EVALUATION OF BCG VACCINE COVERAGE IN THE MIDWEST REGION UNDER THE INFLUENCE OF THE PANDEMIC AND ANTI-VACCINE MOVEMENTS

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ABSTRACT

Vaccination is an important disease prevention measure, considered one of the greatest achievements in public health in the 20th century. Through the National Immunization Program, the Ministry of Health made vaccination mandatory in 1976 for the prevention of tuberculosis. The vaccine, called Bacillus Calmette-Guérin (BCG), requires only one dose, taken shortly after birth. The decline in vaccine adherence has been a source of great concern for Brazilian health authorities. Vaccine hesitancy, which involves apprehension about or refusal of vaccines, can lead to the creation of anti-vaccine movements, reducing access to this means of protection. Thus, the objective of this study is to identify the prevalence of BCG vaccination coverage in children and analyze the impact of the pandemic and anti-vaccine movements on BCG vaccination coverage in children in the pre-pandemic and post-pandemic periods. This study was conducted using data from 2018 to 2021, available on the DATASUS platform. The results show that BCG vaccination coverage in the Midwest region decreased in the 2020-2021 biennium compared to 2018 and 2019 in most of the states analyzed. This decrease occurred not only in this region but was observed throughout the country. It was concluded that there was a decrease in vaccination coverage in the Midwest region, with a need for normalization of services and causal investigations so that coverage levels return to the recommended target.

Keywords: Public Health; Vaccination; BCG Vaccine.

INTRODUCTION

Vaccination is an important disease prevention measure, which is simple and has a major impact on the general health of a population. It is considered one of the greatest achievements in public health in the 20th century and one of the three most important milestones in public health for the prevention and control of communicable diseases (WORLD HEALTH ORGANIZATION, 2009). State programs such as the World Health Organization (WHO) recommend that at least 90% of the world's babies be immunized, highlighting the importance of vaccination at birth and up to 15 months of age with the main vaccines, which aim to create antibodies and an immune response in the body, thus preventing the development and spread of eradicated diseases (BONANI, SOUZA, 2021).

Through the National Immunization Program (PNI), the Ministry of Health (MS) made vaccination mandatory in 1976 for the prevention of severe forms of tuberculosis. The vaccine, called Bacillus Calmette-Guérin (BCG), is produced from live attenuated bacteria and administered intradermally, with only one dose of the vaccine required, taken shortly after birth. This measure led to a satisfactory reduction in the spread and incidence of the disease (REIS et al., 2019; ARROYO et al., 2020; LEITE et al., 2022).

The BCG vaccine has been proven to be effective in protecting against tuberculosis, offering a good level of protection when administered in the first days of life. This vaccination can reduce the incidence of the disease and protect against infection by *Mycobacterium tuberculosis*, especially in childhood. The vaccine also protects against the progression of pulmonary and extrapulmonary tuberculosis for up to 10 years (ROY et al., 2014; REGO et al., 2021).

The decline in vaccine adherence has been a source of great concern for Brazilian health authorities. This negligence is allowing the resurgence of diseases that previously seemed to be under control or even eradicated. Since they began to be recorded in the PNI Information System (SI-PNI) in the 1990s, vaccination coverage has remained at satisfactory levels (ARROYO et al., 2020; OLIVEIRA et al., 2020; DURANS et al., 2021). However, since the end of 2015, there has been a worrying decline in vaccination coverage in the country, especially in the case of vaccines that belong to the childhood schedule, BCG being one of them (SOUZA et al., 2022; SATO; CAMPOS, 2023).

In February 2020, the Ministry of Health declared a public health emergency due to the new coronavirus. As a result, the demand for health care services and vaccination rates may have fallen. Added to this is vaccine hesitancy, which involves apprehension about or refusal of vaccines and can lead to the creation of anti-vaccine movements or individuals who, together, discuss and apply arguments to reject, question, or disparage vaccination programs and the immunobiological agent itself (APS et al., 2018).

Given the above, this study aims to identify the prevalence of BCG vaccination coverage in children and analyze the possible impact of the pandemic and anti-

vaccination movements on BCG vaccination coverage in children in the pre-pandemic and post-pandemic periods.

METHOD

This research is a retrospective quantitative and qualitative study based on the collection and analysis of data on childhood vaccination coverage in the Midwest region between 2018 and 2021 for the BCG vaccine, collected through the Immunization Program Evaluation System, made available by the Information Technology Department of the Unified Health System (DataSUS). The sample will include all male and female individuals up to the second year of life who were vaccinated during the aforementioned period.

The data of interest for this research were stored in a spreadsheet obtained through Microsoft Office Excel 2019. In addition, the data analysis also relied on theoretical input provided through bibliographic research, prioritizing publications from the last 10 years, with the help of data searches on the websites Pubmed, SciELO, and Biblioteca Virtual em Saúde. Finally, since the DataSUS information is in the public domain, this research was not submitted to the Research and Ethics Committee (CEP).

RESULTS

The data presented below (Table 1) were collected from the DATASUS platform, using information made available to the entire population, from January 2018 to December 2021. The figures refer to the BCG vaccine and show the total number of doses administered in the Midwest region and the percentage of vaccination coverage during this period.

Table 1. Doses administered and vaccination coverage of the BCG vaccine in the Midwest region.

Vaccine	2018 n (%)	2019 n (%)	2020 n (%)	2021 n
BCG	243,492 (102.2)	231,322 (93.8)	191,502 (79.7)	182,954 (76.6)

BCG: Bacillus Calmette–Guérin. Source: Authors, according to TABNET – DATASUS, 2024.

Based on these figures, there was a clear drop in vaccination coverage in 2020–2021 compared to 2018–2019. The comparative percentage drop was 19.85. There is a downward trend in vaccination coverage, which is more pronounced in the second year of the COVID-19 pandemic.

Table 2. Doses administered and vaccination coverage of the BCG vaccine by state in the Midwest region.

Federative unit	2018 n	2019 n (%)	2020 n	2021 n
Federal District	39,167	41,891 (93.24)	42,073 (91.32)	44,933 (98.78)
Goiás	91,068 (93.58)	85,899 (86.73)	73,068 (80.16)	66,493 (74.25)
Mato Grosso	58,093 (106.14)	52,356 (90.11)	49,351 (84.98)	44,498 (81.82)
Mato Grosso do Sul	55,164 (129.56)	51,176 (93.76)	29,053 (80.50)	28,712 (78.80)

Source: Authors, according to TABNET – DATASUS, 2024.

When analyzing the data from the Federation Units in the Midwest region separately, a general decline in vaccination coverage was also observed, except in the Federal District, which managed to remain above the 90% coverage target in the first two years of the pandemic. Mato Grosso and Mato Grosso do Sul achieved results above the recommended average in 2018 and 2019, but there was a significant drop in the following two years. The state of Goiás, on the other hand, recorded a decline starting in 2019 and has not reached the target since then.

In relation to national data (Table 3), a similar pattern to that observed in the Midwest region can be seen, with a significant drop in coverage during the two years of the pandemic. In fact, it can be seen that the Southeast region had the lowest coverage rate for the years 2020-2021, possibly influenced by the COVID-19 pandemic.

Table 3. BCG vaccine coverage by Brazilian region.

Federative unit	2018	2019	20	2021
Northern	94	91.04	81.19	80.6
Northeast Region	100.35	85.39	74.83	75.1
Southeast Region	101.98	84.41	73.41	71.18
Southern Region	94.15	88.08	87.45	78.42
Central-West Region	102.19	93.76	80.50	7

Source: Authors, according to TABNET – DATASUS, 2024.

CONCLUSION

BCG vaccination coverage between 2018 and 2021, although not declining in the Federal District, followed a downward trend in most states in the Central-West region, especially in 2020–2021 (a period that coincides with the COVID-19 pandemic), with Goiás standing out as the state with the lowest vaccination coverage. Coverage is likely to increase in the coming years, given that vaccination services have returned to normal. It can be inferred that the pandemic was a contributing factor to the decline in BCG vaccination coverage in the Federal District,

and that encouraging immunisation is essential to achieving good public health indicators.

In addition, further studies are needed to understand the possible causes of low vaccination adherence and to propose complementary actions to vaccination campaigns in order to restore the high levels of vaccination coverage that were essential in the past in combating infectious diseases.

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