Change in the Epidemiological Profile of Hepatitis B in Brazil

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Abstract

Infection caused by hepatitis B virus (HBV) is an important public health problem and can progress with death from cirrhosis and liver cancer. In 2017 it has been 21 years since the universal vaccination against HBV has been introduced in Brazil. The objectives are to analyze the reports of hepatitis B virus infection in the Brazilian public health system between 2010 and 2015 and to calculate incidence and prevalence of the hepatitis B virus infection. The methods are observational, descriptive, and cross-sectional epidemiological study of reports of hepatitis B infection in children under 20 years of age in Brazil between 2010 and 2015. There were 4275 cases in Brazil. The prevalence was 6.49 cases/100,000 inhabitants. The age group with the highest number of notifications in Brazil was from 15 to 19 years old (68.58%). The incidence dropped significantly in 2015, and the occurrences were predominant in females. The Amazon region presented the highest number of occurrences, annual incidence, and prevalence. The form of transmission was ignored in almost half of the cases, and the most reported form of transmission in Brazil was the sexual transmission. The most common coinfection was with the hepatitis delta virus (1.87%). Chronic hepatitis was the most prevalent clinical form. The prevalence and incidence of hepatitis B virus in children under 20 years of age showed a marked and progressive decrease, which indicates the efficacy of the vaccine. The form of sexual infection in adolescents reinforces the need for policies aimed at the prevention of sexually transmitted infections.

Keywords Hepatitis B · Child · Teenager · Compulsory notification · Prevalence

Introduction

Hepatitis B is a major public health problem, with a wide diversity of global prevalence, responsible for deaths from liver cirrhosis and hepatocellular carcinoma [1]. In Brazil, between 1980 and 1990, the prevalence of chronic carriers of hepatitis B virus (HBV) was from 2 to 7%, with areas of higher endemicity, such as the Amazon, reaching a prevalence of 11.5% [2–4]. In 1986, the HBV vaccine was developed with recombinant deoxyribonucleic acid (DNA) technology. In Brazil, in 1996, the government initiated the vaccination in children under the age of 1 [5].

In 2017, the vaccination against HBV in children in Brazil completed 21 years, so theoretically, children and adolescents under the age of 20 years old should not have chronic hepatitis B. The objective of this short communication was to analyze the compulsory notifications of HBV infection in the public health system in children under 20 years old in Brazil to evaluate the prevalence of hepatitis B in the population that received the vaccination in their childhood.

Materials and Methods

This is an observational, descriptive, and cross-sectional epidemiological study. The sample consisted of secondary public data obtained from the Information System of Notifiable Diseases (SINAN) and the Health Information Program TABNET of the Department of Informatics of the Unified Health System (DATASUS), concerning reports of HBV infection in citizens under the age of 20 in Brazil, between 2010 and 2015, through the website <http://datasus.saude.gov.br> and compared to the Brazilian population data of the Brazilian Institute of Geography and Statistics (IBGE), through the

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electronic website <http://www.censo2010.ibge.gov.br/sinopse/index.php?dados=8>.

The number of cases registered per year in Brazil between 2010 and 2015 was analyzed, divided by federative units and the regions of Brazil, according to Fig. 1. Frequency, prevalence, and incidence analysis were performed.

Results

Brazil, in the period from 2010 to 2015, had a total population of approximately 200 million inhabitants, with approximately 65,800,000 individuals under 20 years old. In this period, 4275 cases of HBsAg positive individuals were reported in this age group, corresponding to an estimated prevalence of 6.49 cases per 100,000 inhabitants, as can be observed in Table 1. Of the 4275 reports, 2,773 were female (64.86%). Regarding the age group, there were 403 reports in children less than 1 year old (9.43%), 148 between 1 and 4 years old (3.46%), 263 from 5 to 9 years old (6.15%), 529 from 10 to 14 years old (12.38%), and 2932 between 15 and 19 years old (68.58%). When evaluating hepatitis B coinfection with other hepatitis in Brazil, we observed 80 cases of association with delta hepatitis in the Amazon region and 42 cases with hepatitis C (5 in children under 1 year old, 2 cases in 1 to 4 years old, 9 cases in 10 to 14 years old, and 26 cases from 15 to 19 years old). During the study period, there were 5 reports of fulminant hepatitis (0.11%) related to HBV in

the pediatric age group. 862 cases were described as an acute hepatitis (20.16%). The form of transmission was ignored in almost half the cases of acute hepatitis (38.97%), but 159 cases (18.44%) were reported as a sexual transmission, mainly in the 15–19 year age group (83.64%). The clinical form of chronic hepatitis was recorded in 3084 cases (72.15%).

The highest prevalence among Brazilian states was in the state of Acre, belonging to the Amazon region, which presented a prevalence of 132.56 cases/100,000 inhabitants. Table 2 shows the incidence and prevalence of reporting of hepatitis B virus infection in children under 20 in the years of 2010 to 2015 by Brazilian regions.

Discussion

The prevalence of hepatitis B is decreasing in several parts of the world, as demonstrated by Ott et al., especially in countries that have adopted HBV vaccination, but this reality is not true in some regions [8]. Considering the Brazilian population in the age group under 20 years old in 2015, of 64.5 million inhabitants, if the vaccination program was not established, they would expect 1.29–4.5 million HBV carriers [3, 4]. This study observed 4275 reports of HBsAg positive individuals in this age group, corresponding to 0.33%–0.09% of the expected value. This data indicates the effectiveness of the vaccination.

Fig. 1 Map of Brazil, divided by regions and federative states

Table 1 Incidence and prevalence of cases of hepatitis B virus infection in children under 20 years of age from 2010 to 2015 in Brazil by age group

Brazil	Incidence: cases/ 100 thousand population 2010	Incidence: cases/ 100 thousand population 2011	Incidence: cases/ 100 thousand population 2012	Incidence: cases/ 100 thousand population 2013	Incidence: cases/ 100 thousand population 2014	Incidence: cases/ 100 thousand population 2015	Incidence: cases/ 100 thousand population 2010–2015
0 to 4 years	0.54	0.68	0.70	0.71	0.72	0.25	3.61
5 to 9 years	0.25	0.33	0.26	0.36	0.32	0.10	1.61
10 to 14 years	0.84	0.67	0.51	0.57	0.39	0.11	3.09
15 to 19 years	3.38	3.63	3.17	3.13	2.71	1.07	17.10
0 to 19 years	1.27	1.35	1.18	1.22	1.06	0.39	6.49

Source: SINAN and IBGE data [6, 7]

Of the 4275 cases reported in the period from 2010 to 2015, 80 had associated hepatitis delta, corresponding to 1.87% of the total, observed mainly in the states of the Amazon region. In 1989, Bensabath and Soares, in the state of Amazonas, showed that 24% of the HBsAg positive patients had positive serology for the delta virus, and, among those younger than 20 years old, the positivity was 17.33% [9].

Sexual transmission was reported in 1035 cases (24.21%), especially in the 15–19 age group, demonstrating the importance not only of vaccination but also of the orientation regarding preventive care for sexually transmitted diseases.

In the Amazon region, there was a significant reduction in the prevalence of hepatitis B, such as in the State of Amazonas, which had a prevalence of hepatitis B of 11.5% in the 1980s, in children under 14 years old [2] and in the present prevalence of 20.86 cases/100,000 inhabitants. However, that is still a high number, with the highest prevalence in Brazil, which can be attributed to the fact that it is a region with many isolated populations, including indigenous people, and that births are often at home, which makes the vaccination at birth difficult to achieve. It is important to note that the prevalence in the State of Acre (in the Amazon region) was the highest in Brazil, with 132.53 cases/100,000

inhabitants in the studied age group, needing to have a more targeted study in this area to identify possible prenatal, immunization, and immunoglobulin failures in maternity hospitals for at-risk patients.

The sample of this study consisted in secondary public data obtained from the Notifiable Disease Information System in Brazil. There are limitations on the use of these administrative data sets and may not reflect the total epidemiological changes of Hepatitis B.

Conclusion

Hepatitis B in Brazil, after 21 years of the initiation of the vaccination, presents an epidemiological profile that is very different from the one observed in the 1980s. In adolescents, the main causes of HBV infection are drug use and unprotected sexual intercourse. In order to reduce the future implications on these young people, actions directed toward this public are necessary. Further population studies are needed to confirm the data observed in the secondary public data obtained from the Notifiable Disease Information System in Brazil.

Table 2 Incidence and prevalence of notification of hepatitis B virus infection in children under 20 years of age from 2010 to 2015 by Brazilian Regions

Region	Incidence: cases/ 100 thousand population	Incidence: cases/ 100 thousand population	Incidence: cases/ 100 thousand population	Incidence: cases/ 100 thousand population	Incidence: cases/ 100 thousand population	Incidence: cases/ 100 thousand population	Incidence: cases/ 100 thousand population
Year	2010	2011	2012	2013	2014	2015	2010–2015
Brazil	1.27	1.35	1.18	1.22	1.06	0.39	6.49
North (Amazonic)	3.11	3.39	2.73	3.91	3.70	1.05	1791
Northeast	0.54	0.73	0.62	0.70	0.58	0.20	3.38
Southeast	0.76	0.87	0.82	0.70	0.62	0.22	4.01
South	2.42	2.12	2.08	1.49	1.32	0.75	10.26
Midwest	2.28	2.14	1.49	1.68	1.03	0.47	9.10

Source: SINAN and IBGE data [6, 7]

Author contributions All authors contributed to the study conception and design. Material preparation performed by Beatriz Zago Gomes Rueda, Luciana Lofego Gonçalves and Maria da Penha Zago-Gomes, data collection were performed by Beatriz Zago Gomes Rueda, Mateus André Rueda-Dantas and Brunna Vila Coutinho Ferreira and analysis were performed Beatriz Zago Gomes Rueda, Luciana Lofego Gonçalves and Maria da Penha Zago-Gomes. The first draft of the manuscript was written by Beatriz Zago Gomes Rueda, Luciana Lofego Gonçalves and Maria da Penha Zago-Gomes and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

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