MEASLES: INCIDENCE OF THE DISEASE AND CHILDHOOD VACCINATION IN BELÉM, PARÁ BETWEEN 2018-2021

SARAMPO: INCIDÊNCIA DA DOENÇA E VACINAÇÃO INFANTO-JUVENIL EM BELÉM DO PARÁ ENTRE 2018-2021

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ABSTRACT: The objective of this study was to evaluate the incidence of measles and to analyze the vaccination coverage of the Measles–Mumps–Rubella (MMR) vaccine in Belém, Pará, Brazil, among individuals aged 0 to 19 years, between 2018 and 2021. This was an ecological, descriptive, and retrospective study, with data obtained from the Department of Informatics of the Brazilian Unified Health System (DATASUS). Data analysis showed that the highest number of measles cases occurred in 2020, predominantly among individuals aged 15 to 19 years (40.71%), males (53.48%), and those of mixed race/"pardo" ethnicity (59.89%). The highest vaccination coverage was observed in 2019 among one-year-old children (79.76%), followed by a subsequent decline in vaccination rates in the following years. It is concluded that the highest incidence of measles occurred in 2020, mainly among males aged 15 to 19 years and individuals of mixed race. The highest administration rate of the MMR vaccine was observed in one-year-old children in 2019.

KEYWORDS: Epidemiology. Measles. Measles-mumps-rubella vaccine.

RESUMO: O objetivo foi avaliar a incidência de sarampo e analisar a cobertura vacinal da Tríplice Viral em Belém do Pará na faixa etária de 0 a 19 anos, entre 2018-2021. Trata-se de um estudo do tipo ecológico, descritivo e retrospectivo, obteve-se os dados por meio do Departamento de Informática do Sistema Único de Saúde. Ao analisar os dados, verificou-se o maior número de casos de sarampo no ano de 2020 e em pacientes de 15 a 19 anos (40,71%), do sexo masculino (53,48%) e pardos (59,89%). Houve a maior taxa de vacinação no ano de 2019 em crianças de 1 ano de idade (79,76%), com posterior redução da taxa de vacinação. Conclui-se que a maior incidência de sarampo ocorreu em 2020, no sexo masculino, entre 15 a 19 anos e raça parda. A maior aplicação da Tríplice Viral ocorreu crianças com 1 ano de idade, em 2019.

PALAVRAS-CHAVE: Epidemiologia. Sarampo. Tríplice Viral.

INTRODUCTION

Viral exanthematic diseases are infections that cause a cutaneous eruption as a dominant trait of their clinical condition. Measles is especially emphasized as a frequent pathology in the age ranges among children, adolescents, and young adults. Prevention highlights the administration of the Measles-Mumps-Rubella (MMR) vaccine in the twelfth month of life, and a booster shot is administered from the ages of 15 to 18 months[1,2].

Measles is caused by a paramyxovirus and contagion is through the air or the conjunctive by contact with droplets and aerosols with suspended viruses. The incubation period ranges from eight to twelve days. The clinical condition course includes fever, dry cough, migraine, intense exhaustion, enanthema, Koplik spots, erythematosus maculopapular rashes, and morbilliform eruptions.[3]

There was an 80% reduction confirmed in the number of deaths from measles from 2000 to 2017 on the global context. Although, there were 110,000 deaths in the previously mentioned year, registered in children under the age of five years old.[17] Approximately, 21,029 people were infected in Brazil from 2018 to 2022 in the age range from 0 to 19 years old, being that 44% of these notifications occurred in the northern region of Brazil[3,4].

5.452 cases of measles were confirmed from 2018 to 2021 in those under the age of 19 in Pará State, and among those 1,496 were identified in the city of Belém. Such a fact directly correlates with the decreased vaccinal coverage in children, and, because of this, immunity against the viruses related to the vaccine is negatively impacted, making them more susceptible to manifesting the diseases[2,4,5].

Vaccines are the agents responsible for causing immunity to certain pathogens, by stimulating the production of antibodies, as they get in direct contact with the attenuated viruses or bacteria. They are inactive, fragments of these biological agents or even the toxin released by some of them. In this context, the MMR vaccine is an attenuated vaccine (it contains weakened live viruses) and it is related to immunity against the measles, mumps, and rubella live viruses. The people who have been vaccinated twice are considered as immune, with at least a one-month interval between doses, starting at an age of 12 months[6,7].

However, alternative schedules of the MMR vaccine can occur. In cases of outbreaks or household exposure, the first dose can be administered after an age of 6 months, for example (this, although it is not considered a valid dose for adhering to a routine protocol). The administration of two doses, at a two-month interval, are recommended for older individuals, who do not have any proof of vaccination[7].

Hence, the relevance of vaccination is unquestionable, regarding the avoidance of dissemination of diseases. In that context, it has been observed that in Brazil, from 2018 to 2022, around 84% of the population have been vaccinated by at least one dose of the MMR vaccine[8,9,10].

However, a reduction has been observed in the number of vaccinations against the measles virus in the period studied in the northern region. Regarding this, a significant reduction of doses was administered in Pará State in 2020. Concurrently, there was a reduction in the vaccinations administered in Belém in 2021 and 2022. Hence, it is imperative to mobilize the population, seeking to vaccinate and reduce the number of cases of these diseases[8,9,10].

As a result, it is essential to report on the incidence and epidemiological profile of patients affected by measles and investigate the profile of immunized by the MMR vaccine. This seeks to identify possible barriers in the vaccination campaigns in the northern region of Brazil and create subsidies for governmental policies focused on the profile of studied patients. Hence, this seeks to evaluate the incidence of measles from the ages of 0 to 19 in the northern region and analyze the vaccination coverage of the MMR vaccine in that same age range and region.

METHODOLOGY

This study collected data from secondary sources, through the Unified Health System Data Processing Department (DATASUS), at the following website (http://www.datasus.gov.br). It has not been necessary to get approval from the ethics committee. As it is an ecological, descriptive, and retrospective type study.

Furthermore, regarding the inclusion and exclusion criteria, data were included on the incidence of measles from 2018 to 2021 and immunization by the MMR vaccine during the same period, in the city of Belém of Pará. Incomplete and paid data were excluded.

The sampling universe included the number of measles cases in patients ranging in ages from 0 to 19 in Belém. The collected data refer to the period from 2018 to 2021, including the use of age range, sex, and race/color. Excel was used to calculate the incidence, by selecting the variables and the ratio between the number of cases of each variable related to the total number of cases.

A descriptive analysis was applied that corresponded to the data analysis, based on the nature of the variables, since the analyzed data percentages were informed. This study even counted on a quantitative type of analysis on the collected results. Microsoft Office Excel and Word 2019 were the software programs used for analyzing the data.

RESULTS

A total of 1,496 cases of measles were verified in Belém do Pará during the analyzed period. The largest percentage (40.71%) in age range was from 15 to 19 years old, followed by those under 1-year-old (25.94%). Furthermore, the prevalence was among males, about 53.4% of the cases, and in brown-skinned people as 59.9% of the cases. This data is presented in table 1.

Table 1. The number of measles cases, compared to the main variables, which occurred in Belém do Pará, from 2018 to 2021.

EPIDEMIOLOGICAL PROFILE		
Evaluated factor	n	%
Age range		
< 1 year	388	25.936%
1 ⊢ 4	213	14.238%
5 ⊢ 9	139	9.291%
10 ⊢ 14	147	9.826%
15 ⊢ 19	609	40.709%
Gender		
Female	696	46.52%
Male	800	53.48%
Race/Color		
White	261	17.45%
Black	110	7.35%
Yellow	8	0.53%
Brown	896	59.89%
Indigenous	11	0.74%
Ignored/white	210	14.04%
TOTAL	1496	100%

Source: Research Protocol, 2024/DATASUS, 2024.

The vaccination profile is analyzed in table 2, notice how the reduced rate of vaccination among the 3-year-old population is linked to the lowest percentage (3.0%). Notice the highest percentage is among the 1-year-old population of children (79.76%).

Table 2. The number of MMR vaccine doses administered in Belém, compared to the age variable, from 2018 to 2021.

VACCINATION PROFILE		
Evaluated factor	n	%
AGE RANGE		
< 1 year old	4886	3.98%
1 year old	98023	79.76%
2 years old	7658	6.23%
3 years old	3692	3.00%
4 years old	3876	3.15%
12 years old	4769	3.88%
TOTAL	164823	100%

Source: Research protocol, 2024/DATASUS, 2024.

One can notice a small increase from the administration of the MMR vaccine in 2019 from 2018 to 2021. As there was a 15% reduction in the number of vaccinations in the following years, as shown in figure 1. However, it was not possible to evaluate the corresponding age range from 5 to 11 years old, since there was insufficient data provided from DATASUS.
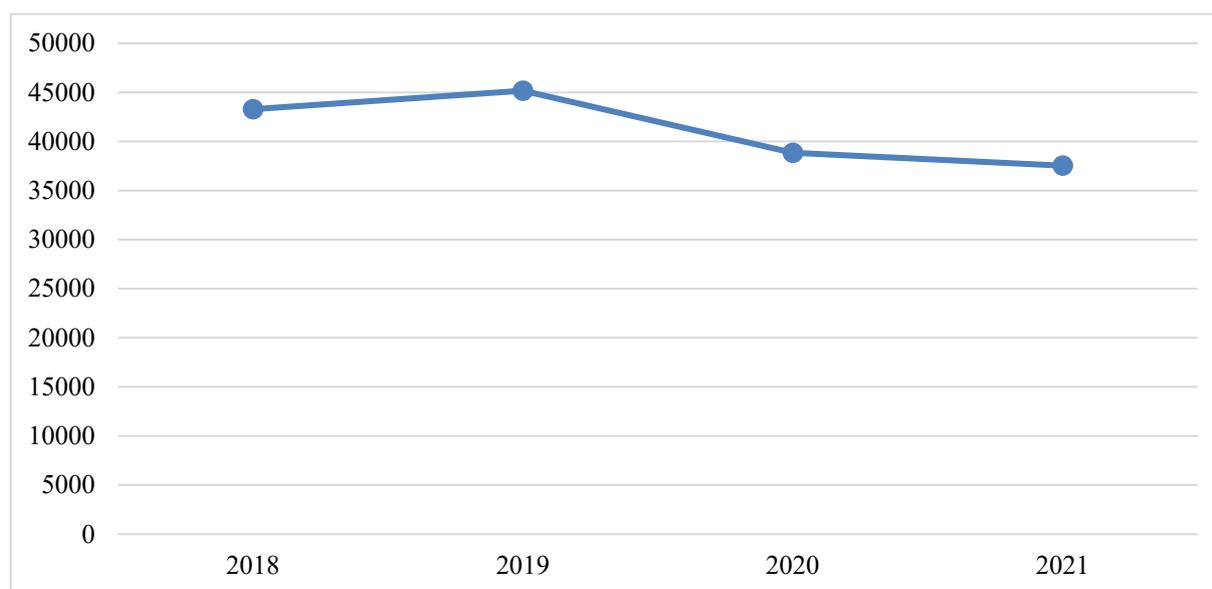

Figure 1. Displays the yearly records on the administration of the MMR vaccine of people from the ages of 0 to 19, in Belém do Pará from 2018 to 2021. Source: Research Protocol, 2024/DATASUS, 2024

When evaluating the immunization doses, one can notice that the largest number of first doses was administered in 2019, a subsequent decrease of that quantity in the following years. When evaluating the administration of the second dose, an annual increase was identified, and the largest number was in 2021 (figure 2).
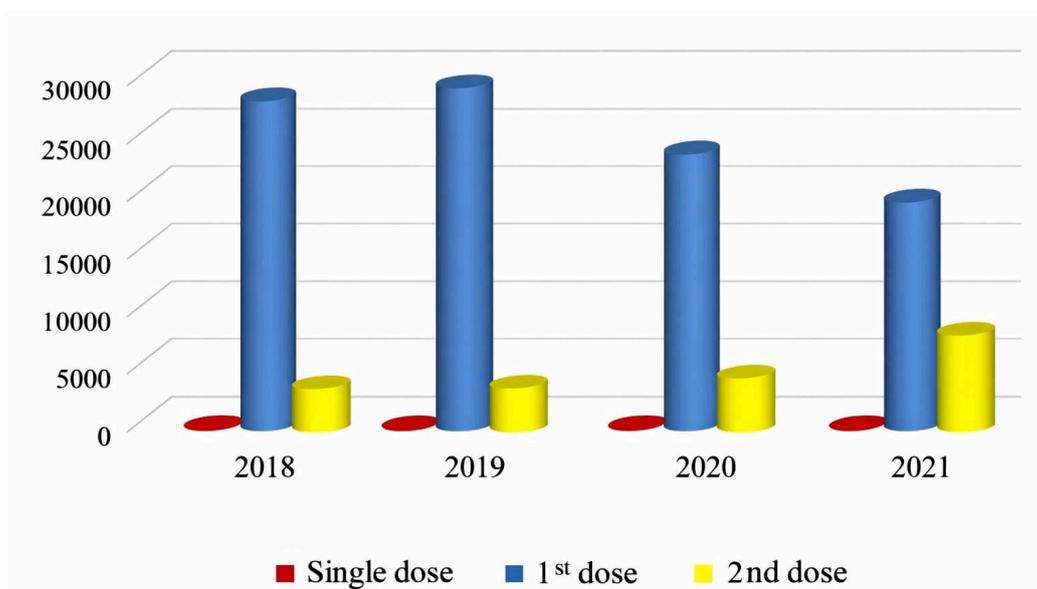
Figure 2. Displays the yearly records on the administration of the MMR vaccination doses of people administered from the ages of 0 to 19, in Belém do Pará from 2018 to 2021. Source: Research Protocol, 2024/DATASUS, 2024

There was an increase in the number of cases from 2018 to 2020 related to the yearly records on the cases of measles from 2018 to 2021. The incidence peaked in 2020 as there were 1293 notified cases. Subsequently, there was a reduction in the incidence of this disease (figure 3).
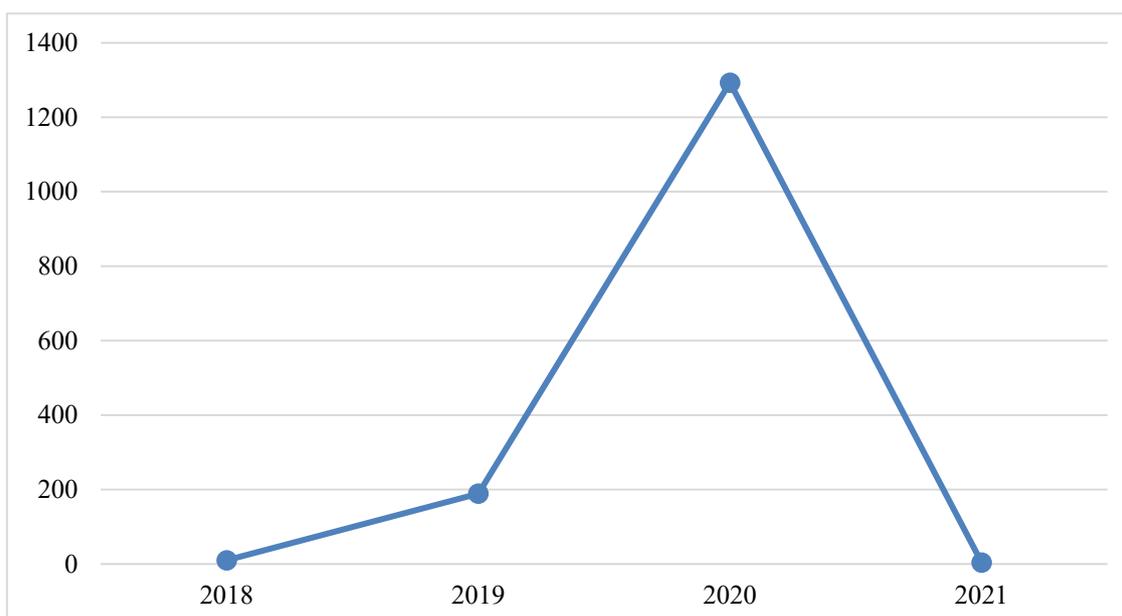

Figure 3. Displays the yearly records on Measles of people from the ages of 0 to 19, in Belém do Pará from 2018 to 2021. Source: Research Protocol, 2024/DATASUS, 2024.

DISCUSSION

Age 15 to 19 years old was the most studied age range of those who were infected by measles in the city of Belém–PA, which differs from the typical Brazilian context. Whereas the age most affected is in children under the age of 1. Likewise, in São Paulo State, the most-affected age is in children under the age of 1 in 2019[11,12]. Hence, it is valid to emphasize the heterogeneity of affected age ranges, which is due

to different contexts in each region. Thus, when analyzing the Amazonian region, especially the Pará State capital, one can observe that the affected age range reflects the socioeconomic condition of those patients. This is the age when the people coexist more with groups in school surroundings, thus facilitating transmission by airways.

There is greater prevalence among males in the Northern region of Brazil, as identified in this study carried out in Belém[4,13]. This fact can be explained by the decreased interest of this group in the prevention of diseases, since the male population has displayed lower incidence in seeking medical services.

A greater incidence of measles was identified among the brown-skinned people in Brazil. That result was confirmed as the brown-skinned people[4] are more predominant in the Northern region and in the Pará State capital, which is justified due to the Brazilian populational characteristic.

The study observed that the highest rate of administering the MMR vaccine in one-year-old children, followed by two-year-olds when evaluating age ranges in the city of Belém. Regarding this, the best vaccination status was among 3 to 4-year-old children in Natal-RN[14]. We recommend administering the MMR vaccine at 12 months old, as this is justified by the highest incidence in this age range[7]. However, it was noticed that the insufficient administration of the vaccination rate is well below the established PNI (National Immunization Program) percentage (<95%). Hence, it is essential to encourage vaccinations to prevent the occurrence of Measles in Belém.

There was increased vaccination from 2018 to 2019, but a subsequent decrease from 2020-2021, as observed by the rate in the city of Belém. Based on this perspective in Brazil, there was a decreased rate of vaccination from 2015 to 2021, especially related to the 2nd dose of the MMR vaccine[15]. Furthermore, in the Northern region of Brazil from 2015 to 2021, there was lower vaccination coverage in Brazil[16]. Insufficient information has become noticeable regarding the prevention of diseases, as well as the necessity for completing the doses for complete immunization. Thus, the importance of encouraging vaccination is emphasized to provide collective immunity assurance.

This study noticed that in Belém, from 2018 to 2020, there has been an increased number of cases of measles, followed by a reduction in 2021. In this context, in Brazil, in 2018, 10.330 cases were registered and that increased in 2019 (a total of 15,914) and then the numbers of notifications reduced in 2020 (8,200)[17]. Regarding this, it is possible to reduce the number of cases in 2021 that are related to the reduced number of notifications of new cases, as that occurred during the same period the COVID-19 pandemic.

CONCLUSION

Hence, it has been concluded that during the studied period, there was an increased incidence of measles in 2020, in young people in the age range from 15 to 19, in males, and brown-skinned people. Furthermore, it was observed that there was a greater number of MMR vaccine administrations in 2019 in one-year-old children, and an increased number of vaccine administration of only the first dose in that year. Based on that perspective, we identified incomplete vaccination coverage among most of the population studied. That demonstrates the necessity for holding vaccination campaigns and actions to promote preventive healthcare in school for encouraging the public to conclude the immunization process.

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