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Contemporary challenges in adherence to childhood immunization in Brazil

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ABSTRACT

Childhood immunization is a crucial strategy to prevent diseases and reduce child morbidity and mortality, playing a vital role in public health. However, Brazil faces increasing challenges with low adherence to childhood vaccination, negatively impacting the health of children and the general population. This qualitative and descriptive study conducts an integrative literature review to identify the main factors that influence this low adherence, analyzing publications between 2018 and 2023 in the VHL, Scielo, and PubMed databases. Of the 91 studies initially identified, 10 were selected for in-depth analysis. The discussion covers the history of childhood vaccination, the importance of vaccines, and the factors that contribute to low vaccination coverage, such as misinformation, sociodemographic factors, anti-vaccine movements, cultural and religious influences, as well as deficiencies in the infrastructure and qualification of health professionals. The loss of the measles eradication certificate in 2016 and the worsening of the situation during the Covid-19 pandemic and the return of yellow fever highlighted the urgency of this problem. The media, sociocultural aspects and the ineffectiveness of Basic Health Units are determinant for the current scenario. It is concluded that a holistic approach, which includes the expansion of UBS in vulnerable areas, awareness through educational programs and the adequate preparation of health professionals from academic training, is essential to improve adherence to childhood immunization and reverse this worrying situation.

Keywords: Vaccines, Childhood Immunization, Public Health, Anti-Vaccine Movements.

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INTRODUCTION

Immunization, historically, has been one of the most effective public health tools for the eradication of diseases, such as smallpox and yellow fever. However, with the advent of the internet and the growth of social networks, we observe the spread of misinformation, driven by anti-vaccine movements that even reach health professionals (Bojic; Nikolic; Tucakovic, 2023). These movements, fueled by conspiracy theories and distorted scientific data, have contributed to the low adherence to childhood immunization in the world and in Brazil in the last decade, which, in turn, has facilitated the reemergence of previously controlled diseases (Oliveira *et al.*, 2022; Burns, 2023).

Infectious diseases have historically shaped the trajectory of humanity, causing profound impacts such as the Black Death and, more recently, the COVID-19 pandemic. In response to these threats, the creation of vaccines has emerged as one of the greatest achievements of medical science, significantly reducing mortality and the prevalence of disease over the centuries (Oliveira *et al.*, 2023). The first vaccine, developed by Edward Jenner in 1796, against smallpox, ushered in a new era in public health. This innovation, crucial to human survival, remains essential in tackling emerging and reemerging diseases (Xavier *et al.*, 2024).

In addition, it is a fact that vaccines have represented one of the greatest technological advances for human health, with the purpose of triggering an immune response through exposure to infectious agents. As a result, they reduce the risks of mortality and complications in cases of infection by the microorganism (Canouï; Launay, 2019).

After inoculation, vaccines allow the immune system to create immune memory, using memory T and B cells, which enables the development of vaccines and the efficient control of infectious diseases. Immunization is characterized by the process in which we acquire immune protection against infectious diseases, using vaccines, immunoglobulins, or antibody sera(da Silva Vieira *et al.*, 2020).

In Brazil, the National Immunization Program (PNI), established in 1973, has established itself as one of the most significant public health interventions, promoting universality and equity in the supply of immunobiologicals for all vaccination target groups. Through the PNI, Brazil has achieved the eradication of several diseases, providing protection against more than twenty diseases. However, from 2016 onwards, the country began to face a worrying drop in vaccination coverage, reflecting a global trend that threatens to reverse the advances made in recent decades.

Thus, it is essential to recognize that all age groups have specific immunization needs, demanding comprehensive and effective planning by the Unified Health System (SUS) through primary health care services. This strategic approach aims to ensure that the population is properly protected against a diverse spectrum of diseases (Days *et al.*, 2021).

In addition, it is relevant to point out that in the context of children, where immunization is an inalienable right, it is of paramount importance to maintain constant awareness among those responsible for them, since vaccines play a fundamental role in safeguarding children's health (de Sousa, 2019; de Oliveira Medeiros *et al.*, 2022). Such immunizations strengthen the immune system and confer protection against highly contagious diseases, which can adversely impact children's quality of life and general well-being (Oliveira *et al.*, 2021).

In recent years, the debate to the detriment of the problem of low adherence to childhood immunization in Brazil is a worrying issue that affects the country's public health, given the re-emergence of diseases such as smallpox and yellow fever. Despite significant advances in the vaccination program, there are still challenges in ensuring that all children are adequately protected against vaccine-preventable infectious diseases (da Silva Vieira *et al.*, 2020).

As noted, since 2016 data from the Ministry of Health point to drops in the immunization rate, reaching the lowest rate since the 2000s, for the most different types of vaccines, pointing out that the biggest setbacks were in immunizers such as Poliomyelitis, Hepatitis A and B, Menigococcal, and Hepatitis C, in addition to Rotavirus (Brazil, 2021; Blanes, 2023).

Factors contributing to low childhood immunization rates include the spread of misinformation through social media, the influence of anti-vaccine movements, limited access to health services in certain regions, and growing distrust of health institutions. However, the consequences of this low adherence to childhood immunization can be even more serious, as infectious diseases previously controlled or eradicated, such as measles and polio, can reemerge and cause outbreaks, putting collective health at risk (da Silva, Juan Felipe Galvão et al., 2022).

In turn, unvaccinated children are vulnerable to diseases that can be potentially serious or even fatal. In addition, reduced vaccination coverage undermines disease eradication efforts and can affect the effectiveness of public health strategies (Barroso; Sousa; de Sousa, 2023).

The study was justified since low adherence to childhood immunization is a complex challenge that requires coordinated action and joint efforts by governments, health professionals, and civil society (by Oliveira Medeiros *et al.*, 2022). In addition, immunization is one of the most significant achievements of modern medicine, and ensuring that all children are properly vaccinated is essential for the health and well-being of the entire Brazilian population (Canouï; Launay, 2019; de Oliveira *et al.*, 2022).

In view of the above, the study aimed to explore which factors have impacted the low adherence to childhood vaccination in Brazil. In addition, presenting itself on aspects related to the lack of information, such as the impact of low vaccination coverage reflects on public health and the importance of awareness campaigns.

METHODS

This study was conducted through an Integrative Literature Review (RIL) with a qualitative approach, a methodology that aims to synthesize, in a systematic, orderly and comprehensive way, the results of existing research on a given theme or issue. The review is called "integrative" because it offers a broader and more consolidated view of the available knowledge, allowing the construction of a solid and comprehensive body of knowledge on the subject in focus (from Lima Dantas *et al.*, 2022).

In the construction of an RL, it is necessary to formulate a problem, conduct research in the literature on the subject, critically evaluate a set of data, analyze these data and present the results. With this, this method will be able to gather the research data and synthesize the results obtained, in a systematic and orderly way, to support a significant study on the proposed theme (Toronto; Remington, 2020).

The investigation on the subject was carried out through the analysis of previously published and evaluated evidence, with the objective of answering the following guiding question: "What are the main factors that influence low childhood vaccination coverage and its impacts on public health?". To conduct the research, the article indexing platforms Virtual Health Library (VHL), Scielo and PubMed were used. The search process was systematized through the combination of the descriptors: "Immunizers", "Children", "Vaccination Coverage", "Vaccine Adherence", "Vaccine Abstention" and "Misinformation", using the Boolean operators "AND" and "OR" to refine the results.

It was delimited how the inclusion criteria defined for the selection of articles were: complete original articles, available online for free, in Portuguese, English and Spanish, with year of publication, with publication period from 2018 to 2023. As exclusion criteria, it was decided not to use studies with methodologies inconsistent with their findings, abstracts of proceedings and conferences, monographs and theses and other narrative reviews, duplicate articles in the databases and that are not related to the theme proposed in the study.

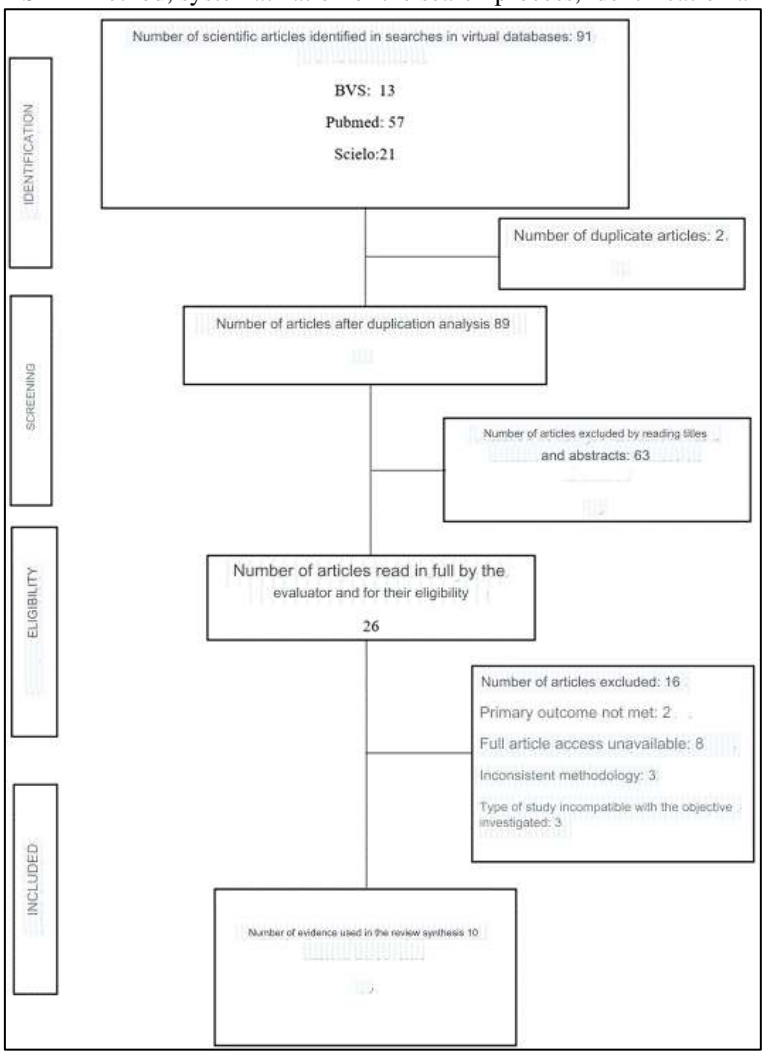
For data collection, the study was conducted using qualitative parameters, according to the methodology of the Gonçalves study (2019), and will be divided into seven stages: the establishment of the theme and research question; establishment of inclusion and exclusion criteria for articles (literature search); definition of information that will be extracted from the selected articles; critical analysis of the included studies; discussion and presentation of results; presentation of the integrative review.

To define the information that was extracted from the selected articles, a data collection instrument was used previously adapted and validated by Galvão and Ursi (2006), divided into four

(04) axes: A) Identification; B) Institution where the study took place; C) Publication journal; and D) Methodological characteristics of the study.

Subsequently, the demonstration of the sampling procedure of the articles, the flow (Figure 1) of information with the different selection phases, guided by the PRISMA recommendation, will be used in order to scrutinize the process of search and synthesis of the review (Selçuk, 2019).

Figure 1. Flowchart PRISMA method, systematization of the search process, identification and screening of studies.



Source: Adapted from Page *et al.*, (2021).

For data analysis, the thematic content analysis technique proposed by Bardin was used (2016), which is a methodology widely used in qualitative research. This technique is composed of three fundamental phases: pre-analysis, exploration of the material and treatment of the results.

RESULTS AND DISCUSSION

In the search process, a total of 91 studies related to the theme were identified, which after the identification process and trigarem were selected, 10 were included as main results and that helped in the discussion of the theme investigated, the main findings are shown in Chart 1.

Table 1. Presentation of the main results.

TITLE/AUTHOR/YEAR	OBJECTIVE	DESIGN OF STUDY	KEY FINDINGS
Childhood vaccination incompleteness of new and old vaccines and associated factors: BRISA birth cohort, São Luís, Maranhão, Northeast Brazil. (Silva *et al.*, 2018).	To estimate incompleteness percentages for vaccines from the National Child Vaccination Calendar for the first year of life and factors associated with them.	Cohort Prospective	Period Evaluated: 2010-2013 Two Hospital units. N = 5,166 interviewees, of whom 3,308 returned to the follow-up in the second year of life, and 1,858 (36%) did not return due to refusal, non-attendance or non-location of the mothers. The study showed that vaccine incompleteness is very recurrent in children in their first years of life who are from classes D and E, due to vaccine hesitancy, lack of information from mothers and in regions where there is less availability of health services.
Do I really need to get vaccinated? Information and knowledge about vaccines in adolescence. (Viegas *et al.*, 2019)	To describe the knowledge of adolescents in the 9th grade of elementary school in public schools about vaccines, vaccine-preventable diseases and communicable diseases.	Epidemiological Transverse Descriptive	Adolescents were misinformed about vaccines, communicable and vaccine-preventable diseases, and low vaccination coverage (41%). Health communication/information was effective in the decision of adolescents to get vaccinated, increasing vaccination coverage (91%).
Bolsa Família program and incomplete childhood vaccination in two Brazilian cohorts. (Silva *et al.*, 2020)	To estimate the effect of being a beneficiary of the Bolsa Família Program (PBF) on the vaccination of children aged 13 to 35 months.	Cohort Prospective	Period 2011-2013 N = 1,761 mothers interviewed. The study showed that after the analysis and cross-referencing of the data, it was evident that the receipt of the PBF benefit did not influence childhood vaccination, which is one of the program's conditionalities. This may indicate that this conditionality is not being adequately monitored.
Mothers' knowledge about vaccines administered to children under one year of age. (Soares *et al.*, 2020)	To analyze the knowledge of student mothers regularly enrolled at the Santo Agostinho University Center about vaccines for children under one year of age	Cross-sectional study Descriptive	The study pointed out that the knowledge of the mothers of the Santo Agostinho University Center is very significant regarding the vaccination of their children in the first year of life. It is also necessary to emphasize that other health professionals, in addition to nursing technicians, need to stand out more and exercise more communication and dialogue with mothers in the vaccination rooms.
Vaccination coverage in Brazil: factors related to low adherence in early childhood. (Oliveira *et al.*, 2021)	Analyze scientific production on the factors related to low vaccination adherence among children under five (5) years of age in Brazil.	Qualitative Study	The study pointed out that the main factors related to the drop in immunization are the ineffective performance of health services and their professionals, the lack of truthful and reliable information for the population, as well as the negligence of those responsible and the influence of sociocultural, religious and economic factors.

Paradigms of vaccine adherence in the 1000 days of life: analysis and repercussions on public health (da Silva *et al.*, 2022).	To analyze the vaccination coverage directed to children in the period of 1000 days, between the years 2016 and 2020	Analytical epidemiological transverse	There was a reduction, predominantly, of 10.51% in vaccine applications between the years 2016 and 2020 in the population up to 2 years of age. In addition, the immunobiologicals that suffered the most reduction were: hepatitis B (84.87%), influenza (99%) and oral poliomyelitis (18.45%). Some of the factors related to the reduction in the application of immunobiologicals in this period are low vaccination coverage, the spread of fake news, lack of information for the population, and the COVID-19 pandemic, with social isolation.
The Evolution of Public Health Policies in Brazil from 1900 to the Present Times. (de Oliveira *et al.*, 2022).	To describe the evolution of public health policies in Brazil from 1900 to the present day.	Study Qualitative	The study makes a historical analysis of public policies aimed at Health in Brazil, addressing the vaccine issue and its importance for public health.
Childhood immunization in primary health care: vaccine hesitancy among parents and professionals' perspectives.(Benício, 2023).	To analyze Vaccine Hesitancy among parents and the perspective of health care professionals health care about childhood immunization in Primary Health Care, in the municipality of São Bentinho-PB	Observational, cross-sectional, and descriptive	N= 200, parents of children, registered in the Family Health Strategy of the aforementioned municipality, and by 23 professionals from the health teams. The results indicate a low prevalence of Vaccine Hesitancy; suggest parents' confidence in the vaccination process and in professionals, although they claim to be afraid of severe vaccine reactions; parents have a high level of intention to vaccinate children, however, a low level of adherence is observed; updating information from professionals and passing it on to parents is necessary and can contribute positively to the process of more effective vaccination.
Anti-vaccination movements in the world and in Brazil. (Oliveira *et al.*, 2022)	It aimed to explore factors related to vaccine hesitancy in the world in comparison with Brazil.	Study Qualitative	The study revealed that confronting the anti-vaccine movement requires a long-term approach, which includes the implementation of innovative educational programs focused on immunization and critical thinking, using various communication channels, such as social media. For this strategy to be effective, cooperation between biological and health scientists, ethicists, social scientists, policymakers, journalists, and civil society is crucial. This interdisciplinary collaboration is key to deeply understanding the social motivations behind vaccine refusal and to planning educational measures that can increase vaccination coverage in a sustainable way.
Temporal and spatial distribution trends of polio vaccine coverage in less than one-year old children in Brazil, 2011-2021. (da Silva *et al.*, 2023)	It analyzed the temporal trends and spatial distribution of polio vaccination coverage in one-year-old children in Brazil, between 2011 and 2021.	Study ecological, time-series	From 2011 to 2021, polio vaccine coverage decreased by 29.9%. There was a progressive increase observed in the clusters resulting in low vaccination coverage (140 Brazilian municipalities low-low in 2011 vs. 403 in 2021), reported mainly in the North and Northeast regions of the country.

THE BRIEF HISTORY OF BRAZILIAN PUBLIC HEALTH AND THE NATIONAL IMMUNIZATION PROGRAM

The history of health in Brazil is a trajectory marked by significant evolution over time, reflecting not only advances in medicine and the provision of health services, but also political and social changes that have shaped the current health system. Initially, health in Brazil was based on traditional practices, such as healers and natural medicine, in addition to philanthropy, which played an important role in medical care for the population (Megiani; Lopes; Lazaro, 2021).

However, in the twentieth century, Brazilian health became increasingly intertwined with the country's historical-political context. Rights to health and sanitary control, which are fundamental today, were conquered after facing devastating epidemics and crucial political challenges (Magaton *et al.*, 2023).

In turn, we observe that notable historical events, such as the Vaccine Revolt, highlighted the arbitrariness and abuses against the population and workers, serving as catalysts for the creation of laws and institutions that aimed to benefit these groups.

Conforme, exposed by de Oliveira *et al.*, (2022) and Olive tree *et al.*, (2022) it was through the movements of the Health Reform, the 8th National Health Conference, the Federal Constitution of 1988 and, ultimately, the creation of the Unified Health System (SUS), that Brazil began to experience a more preventive, equitable and comprehensive health approach. The SUS represented a milestone in the history of Brazilian health, promoting universal access to health, community participation, and a more comprehensive view of health, which goes beyond mere medical care, embracing health promotion, prevention, and recovery.

The National Immunization Program (PNI) plays a central role in childhood immunization in Brazil. Since its inception in 1973, the PNI has been a cornerstone in protecting children's health, offering universal and free access to a wide range of vaccines (by Oliveira Medeiros *et al.*, 2022).

Over the years, the program has demonstrated its effectiveness in preventing highly contagious diseases such as measles, polio, and rubella, helping to drastically reduce infant morbidity and mortality related to these diseases. In addition, the PNI has played a crucial role in mass vaccination campaigns, ensuring that the child population is adequately protected against disease outbreaks (Blanes, 2023).

Benicio, (2023), argues that the PNI is one of the most successful programs in Brazil, promoting mass vaccination and protecting the population against a series of infectious diseases. Its effectiveness is evidenced not only by the eradication of polio and the significant reduction in measles cases, but also by its role in responding to public health emergencies such as the COVID-19 pandemic.

In short, the PNI is an essential element in the history of health in Brazil, representing the view that prevention and immunization are fundamental for the promotion of a healthy and resilient society.

THE IMPORTANCE OF CHILDHOOD VACCINATION

Childhood vaccination is a fundamental pillar of public health in Brazil, playing a crucial role in the prevention of infectious diseases that affect children. This importance is based on well-established scientific principles, which demonstrate the efficacy and safety of vaccines (Canouï; Launay, 2019).

Vaccines are designed to boost children's immune systems, allowing them to develop a protective response against specific pathogens, such as bacteria and viruses. Childhood immunization not only protects children against potentially serious diseases, but also contributes to building herd immunity, making it more difficult for disease to spread throughout the community (Canouï; Launay, 2019).

Brazil has a long history of success in implementing childhood vaccination programs, which have resulted in the eradication of diseases such as smallpox and a significant reduction in the incidence of others, such as measles and polio (Freitas *et al.*, 2023). However, the importance of childhood vaccination goes beyond the national level, contributing to the prevention of global epidemics (Viana *et al.*, 2022). International cooperation in health and adherence to the recommendations of the World Health Organization (WHO) are essential aspects of this approach, highlighting the shared responsibility in protecting children's health (Magaton *et al.*, 2023).

Despite historic advances, Brazil is currently facing challenges related to the drop in vaccination coverage. The resurgence of diseases that were under control, such as measles, is a worrying sign of this trend. In this sense, low vaccination coverage can be attributed to several factors, including the spread of false information and misinformation about vaccines, the lack of adequate access to health services, and socioeconomic barriers (Junior, 2019; Peixoto *et al.*, 2022).

The resurgence of these diseases such as measles and polio highlights the pressing need to educate the population about the importance of childhood vaccination, strengthen health systems, and promote awareness campaigns.

FACTORS THAT INFLUENCE LOW CHILDHOOD VACCINATION ADHERENCE

In the process of investigating and reading the studies, some unusual points were identified, such as: vaccine hesitancy, vaccine incompleteness, lack of knowledge, lack of adequate information by health professionals, and dissemination of misinformation about the immunizers long established by the PNI (SILVA *et al.*, 2018, 2020; VIEGAS *et al.*, 2019; DA SILVA *et al.*, 2023).

It is known that it is challenging to define the reasons that lead some parents and guardians to choose not to immunize their children, since this behavior is influenced by a complex intersection of sociocultural, economic, and religious factors (Blanes, 2023). In addition, these elements play a direct role in caregivers' decision-making and underscore the growing need to address parents' understanding of childhood immunization (Silva *et al.*, 2020).

Conformable Olive tree *et al.*, (2021), among the various reasons that contribute to parents' refusal to vaccinate, we find in the findings the influence of precarious family structures, in which caregivers do not have the necessary support to take care of their children. In addition, the inability of parents to reconcile their work schedules with the opening hours of Basic Health Units (UBS) and the accumulation of responsibilities, especially among single mothers with three or more children, often results in the neglect of tasks considered of minor importance, such as vaccination.

On the other hand, according to Olive tree *et al.*, (2022), the increase in the number of people choosing not to vaccinate raises questions about the underlying reasons for this behaviour, which may increase the risk of vaccine-preventable diseases (VPDs). Parents who vaccinate their children often express concerns or doubts about the efficacy and risks associated with vaccines. Parents' decisions regarding vaccination programs are usually influenced by a number of factors, which can be categorized into individual, group, and contextual. Contextual factors, in turn, may include historical, sociocultural, environmental, temporal, and institutional reasons, with emphasis on political and socioeconomic ideologies, such as the absence of health insurance coverage.

Vaccine hesitancy has been analyzed by several models that consider both acceptance and resistance, with most models focusing on parental decision-making (Oliveira *et al.*, 2022).

A previous study identified several parental profiles regarding vaccination: (1) the "conceited", who firmly believe in the benefits of vaccines; (2) the "cautious", who, although emotionally involved with their children, are hesitant to vaccinate them; (3) the "relaxed", who show skepticism about vaccines; (4) the "unconvinced," who are distrustful of both vaccines and vaccination policies; and (5) the "hesitant", who form a heterogeneous group, who may refuse some vaccines while accepting others (Keane *et al.*, 2005).

These challenges reveal the need for a multifaceted approach that takes into account not only the availability of vaccines, but also the socioeconomic and cultural conditions of caregivers, in order to promote greater uptake of childhood immunization (Xavier *et al.*, 2024).

Immunization represents one of the most effective strategies to prevent vaccine-preventable diseases, however, the refusal by parents and guardians to guarantee this fundamental right can result in irreparable damage to both the child and society as a whole (Megiani; Lopes; Lázaro, 2021; Miler-da-Silva *et al.*, 2021; Nedel *et al.*, 2021).

This includes the risk of death or the acquisition of permanent sequelae that can last throughout adult life. In addition, the refusal to immunize can culminate in the resurgence of previously controlled diseases in Brazil, exemplified by the return of measles, after the country won the certificate of elimination of the circulation of the virus in 2016 (Peixoto *et al.*, 2022).

Increasingly, the resistance of certain groups to follow the immunization schedule is becoming evident, creating a scenario of parental negligence (Carrieri; Madio; Principe, 2019; Viegas *et al.*, 2019).

Contradicting what is established in Law No. 6,259 of 1975, regulated by Decree No. 78,231/76, which determines the mandatory vaccination throughout the national territory against diseases controllable by this prevention technique, considered relevant to Brazilian public health. Lack of adherence to immunization not only puts individual health at risk, but also threatens the achievement of a safer and healthier collective environment (Barroso; Sousa; de Sousa, 2023).

According to the studies of Olive tree *et al.*, (2021), da Silva Vieira *et al.*, (2020) and Benício (2023), the discussion around the need for vaccination is influenced by several doubts, including concerns about potential adverse events, philosophical and religious beliefs. These issues have generated hesitancy among both families and health professionals, questioning the relevance of vaccines in protecting public health.

In the eighteenth century, the English theologian Edmund Mossey delivered a sermon that condemned the practice of inoculation, arguing that diseases were sent by divine will to punish sinners, making any attempt at prevention a "diabolical operation" (Lima; Vieira, 2022). In addition Olive tree *et al.*, (2021) and Burtet, Fontanela, Morocco (2021), point out in their respective studies that religious movements, such as the Quakers and the Baptists, were also anti-vaccination, claiming that interfering with the divine will by preventing someone's death would be a sin, evidencing the influence of religious beliefs on the anti-vaccine movement.

Resistance to immunization is not a recent phenomenon and dates back to periods before the discovery of modern vaccines. Even with variolation, one of the first immunization techniques that involved inoculating pus taken from lesions of infected individuals into non-immune people, was viewed with suspicion by the Catholic Church because it considered it unnatural (Cardoso *et al.*, 2021; Junior, 2019).

The growing anti-vaccination movement, driven by the dissemination of false information, known as "fake-news", has negatively impacted the control of epidemics and diseases previously controlled through immunization.

We highlight that this phenomenon is especially even more worrying in Brazil and around the world, questioning the effectiveness of vaccines in the twenty-first century and putting public health at risk. Given the use of social networks for this dissemination of misinformation and due to the

precariousness of education, many people do not question the information and even when proven false they prefer to follow the recommendations passed on by people who claim to be "experts" in the area (Cardoso *et al.*, 2021; Waszak; Kasprzycka-Waszak; Kubanek, 2018; Yabrude *et al.*, 2020).

In addition to issues related to religious beliefs and misinformation, demographic and socioeconomic factors have a substantial impact on vaccination adherence in certain populations. Studies carried out in the Northeast region of Brazil highlight that mothers with low education tend to have lower adherence to vaccines, often due to the lack of knowledge about the real need and importance of immunizations (da Silva *et al.*, 2023; Silva *et al.*, 2018, 2020).

This intersection of socioeconomic, educational, and demographic factors emphasizes the complexity of the challenge faced by vaccination programs, which must consider not only medical but also social and cultural aspects when promoting vaccine uptake (Silva *et al.*, 2020).

It is essential that efforts are directed to educate and raise awareness among the most vulnerable populations about the importance of immunization and ensure equitable access to health services that offer the necessary vaccines, thus contributing to the protection of children's health and the prevention of vaccine-preventable diseases.

Conformable Silva *et al.*, (2018), the Vaccine incompleteness is a significant concern, as a child who does not receive all the necessary doses of a vaccine may not develop adequate immunity against the target disease. This leaves it vulnerable to potentially serious infections that could be prevented with full vaccination. In addition, when many children in a community are not properly immunized, there is a decrease in herd immunity, making the entire population more susceptible to disease outbreaks (Silva *et al.*, 2018).

Therefore, to combat vaccine incompleteness, a coordinated effort is essential that includes public awareness of the importance of vaccination, educating parents about the vaccination schedule, and creating health systems that facilitate access to immunization (da Silva *et al.*, 2022). Health professionals play a crucial role in identifying and addressing children who are at risk of vaccine incompleteness, ensuring that all recommended doses are administered at the appropriate time (Oliveira *et al.*, 2021).

We underscore that vaccine incompleteness is a challenge that requires a holistic approach, involving both the community and health systems, to ensure that all children have access to the vaccines they need to protect their health and prevent the spread of infectious diseases (Silva *et al.*, 2018).

In this sense, it is expected that health professionals master this knowledge and be able to clarify the population's doubts. However, the effectiveness of vaccination campaigns carried out in Brazil in recent years has not been widely publicized, and the lack of information on social networks

and media and the use of influencers about the importance and benefits of immunization contribute to the drop in adherence rates (Soares *et al.*, 2020).

It is reinforced that an imaginary line can even be drawn in the pandemic and post-pandemic period, since the low immunization during the COVID-19 pandemic and the potential post-pandemic impact present serious concerns regarding public health and infectious disease control (Benedetti *et al.*, 2022; by Oliveira Medeiros *et al.*, 2022).

Second Sources *et al.*, (2023) During the pandemic, the main focus was on vaccination against SARS-CoV-2, the virus that causes COVID-19. However, attention should also be directed to ensuring the continuity of routine immunization, including childhood immunization.

During the pandemic, there was a disruption in health services, restrictions on movement, and people's fears about seeking medical care, which led to a decrease in vaccination coverage for other preventable diseases. This has resulted in pockets of low immunization, increasing the risk of outbreaks of other vaccine-preventable diseases (Benedetti *et al.*, 2022).

In the post-pandemic, the recovery of complete vaccination coverage for all age groups, including childhood immunization, becomes crucial. A concerted effort is needed to regain confidence in vaccines and health services, as well as to raise awareness of the importance of routine immunization (Sources *et al.*, 2023; Moura *et al.*, 2022).

In this context, low post-pandemic immunization can have several causes, including people's persistent fear of seeking health care, ongoing misinformation, and distrust of vaccines and religious beliefs and political ideologies (Martins-Filho; Barbershop, 2022; Xavier *et al.*, 2024). Health systems will need to adapt and intensify their awareness and education strategies for the community, ensuring that the population understands the importance of vaccines and the need to maintain high immunization rates to prevent disease(Sources *et al.*, 2023; Moura *et al.*, 2022).

In addition, another obstacle to vaccination is the lack of knowledge, both on the part of the population and health professionals, of the diseases targeted by the National Immunization Program (PNI). Due to the lack of frequent contact with these pathologies, many people do not understand the risk associated with not vaccinating (by Oliveira Medeiros *et al.*, 2022; Benício, 2023).

Another important point is the deficient performance of health centers in the community. The notoriety of the Basic Health Units (BHU) came after the implementation of the Family Health Strategy (FHS) and the expansion of the National Immunization Program (PNI) in Brazil, with the objective of providing comprehensive care to the entire population, promoting universality and equity in health services (Benicio, 2023; da Silva *et al.*, 2023).

However, the implementation of these services often occurred in irregular conditions of structure and processes, including the reuse of old and inadequate facilities for the FHS, which negatively impacted the provision of care to patients.

It is highlighted in the study of Olive tree *et al.*, (2021), that the location and structure of primary care services have a significant impact on the availability of immunobiologicals in different regions of Brazil. Since, despite the PNI, it establishes specific guidelines for the structuring of the vaccination room, including material and human resources, such as refrigerators, immunizers and qualified professionals. When these resources are in short supply, it directly affects vaccination coverage rates, resulting in missed opportunities and compromising the achievement of the goals set for immunization.

Emphasizing that the infrastructure and organization of health centers play a key role in promoting childhood immunization, and the lack of adequate resources can have a negative impact on vaccination coverage rates, requiring efforts to improve the availability and quality of health services throughout the country (da Silva *et al.*, 2022).

These challenges and factors highlight the need for a comprehensive approach that involves the education and awareness of the population, as well as the continuous and up-to-date training of health professionals. Promoting childhood immunization requires effective collaboration between health professionals, public health institutions, and the media to ensure that the right information about vaccines reaches families and that all doubts and concerns are properly addressed.

PROGRAMS AND MEASURES ADOPTED AGAINST LOW IMMUNIZATION

The low immunization rate has become a growing public health concern, leading to the return of diseases that were previously under control or eradicated in many parts of the world. Vaccines are one of the most effective tools in preventing infectious diseases, and reduced vaccination coverage can result in outbreaks of vaccine-preventable diseases. Among these diseases, measles, yellow fever, diphtheria, pertussis, and polio stand out (Oliveira *et al.*, 2022).

In Brazil, the fight against low vaccination coverage has been addressed through effective programs and measures. One of the most emblematic examples is "Zé Gotinha". This iconic character was created as part of the National Vaccination Campaign and played a key role in raising awareness among the population about the importance of immunization (Oliveira; de Magalhães Porto, 2024).

Another significant initiative is "D-Day", which is often used to intensify vaccination campaigns. On this specific day, health services across the country are mobilizing to offer vaccines in a broad and accessible way to the population. "D-Day" is marked by concerted awareness-raising efforts, community events, and widespread outreach aimed at increasing vaccination coverage rates in a short period of time (Magaton *et al.*, 2023).

In addition, Brazil maintains a National Immunization Program (PNI) that offers clear guidelines for vaccination throughout the country. The PNI establishes the immunization schedule,

priority groups, and vaccination strategies, ensuring that essential vaccines are widely available and accessible to the population. These measures have been crucial in the fight against low vaccination coverage in Brazil, contributing to the prevention of infectious diseases and the promotion of public health (Megiani; Lopes; Lazaro, 2021).

As observed in the studies of Viegas *et al.*, (2019),Soares *et al.*, (2020),da Silva *et al.*, (2022) and da Silva *et al.*, (2023), only through the dissemination of adequate information to parents and guardians and the practice of health education will the scenario of Brazil in the face of low immunization change, because when adequate information is passed on and breaking the myths about adverse effects, parents will no longer hesitate to vaccinate their children as observed in these studies.

It should be noted that even public policies that serve low-income families, such as Bolsa Família, join efforts to try to reverse the low vaccination coverage. According to the study by Silva *et al.*, (2018), which expose that despite the obligation, it is still not effective in which non-vaccination and compliance with the guidelines established by Bolsa Família in the child vaccination process are observed.

The continuing education of health professionals plays a fundamental role in combating fake news and promoting public health. In a scenario where misinformation and misinformation can drastically affect people's decision-making regarding health, health professionals need to be prepared and up-to-date to play a leading role in disseminating correct and reliable information (Benício, 2023).

In short, in a world increasingly flooded with information, continuing education and combating fake news by health professionals play an essential role in building a healthier and better-informed society. Investment in the ongoing education of both the population and health professionals, along with the promotion of evidence-based information, not only improves the quality of care, but also contributes to disease prevention, the strengthening of public trust, and ultimately enhances public health as a whole (VIEGAS *et al.*, 2019; SOURCES *et al.*, 2023).

CONCLUSION

In conducting this integrative literature review, it revealed the main factors that affect low adherence to childhood vaccination in Brazil. It was observed that the lack of information and awareness of parents is one of the main problems, leading to vaccine hesitancy and incompleteness of vaccination cards. This exposes children to serious diseases such as measles and polio, which could be prevented with adequate vaccination coverage. The absence of an effective educational approach has contributed to these worrying scenarios.

The impact of low vaccination coverage in Brazil has been significant and has worsened since 2016, when the country lost its measles eradication certificate. The COVID-19 pandemic has intensified the problem, as social isolation and restrictions on health services have resulted in a further decrease in vaccination rates. After the pandemic, the return of anti-vaccine movements and the spread of misinformation, ideological political obstacles, have fueled doubts about the efficacy and safety of vaccines, further complicating the situation.

Observing in the analysis of the data that pointed to the influence of the media in the spread of disinformation and highlights the impact of sociocultural, political, economic and religious factors on low adherence to vaccines. In addition, the inefficiency of the Basic Health Units (UBS) and the lack of training of health professionals have aggravated the situation. These factors are interconnected and directly contribute to the increase in the rates of vaccine-preventable diseases and to the deterioration of public health.

It is concluded that to overcome these challenges, it is necessary to adopt a holistic and integrated approach. This includes expanding UBS to remote areas, implementing vaccination programs in hard-to-reach places, and promoting educational campaigns that clarify the importance of immunization. It is essential to prepare health professionals from higher education to ensure effective care, which includes the correct administration of vaccines and clear communication with the community. These measures are essential to improve vaccination coverage and strengthen public health in Brazil

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