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Understanding factors related to non-adherence to childhood immunization in a municipality in northeastern Brazil

Compreendendo fatores relacionados às dificuldades para vacinação de crianças no município de Santa Maria da Boa Vista, Pernambuco, Brasil

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ABSTRACT

Introduction: Brazil's National Immunization Program has celebrated more than half a century of consolidated success in preventing and controlling vaccine-preventable diseases. Nevertheless, there are still children who are not brought in for vaccination. Considering the individual and social benefits of vaccination adherence in child health, as well as the different perspectives of care, understanding the reasons behind non-adherence can inform effective strategies. **Objective:** To understand the factors associated with difficulties in vaccinating children in early childhood in the interior of Pernambuco, Brazil. **Method:** A qualitative, descriptive study was conducted with 23 parents or guardians of children up to 5 years old, users of Primary Health Care Units located in the urban area of Santa Maria da Boa Vista, Pernambuco, Brazil. Data collection was carried out through semi-structured interviews with both open- and closed-ended questions. Data were processed using IRAMUTEQ software and analyzed through Descending Hierarchical Classification (DHC). **Results:** The analysis generated 137 text segments, with a retention rate of 68.61%. The DHC revealed two main clusters: political, socioeconomic, and cultural factors; and communicational and educational factors. These clusters unfolded into five classes: doses and schedules; actions and care; diseases and health; knowledge and vaccines; and fake news and anti-vaccination. **Conclusions:** The main factors impacting the updating of the childhood vaccination schedule include vaccine stock shortages, child illness, incompatibility with work schedules, lack of transportation, the spread of fake news, and the effects of the COVID-19 pandemic. These findings highlight structural and social challenges faced by families, underscoring the need for integrated actions to expand vaccination coverage.

KEYWORDS: Vaccination Coverage; Immunization Programs; Primary Health Care; Anti-Vaccination Movement

RESUMO

Introdução: O Programa Nacional de Imunização do país comemora mais de meio século de consolidado sucesso na atuação e no combate a doenças imunopreveníveis, no entanto, ainda há crianças que não são levadas para a vacinação. Considerando os benefícios individuais e sociais da adesão vacinal na saúde infantil, bem como as diferentes perspectivas de cuidado, compreender os motivos dessa não adesão pode subsidiar estratégias eficazes. **Objetivo:** Compreender os fatores relacionados às dificuldades para vacinação de crianças na primeira infância no interior de Pernambuco. **Método:** Estudo qualitativo, descritivo, realizado com 23 pais ou responsáveis de crianças até 5 anos, usuários de Unidades Básicas de Saúde na zona urbana de Santa Maria da Boa Vista, Pernambuco, Brasil. A coleta ocorreu por meio de entrevistas semiestruturadas, contendo perguntas abertas e fechadas. Os dados foram processados no *software* IRAMUTEQ e

analisados por meio da Classificação Hierárquica Descendente (CHD). **Resultados:** A análise gerou 137 segmentos de texto, com 68,61% de aproveitamento. A CHD revelou dois blocos principais: fatores políticos, socioeconômicos e culturais; e fatores comunicacionais e educacionais. Esses blocos se desdobraram em cinco classes: doses e prazos, ações e cuidados, doenças e saúde, conhecimentos e vacinas, e *fake news* e antivacinação. **Conclusões:** Os principais fatores que impactam a atualização do calendário vacinal infantil são: a falta de estoque, o adoecimento, a incompatibilidade com horários de trabalho, a ausência de transporte, a disseminação de *fake news* e os efeitos da pandemia da COVID-19. Tais achados evidenciam desafios estruturais e sociais enfrentados pelas famílias, sinalizando a necessidade de ações integradas para ampliar a cobertura vacinal.

PALAVRAS-CHAVE: Cobertura Vacinal; Programas de Imunização; Atenção Primária à Saúde; Movimento contra Vacinação

INTRODUCTION

The National Immunization Program (PNI), established in 1973, was designed to organize the national vaccination policy for the Brazilian population, aiming at the control, eradication, and elimination of vaccine-preventable diseases[1]. Recognized as an efficient and well-established public policy, the PNI is highly regarded both nationally and internationally[2].

In 1980, the PNI gained significant momentum with the implementation of national vaccination campaigns, a large-scale strategy aimed at immunizing as many children as possible up to five years of age. Ensuring adequate vaccination coverage in childhood plays a crucial role in the control and eradication of infectious diseases[3].

Despite the robustness of the PNI and the regular distribution of immunobiologicals, there are children who are not taken for vaccination by their parents or guardians[4]. Furthermore, the growing influence of anti-vaccination movements represents a significant barrier that has raised concerns in the public health sphere[5].

Thus, it is imperative that the population be informed about the benefits and mandatory nature of childhood vaccination, and that failure to comply with vaccination guidelines carries serious consequences, since unvaccinated children are more susceptible to childhood morbidity and mortality from vaccine-preventable diseases[6].

Considering the individual and social benefits of vaccination adherence in child health, as well as different perspectives on care, this study aimed to understand the factors related to vaccination adherence in early childhood.

METHOD

This is a descriptive study with a qualitative approach, conducted with 23 parents and/or guardians of children in early childhood who are users of five Basic Health Units (UBS) in the municipality of Santa Maria da Boa Vista, Pernambuco, Brazil, located in the urban area. The inclusion criteria were: parents and/or guardians of children up to five years of age, over 18 years of age, and residents of the municipality. The exclusion criterion was: individuals with a condition that prevents them from responding to the interview. It should be noted that the municipality has approximately 42,782 residents, according to the 2022 census; of these, 4,075 fall within the study's age group, under five years of age. The municipality has 10,493 families registered at 12 Basic Health Units (UBS); of these, five are in the urban area and were therefore included as the study setting, according to data from the SUS Department of Information and Informatics (DataSUS) in 2021.

Participants were selected at random while their parents or guardians waited for the children to be vaccinated. The number of participants was determined based on the criterion of theoretical saturation—the point at which the inclusion of new subjects no longer added relevant or novel information to the phenomenon under investigation—ensuring the sufficiency and analytical depth of the data. For data collection, which took place between January and April 2024, a semi-structured interview guide was used, containing questions about demographic and socioeconomic status, as well as information regarding the importance of the vaccine and a description of factors related to vaccination adherence.

The interviews were conducted in a private, secure, and confidential setting, with no individuals other than the researchers permitted to be present. An audio recorder was used after prior authorization and the signing of the Informed Consent Form (ICF), and subsequently, the interviews were fully transcribed and organized according to the standards for compiling *a* textual *corpus*. They were then subjected to lexical analysis of the Descending Hierarchical Classification (DHC) type, using the *Analyses Multidimensionnelles de Textes et de Questionnaires* (IRAMUTEQ) software. To interpret and name the generated classes, Bardin's content analysis was used, considering the following phases: 1) pre-analysis, 2) categorization, 3) inference and interpretation of the data.

The study followed the guidelines and standards established in Resolution No. 466, dated December 12, 2012, of the National Health Council (CNS, 2012), and was submitted to and approved by the Research Ethics Committee of the Amaury de Medeiros Integrated Health Center (CISAM) at the University of Pernambuco, under opinion No. 6,505,732. To ensure the anonymity and confidentiality of the data, participants were identified with the letter "E" followed by Arabic numerals, according to the order in which the interviews were transcribed.

RESULTS AND DISCUSSION

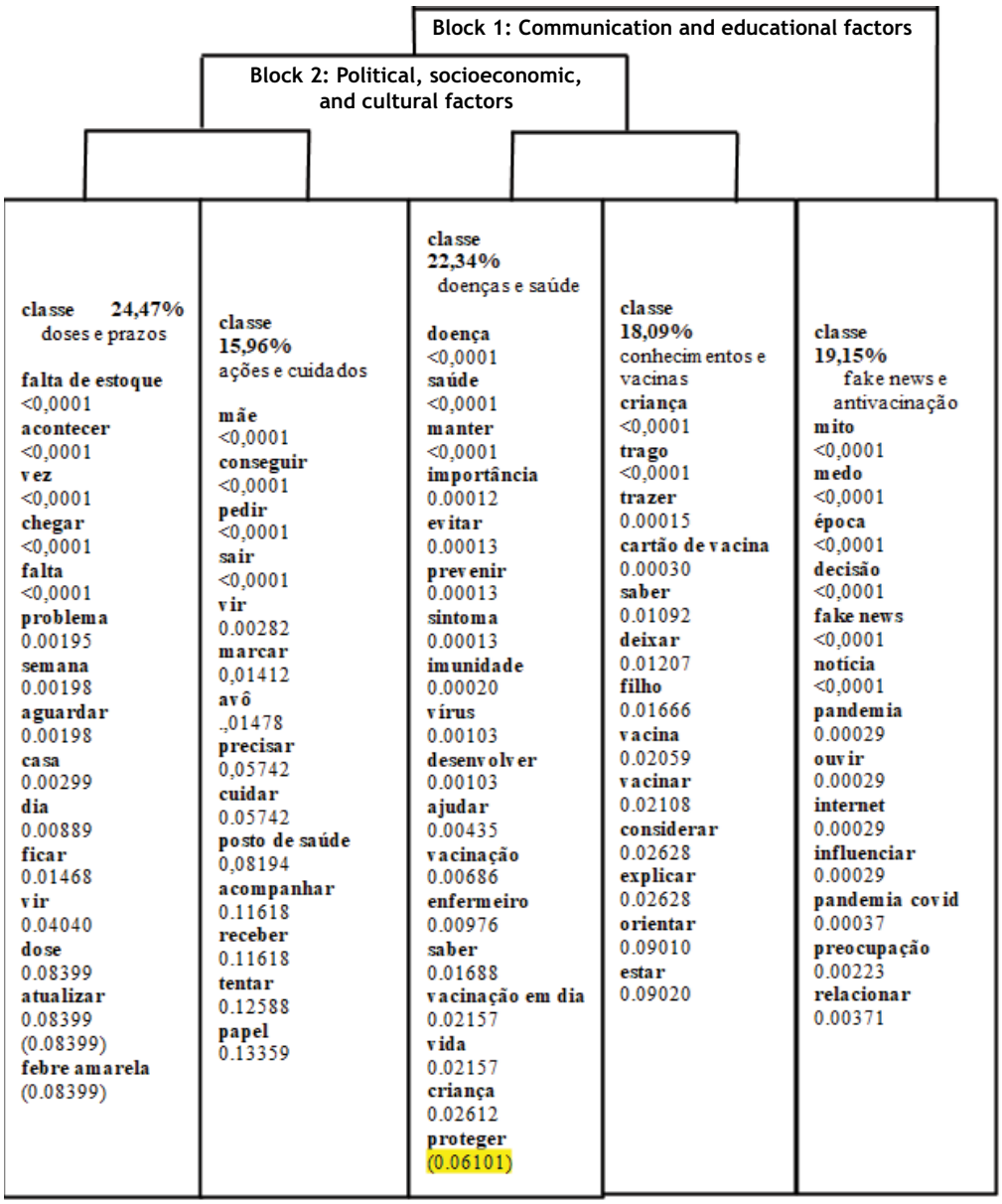
The study participants are aged between 19 and 59 years, with a mean age of 29 years, and are predominantly women (91.30%), married (43.48%), with a high school diploma (26.09%) and a college degree (13.04%), and are formally employed.

The thematic corpus consists of 23 texts and 137 text segments (ST), representing 68.61% of classifiable segments or the text utilization rate. This is due to the exclusion of definite and indefinite articles, onomatopoeia, conjunctions, adverbs, interjections, and prepositions. The descending hierarchical distribution classes (CHD) generated from the analysis consist of two blocks and five classes that can be read from left to right in the dendrogram (Figure).

Block 2, titled "Political, socioeconomic, and cultural factors," explores the barriers and obstacles that permeate the vaccination process, ranging from logistical and distribution issues to vaccine hesitancy among the population related to socioeconomic and cultural aspects. Additionally, it analyzes strategies and practices adopted to overcome these difficulties and ensure adequate protection for the community.

Class - doses and schedules

Updating the child's vaccination record is crucial for public health, but vaccine shortages and delays constitute significant barriers. This class presents an ST in which there are references to updating the child's vaccination record. The most frequent



Source: Iramuteq 0.7 alpha 2 software, 2024.

Figure. Dendrogram of descending hierarchical distribution (CHD) classes generated by IRAMUTEQ 0.7 alpha 2 software. Thematic subcorpus – Factors related to vaccination adherence in early childhood. Santa Maria da Boa Vista, Pernambuco, 2024.

words associated with this class were “lack of stock,” “happen,” “arrive,” “problem,” “week,” “wait,” “come,” “yellow fever”; the participants’ statements referring to these words are distributed as follows:

> [...] only once when we came was the yellow fever vaccine out of stock, but a few days later he was able to get the dose [...] (E16).

> [...] I came last week and they didn’t have the chickenpox vaccine; they were waiting for it to arrive [...] (E18).

> [...] His tetanus booster is overdue because, when I came here, it was out of stock [...] (E20).

In this regard, it is important for nurses to acknowledge and observe the difficulties faced by the UBS staff and the community in distributing vaccines, particularly during children’s first access to healthcare and in conversations with parents about their children’s vaccinations. Thus, it can be stated that the child’s vaccination card is a document linked to the monitoring of childhood vaccination[7].

In addition to highlighting aspects related to vaccination adherence, this category features some words associated with raising awareness about the importance of keeping the vaccination schedule up to date. Furthermore, words related to support from the family or guardian in this situation are presented. Some STs on this topic are worth highlighting:

> [...] I try to keep them up to date, always giving the vaccine on the date recommended by the vaccinator [...] (E10).

> [...] I always try my best not to let any get delayed, because I know how important they are for her health [...] (E15).

> [...] I always keep an eye on it together with his mother so we don’t miss the scheduled dates. We always plan on who will take him on the next date, to make sure everything goes smoothly [...] (E17).

One of the most frequently mentioned difficulties in this group is the lack of availability of specific vaccines, which leads to the postponement of children’s immunizations. vaccine shortages at health centers not only delay the immunization schedule but also cause frustration among parents and guardians, who must return to the center repeatedly. This situation is exacerbated by the need to balance visits to the UBS with other daily responsibilities, increasing the time burden on families.

As stated by the Ministry of Health, the continuity of vaccine supply is essential to prevent gaps in immunization and ensure that the population receives the necessary doses at the correct time[8].

Category - Actions and Care

In this category, several barriers faced by parents or guardians when taking children to receive the doses scheduled on the vaccination card stand out. Despite all the scientific evidence regarding the importance of vaccination, there are other factors that make it difficult to keep the vaccination record up to date. The most frequent words were “mother,” “manage,” “ask,” “leave,” “come,” “schedule,” “take care,” “accompany,” “try”:

Sometimes his mom has to ask to leave work early to pick him up from school and bring him in for his shot. Since the health clinic only stays open until 5 p.m., in our case it can get a little complicated sometimes. I think if they extended the hours a bit, it would be easier (E16).

> Because I take care of him and the house, I sometimes feel overwhelmed. Because I have to stop doing things around the house to be able to bring him here [...] (E18).

> I can’t come because I own a restaurant, and when it gets really busy, I have to help my staff. And her father is sometimes a bit of a hassle because he makes it difficult to bring her [...] We’ve always had this problem, but in the end, one of us brings her. Most of the time, it’s me (E20).

> [...] sometimes I feel a little overwhelmed because I leave school tired, hungry, wanting to have lunch, and when she needs to get vaccinated, I have to come with her [...] (E22).

According to some findings, one of the reasons parents do not vaccinate their children is unstable family structures, in which caregivers do not receive the necessary support to care for their children; the inability of parents and/or caregivers to coordinate work schedules with the UBS schedule, the overload of responsibilities, excessive responsibility, and lack of time[9].

Some studies associate this with other factors such as: socioeconomic factors including low income and low educational attainment of the caregiver; households with many children; logistical and administrative barriers to vaccine distribution and use, service structure and workflow; in addition to difficulties in accessing immunization services related to transportation, distance to services, and work schedules, are important factors in immunization decisions and can affect childhood vaccination adherence[10].

Class - diseases and health

The participants’ statements in this category reflect this perception, highlighting vaccines as fundamental to children’s health and well-being. Another aspect emphasized is the ability of immunobiologicals to protect against infectious diseases, thereby conferring immunity to the individual. It is observed that vaccination is widely recognized by the interviewees as one of the most effective measures for the prevention of communicable diseases.

In this class, participants express their opinions on vaccination and its importance from their own perspectives, emphasizing that the main benefit of vaccination is the prevention and protection against certain communicable diseases. They provide a list of keywords, including “disease,” “health,” “maintain,”

"importance," "avoid," "prevent," "symptom," "immunity," and "virus," as illustrated in the following statements:

> [...] I see vaccines as a very important preventive measure to ensure children's well-being and health. Helping them grow up healthy [...] (E15).

> They help protect against diseases, making children stronger [...] Because, without up-to-date vaccines, they can get sick and have worse reactions (E18).

> [...] they are essential for maintaining our health and safety, helping to prevent diseases and control the spread of contagious diseases [...] (E21).

They are very important because they can prevent various diseases that can be avoided if vaccinations are up to date; or if a person does get sick, if they've been exposed to that virus before, the symptoms may be milder (E22).

> Without vaccines, our health is worthless! They help strengthen our immunity and prevent disease symptoms from becoming severe. They can even prevent death, depending on the disease contracted (E23).

Other studies have shown significant concern among parents and caregivers regarding the safety and efficacy of vaccines. The scientific literature supports this assertion, emphasizing that vaccination not only prevents initial infection but also reduces the severity of symptoms in the event of exposure to the pathogen, preparing the immune system for a more effective response, reducing the severity of diseases, and preventing serious complications[11].

It is important that the public be informed about the benefits of childhood vaccination and its mandatory nature, and that non-compliance leads to serious consequences. Vaccinations must be ongoing, and monitoring by the responsible agencies is essential to identify unvaccinated children and increase vaccination coverage. Since unvaccinated children are susceptible to higher rates of childhood morbidity and mortality from vaccine-preventable diseases[6].

Class - knowledge and vaccines

This class highlights the reasons why caregivers brought the children to receive vaccinations; the most frequent words associated with this class were: "child," "bring," "vaccination card," "know," "leave," "schedule," "son," "vaccinate":

> He gets his vaccines according to the nurses' instructions, which are always noted on the card (E9).

> [...] I was advised by the nurse during routine checkups about the importance of always keeping the vaccination schedule up to date to ensure protection against various diseases. The vaccination dates are always marked on the vaccination card; I think this makes it much easier to keep track of and bring her in on the right dates (E15).

> [...] we've always thought it's very important to bring her in on the dates marked on the vaccination card [...] not to mention that her mother has always been very well advised by the nurse and the pediatrician who monitors her, about the importance of always keeping her vaccinations up to date (E16).

Ever since I started working at his parents' house, I've always been advised on the importance of vaccines, and they've always asked me to pay attention to the dates marked on the vaccination card. It's gotten to the point where I've started paying closer attention to my daughter's vaccination dates too, because I used to always forget (E18).

> I always try my best to keep up with the dates [...], and the nurse who provides her childcare always emphasizes the importance of keeping vaccinations up to date (E23).

One of the most significant findings on this topic is the extent of nurses' contributions to promoting adherence to childhood vaccination. They play a vital role in educating parents, raising community awareness, and supporting families throughout the vaccination process. The development of trusting relationships between nursing professionals and families emerges as a recurring theme in the analysis of the results. Trust is a crucial component in health-related decision-making, and nurses who build empathetic and respectful relationships with families are more likely to positively influence attitudes toward immunization[12].

Other studies highlight how nursing staff must be attentive and plan interventions addressing the most common challenges people face regarding childhood vaccination, in addition to educating them on the importance of vaccination, its safety, efficacy, and potential adverse effects to improve childhood vaccination rates. It is essential to adopt this approach and thereby help improve the quality of health for everyone, including children[9].

On the other hand, Block 1, "Communication and Educational Factors," addresses the importance of disseminating accurate and reliable information as the foundation for robust public health. In this context, the effects of fake news and misinformation on public perception of vaccines are discussed, as well as the educational and communication initiatives needed to combat these harmful effects.

Category - fake news and anti-vaccination

In this class, it is possible to identify parents' hesitancy regarding vaccination, which is related to various factors, especially adverse events, and is fueled by anti-vaccination movements that spread misinformation.

Notably, in this class, the significant influence of news disseminated during the pandemic—especially online, without reliable sources—on adherence to COVID-19 vaccination is highlighted. Although caregivers are aware of the importance of vaccination and its health benefits, fake news constituted a major factor in the decision to vaccinate children.

This category presents STs in which meanings are attributed to the feelings and factors that influenced caregivers' decisions to vaccinate children during the COVID-19 pandemic. The cluster associates sensations, feelings, and meanings such as "fear," "fake news," "news," "internet," "concern," "believe," and "influence," with these being the most frequent words. Excerpts from participants' statements highlight these findings:

> During the pandemic, it was very difficult to accept the COVID vaccine right away. We know that news spreads very quickly on the internet, and sometimes we end up believing certain things […] (E16).

> My husband wasn't very keen on the COVID vaccine back when it was in the testing phase for children. I talked to him and explained that we can't take everything seriously, especially sources shared on WhatsApp (E17).

> [...] that was the only time I was worried about the vaccine. Because there was the issue of fake news being shared on social media at that time [...] (E20).

> [...] I read a lot about the vaccine and didn't want to take her to get it. I was really scared by the news that was coming out [...] And then I found out that a lot of it was fake news (E22).

Some findings on this topic highlight that the COVID-19 pandemic, which began in 2020, profoundly altered the population's way of life and resulted in a decrease in demand for health services, due to the concentration of efforts on caring for patients affected by the disease. Other relatively new factors that gained prominence during this period were the spread of fake news and the activities of anti-vaccine groups[13].

Misinformation on social media goes beyond mere misinformation and has given rise to a new anti-vaccine movement. Due to a lack of information, fake news disseminated by influential digital media led to a decline in vaccination coverage[4].

CONCLUSIONS

This study investigated factors related to difficulties in vaccination adherence during early childhood in the municipality of Santa Maria da Boa Vista, Pernambuco, highlighting structural and social challenges faced by parents and guardians. It was observed that these factors acted as barriers that hindered, but did not prevent, vaccination, as participants demonstrated awareness of the importance of keeping vaccinations up to date.

These findings highlight the need for the Municipal Health Department to make adjustments to increase vaccination uptake, such as extending the operating hours of Basic Health Units (UBS), improving vaccine distribution logistics, and conducting ongoing educational campaigns aimed at combating misinformation.

The study had some limitations, including the predominance of women as the primary caregivers responsible for taking children to get vaccinated, which may reflect gender influences in the results. In addition, the responses obtained in the interviews were initially briefer, becoming more detailed as data collection progressed. Although the method used does not allow for the generalization of the findings to the entire population, it proved effective in providing a deeper understanding of the phenomenon studied and in offering practical insights into health management.

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Authors' Contributions

Gois ARS, Gama TCCL - Conception, planning (study design), data analysis, data interpretation, and drafting of the manuscript. Campos MEAL, Freitas IOM - Conception, planning (study design), data analysis, data interpretation, and manuscript drafting. All authors approved the final version of the manuscript.

Conflict of Interest

The authors declare that there is no potential conflict of interest with peers, institutions, politicians, or financial entities related to this study

Conflict of Interest

Authors have no potential conflict of interest to declare, related to this study's political or financial peers and institutions.

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