2016.20.03.03

13. Brasil. Ministério da Saúde. Boletim Epidemiológico de Hepatites Virais; 2022. Disponível em: https://pncq.org.br/boletim-epidemiologico-de-hepatites-virais-2022/.

14. Barbosa JR, Bezerra CS, Carvalho-Costa FA, Azevedo CP, Flores GL, Colares JKB, et al. Cross-Sectional Study to Determine the Prevalence of Hepatitis B and C Virus Infection in High Risk Groups in the Northeast Region of Brazil. Int J Environ Res Public Health. 2017;17(14):793. doi: https://doi.org/10.3390/ijerph14070793

15. Sanson MCG, Feitoza HAC, Saraceni V, Koifman RJ, Bessa ARS. Prevalence and epidemiological profile of Hepatitis B in pregnant women: a population study in a Brazilian Western Amazon city from 2007 to 2015. Rev Bras Saude Mater Infant. 2018;18(4):711-721. doi: https://doi.org/10.1590/1806-93042018000400003

16. Chao SD, Cheung CM, Chang ET, Pei A, So SKS. Manejo de gestantes infectadas com hepatite B: um estudo transversal de obstetras. BMC Gravidez Parto. 2019;19(1):1-7. doi: https://doi.org/10.1186/s12884-019-2421-5

17. Oliveira LFM, Almeida DFG, Silva MFCR. Hepatite B e C em centro de testagem e aconselhamento–aspectos atuais. Braz J Health Rev. 2022. 5(2):7545-7557. doi: https://doi.org/10.34119/bjhrv5n2-311

18. Terrault NA, Lok ASF, McMahon BJ, Chang KM, Hwang JP, Jonas MM. et al. Update on prevention, diagnosis, and treatment of chronic hepatitis B: AASLD 2018 hepatitis B guidance. Hepatology. 2018;67(4):1560-1599. doi: https://doi.org/10.1002/hep.29800

19. Tu T, Block JM, Wang S, Cohen C, Douglas MW. The lived experience of chronic hepatitis B: a broader view of its impacts and why we need a cure. Viruses. 2020;12(5):515. doi: 10.3390/v12050515

20. Bixler D, Zhong Y, Ly KN, Moorman AC, Spradling PR, Teshale EH, et al. Mortality among patients with chronic hepatitis B infection: the chronic hepatitis cohort study (CHeCS). Clin Infect Dis. 2019;68(6):956-963. doi: https://doi.org/10.1093/cid/ciy598

21. Paoli J, Wortmann AC, Klein MG, Pereira VRZB, Cirolini AM, Godoy BA, et al. Epidemiologia do HBV e diversidade genética em uma área de alta prevalência de hepatite B no sul do Brasil. Braz J Infect Dis. 2018;22(4):294-304. doi: https://doi.org/10.1016/j.bjid.2018.06.006

22. Ximenes RAA, Albuquerque MFPM, Martelli CMT, Miranda Filho DB, Souza WV, Ichihara MYT, et al. Covid-19 no nordeste do Brasil: entre o lockdown e o relaxamento das medidas de distanciamento social. Ciên Saúde Coletiva. 2021;26(4):1441-1456. https://doi.org/10.1590/1413-81232021264.39422020

23. Piauiense JN, Costa CCS, Silva RJS, Cardoso YMN, Miceli JFD, Resque RL, et al. Hepatitis B Virus Infection among People Who Use Illicit Drugs: Prevalence, Genotypes and Risk Factors in the State of Amapá, Northern Brazil. Substance Use Misuse. 2020;55(10):1633-1639. doi: https://doi.org/10.1080/10826084.2020.1756334

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