ANALYSIS OF CHILDHOOD HEPATITIS B VACCINE COVERAGE IN THE MIDWEST REGION UNDER THE INFLUENCE OF THE PANDEMIC AND ANTI-VACCINE MOVEMENTS

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ABSTRACT

Introduction: Vaccination is a right to health, and the Hepatitis B vaccine (recombinant) (VCHB) is the most effective vaccine for preventing this disease. However, there have been significant declines in most vaccines, accentuated by the Coronavirus pandemic and anti-vaccine movements. **Objectives:** To identify the prevalence of Hepatitis B vaccination coverage in children up to 2 years of age in the pre-pandemic and post-pandemic periods, as well as the impact of the pandemic and anti-vaccination movements on Hepatitis B vaccination coverage. **Methodology:** This is a retrospective quantitative study based on data on childhood vaccination coverage in the Midwest and the national scenario between 2018 and 2021 for Hepatitis B vaccines, obtained from the Department of Informatics of the Unified Health System (DataSUS). **Results:** Hepatitis B vaccination coverage in children under 30 days of age showed widespread declines both nationally and in the Midwest region, with the largest decline occurring during the pandemic period, particularly in Mato Grosso do Sul. Regarding the doses of Hepatitis B vaccines administered to individuals up to 2 years of age, there were decreases between 2018-2019 and 2020-2021 of approximately 13.11% and 12.02% in the Midwest. **Conclusion:** Reductions in hepatitis B vaccination coverage were observed in children up to 2 years of age, with the Midwest region presenting the lowest number of doses administered between 2018 and 2021, with a focus on Mato Grosso do Sul, demonstrating a direct or indirect relationship with the challenges analyzed.

Keywords**:** Hepatitis B vaccines; COVID-19; Pandemics.

INTRODUCTION

Hepatitis B is a disease caused by the hepatotropic DNA virus, the hepatitis B virus (HBV), which has several routes of transmission, including sexual, parenteral, horizontal, and vertical transmission, with an incubation period of around 45 to 180 days (AZEVEDO *et al*., 2021). Thus, HBV infection is a major global health challenge, given that in 2015 HBV had a prevalence of 3.5% of the world population, with an estimated 257 million people chronically infected and approximately 900,000 deaths per year worldwide related to Hepatitis B (BRAZIL, 2023).

The Coronavirus pandemic has impacted the immunization landscape and led to a reduction in vaccination coverage, which, together with the search for a new vaccine,

False information and lack of knowledge among the general population ended up raising doubts about the safety of vaccines, even those that had been on the market for decades. This situation was exacerbated by anti-vaccine or "anti-vax" movements, as restrictive pandemic measures and social isolation led many people, especially parents, to stop getting vaccinated or taking their children to vaccination centers. and with the emergence of vaccines to combat COVID-19, the mindset of distrust about vaccination in general increased, resulting in a reduction in the doses administered between the pre-pandemic (2018 and 2019) and pandemic periods (2020 and 2021) of 17.2% in the entire population and 11.8% in children under 1 year of age, which demonstrates a significant decrease of approximately 7,280,461 doses administered to children under 1 year of age (LIMA; MACIEL; JÚNIOR, 2022).

With this in mind, the hepatitis B vaccine (recombinant) (VCHB) is the most effective method for preventing this disease and HBV infection (SILVA *et al*., 2021). As a result, vaccination is the main preventive measure against HBV and has been available free of charge through the PNI since 1993 in three doses at intervals of zero, one, and six months (AMARAL *et al.*, 2022). In addition, the PNI vaccination schedule recommends vaccination against hepatitis B in the first year of life at birth, with the pentavalent vaccine also being administered at 2, 4, and 6 months of age. It is important to note that the hepatitis B vaccine was one of four vaccines that showed a decline of more than 14% between 2019 and 2020 (from 78.57% to 62.54%), with the lowest average vaccination coverage between 2013 and 2020 of the 10 vaccines analyzed in the literature (PROCIANOY *et al.*, 2022).

In addition, vaccines such as Pentavalent (which protect against diphtheria, tetanus, hepatitis B, pertussis, and *Haemophilus influenzae* type B) also involve hepatitis B prophylaxis and are important in monitoring childhood immunoprevention. Thus, the relevance of these data lies in the need for analysis and monitoring of childhood vaccination coverage, especially in children up to 2 years of age, with emphasis on hepatitis B, in order to identify at-risk populations and provide support and resources for recovery of vaccination coverage, given the existing challenges, which have been accentuated by the pandemic scenario and anti-vaccine movements (LEITE *et al.*,

2022). The objective is to identify the prevalence of Hepatitis B vaccination coverage in children up to 2 years of age and the impact of the pandemic and anti-vaccination movements on Hepatitis B vaccination coverage in children up to 2 years of age in the pre-pandemic and post-pandemic periods.

METHODOLOGY

This research is a retrospective quantitative study based on the collection and analysis of data on childhood vaccination coverage and doses administered in the Midwest region and nationwide between 2019 and 2021, for Hepatitis B vaccines, collected through the Immunization Program Evaluation System, made available by the Department of Informatics of the Unified Health System (DataSUS). The sample consisted of male and female individuals up to two years of age who were vaccinated during the aforementioned period. The data analysis also had theoretical support provided by bibliographic research, which prioritized publications from the last five years, with the help of data searches on *the Pubmed, SciELO, and* Virtual Health Library websites. Finally, since the DataSUS information is in the public domain, this research was not submitted to the Research and Ethics Committee (CEP).

RESULTS

Regarding total vaccination coverage for hepatitis B in children aged 30 days or less, the year with the largest drop was 2020, which saw a 16.3% decrease compared to 2019. The Midwest region had the largest drop, around 21.07% in the same period compared to the previous year. while the South region had the smallest drop, approximately 8.93%, and the Southeast had the lowest coverage in this regard in 2020. Furthermore, the decline in total coverage in Brazil had already been present since 2019 when compared to 2018, and there was an increase only in 2021, of approximately 1.91%, but in the South there was a decrease, as seen in Table 1.

Table 1. Hepatitis B vaccination coverage in children aged 30 days or less between 2018 and 2021 in Brazil.

Region	20	2	20	2
Total	88.40	78.57	65.77	67.03

1 Northern Region	87.51	85.99	74.1	75.7
2 Northeast Region	92.57	80.53	70.34	72
3 Southeast Region	88.94	73.59	57.91	6
4 Southern Region	73.57	75.78	69.02	64
5 Central-West Region	97.58	90.58	71.5	72.42

Source: National Immunization Program Information System (SI-PNI/CGPNI/DEIDT/SVS/MS), 2024.

In the Midwest, hepatitis B in children aged 30 days or younger had the lowest coverage rate of 59.31% in the state of Mato Grosso do Sul in 2020, with all states (Goiás, Mato Grosso, Mato Grosso do Sul) and the Federal District, there were reductions in coverage from 2019 to 2020, with the greatest decrease in Mato Grosso do Sul, as shown in Table 2.

Table 2. Hepatitis B vaccination coverage in children aged 30 days or less between 2018 and 2021 in the Midwest.

Region	20	20	2	2
1 Federal District	111.05	102.65	86	93.05
2 Goiás	79.13	77.48	68.18	67.04
3 Mato Grosso	97.66	86.95	75.25	76
4 Mato Grosso do Sul	125.29	111.71	59.31	59

Source: National Immunization Program Information System (SI-PNI/CGPNI/DEIDT/SVS/MS), 2024.

In Brazil, regarding the total number of doses administered for Hepatitis B, Hepatitis B non-seroconversion, Hepatitis A, recombinant Hepatitis B, and Pentavalent vaccines in individuals up to 2 years of age from 2018 to 2019 and 2020 to 2021, according to Table 5, there were decreases of 14.98% and 13.09%, respectively, while in the Central-West region, there were decreases of 13.11% and 12.02% in this time interval. However, from 2019 to 2020, there was an increase of 6.18% in total, with the largest increase in the South region of 10.95%, followed by the Midwest region of 9.12%, as shown in Table 3.

Table 3. Doses administered in Brazil for Hepatitis B, Hepatitis B non-seroconversion, Hepatitis A, Recombinant Hepatitis B, and Pentavalent in 2018, 2019, 2020, and 2021.

Region	20	20	2	2
Total	10,818,992	9,199,011	9,767,691	8,489,739
1 Northern Region	1,094,292	1,074,500	1,043,012	969,805
2 Northeast Region	3,104,095	2,603,382	2,732,028	2,461,048
3 Southeast Region	4,304,021	3,469,336	3,727,312	3,110,236
4 Southern Region	1,419,027	1,271,868	1,411,217	1,199,756
5 Central-West Region	897,557	779,924	851,122	748,894

Source: National Immunization Program Information System (SI-PNI/CGPNI/DEIDT/SVS/MS), 2024.

CONCLUSION

It is important to highlight the limitations of this study, which, because it uses data from the DataSUS platform, presents data that depends on updates and complete data entry. That said, reductions in Hepatitis B vaccination coverage were observed in children up to 2 years of age, with the Midwest region having the lowest number of hepatitis B vaccine doses administered among all regions of Brazil in the period between 2018 and 2021. In addition, it should be noted that the state of Mato Grosso do Sul had the lowest coverage and number of doses administered between 2019 and 2020. That said, the COVID-19 pandemic and anti-vaccine movements, through social isolation, access restrictions, the spread of fake news, and the strengthening of activist websites and posts, contributed directly or indirectly, as demonstrated in the data collected in this article, to constant impacts on the coverage and number of doses administered for Hepatitis B, leading to reductions in childhood vaccination against Hepatitis B for children up to 2 years of age. Further research is needed to fully understand all the consequences of these impasses.

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