

# Vaccine hesitancy in families of children during the COVID-19 pandemic\*

## Hesitação vacinal de familiares de crianças durante a pandemia de COVID-19

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### ABSTRACT

**Objective:** to identify the reasons that led families of children to vaccine hesitancy during the COVID-19 pandemic. **Methods:** qualitative study with semi-structured interviews carried out with 20 children's relatives, all of which were mothers of hospitalized children. Data was submitted to lexicographical analysis in the software *Interface de R pour les Analyses Multidimensionnelles de Textes et de Questionnaires*, using descending hierarchical classification. **Results:** the fear of leaving one's house during the pandemic and the lack of vaccine supplies were the reasons found for vaccine hesitancy in the family of children during the COVID-19 pandemic. **Conclusion:** the reasons for vaccine hesitancy in the families of children found in this study threaten advancements in the struggle against vaccine-preventable diseases. **Contributions to practice:** government bodies, managers, and health unit nurses should be co-responsible for efficient measures to implement health education in this public, creating a bond of trust to reduce the risks from the increase in vaccine hesitancy and reduction in vaccine coverage in the country.

**Descriptors:** Parents; Family; Child; Vaccination Refusal; COVID-19.

### RESUMO

**Objetivo:** identificar as razões que levaram familiares de crianças à hesitação vacinal durante a pandemia de COVID-19. **Métodos:** estudo qualitativo com entrevistas semiestruturadas realizadas com 20 familiares, sendo todas mães de crianças hospitalizadas. Os dados foram submetidos à análise lexicográfica, com o auxílio do software *Interface de R pour Analyses Multidimensionnelles de Textes et de Questionnaires*, pela Classificação Hierárquica Descendente. **Resultados:** o medo do deslocamento durante a pandemia e o desabastecimento de vacinas se mostraram razões geradoras de hesitação vacinal de familiares de crianças durante a pandemia de COVID-19. **Conclusão:** os motivos da hesitação vacinal de familiares de crianças identificadas nesse estudo ameaçam o avanço no combate às doenças imunopreveníveis. **Contribuições para a prática:** órgãos governamentais, gestores e enfermeiros das unidades de saúde devem se responsabilizar pela tomada de medidas eficazes de implementação de educação em saúde com esse público, criando vínculo de confiança para reduzir os riscos do aumento da hesitação vacinal e das coberturas vacinais no país.

**Descritores:** Pais; Família; Criança; Recusa de Vacinação; COVID-19.

## Introduction

Brazil is recognized worldwide as having one of the largest and most complex vaccination programs as a part of the Single Health System. The National Vaccination Program (*Programa Nacional de Imunizações*) was essential for a significant reduction of cases and deaths by vaccine-preventable diseases<sup>(1)</sup>.

The National Vaccination Program offers 48 immunobiological substance (vaccines, special immunobiological drugs, serums, and immunoglobulins) in its routine vaccination programs and nation-wide campaigns, reaching the target groups of vaccination in all stages of life and offering 15 vaccines for children, 9 for adolescents, and 5 for adults and older persons, thus protecting them against more than 20 diseases. Vaccination was consolidated as one of the most important activities in public health due to the eradication of polio, rubella, neonate tetanus, and the substantial reduction of transmissible diseases, such as diphtheria, tetanus, and pertussis<sup>(2)</sup>.

Children below one year old had vaccination coverage rates above 95%, meaning the population adhered really well to the vaccination. However, there has been a considerable reduction in vaccine coverage in the country. In the last few years, there has been a reduction from 10 to 20 percent, favoring the reappearance of measles, which meant Brazil lost its certificate for the eradication of the disease, due to its large incidence in several Brazilian states<sup>(3)</sup>.

Trends also indicate a reduction in the coverage of the Bacillus Calmette–Guérin vaccine (BCG), the MMR vaccine, and the polio vaccine in Brazilian cities<sup>(4)</sup>. The vaccine coverage in children from 0 to 12 years old was reduced in vaccines against hepatitis B, rotavirus, polio, meningococcal C, yellow fever, pneumococcal, BCG, and in the pentavalent vaccine<sup>(5)</sup>.

The COVID-19 pandemic marked the beginning of a serious global public health issue, with relevant impacts on health, society, economics, and politics<sup>(6)</sup>.

Public health measures to mitigate the effects of the pandemic revolve around the adoption of social distancing and quarantine<sup>(7)</sup>, but these strategies had an influence on the reduced access to vaccination services<sup>(8)</sup>. Parents became worried about exposing their children to the virus when they took them to vaccination units, helping reduce vaccination coverage and, consequently, increasing vaccine hesitancy<sup>(7)</sup>.

Vaccine hesitancy is the delay, reluctance, or refusal to vaccinate, despite the availability of the vaccine. It has been considered one of the ten greatest threats to world public health<sup>(9)</sup>. This phenomenon must be understood as a permanent process, including hesitant individuals who only accept certain vaccines, others who want to delay their application, eschewing the recommended vaccination schemes, as well as those who refuse vaccination regardless of the vaccine offered<sup>(10)</sup>.

Vaccine hesitancy was made worse by the pandemic, but it is a constant issue to the National Vaccination Program, since, even before COVID-19, the vaccination goals were not achieved in regard to a large part of vaccines<sup>(3)</sup>. 1.6 million children received no dose of the vaccines against diphtheria, tetanus, and pertussis, or of the vaccine against polio<sup>(11)</sup>.

The interruption in vaccinations increases the number of susceptible people and the likelihood of outbreaks of vaccine-preventable diseases. The consequences are elevations in morbidity and mortality, especially in pregnant women and other vulnerable groups, in addition to the overcrowding of health services, already overloaded due to the COVID-19 pandemic<sup>(7)</sup>.

Therefore, this study is justified due to the constant reduction of vaccine coverage caused by vaccine hesitancy. As a result, this research is relevant to help discover the reasons that led families to vaccine hesitancy in the pandemic context, in such a way as to help prevent the social issues that the increase and return of vaccine-preventable diseases can bring to children.

In this regard, in order to understand the repercussions of the pandemic in the context of vaccine hesitancy in children, this study aimed to identify the reasons that led families of children to vaccine hesitancy during the COVID-19 pandemic.

## Methods

This is a qualitative study, following the recommendations from the Consolidated Criteria for Reporting Qualitative Research (COREQ).

The setting of the study was a pediatric public hospital, a reference for the attention to children and adolescents in the state of Rio de Janeiro. The institution provides emergency services, hospitalizations, intensive care, and outpatient consultations. Data collection took place from July to September 2021 in the pediatric hospitalization wards of said hospital.

The participants of the study were family members of children up to five years old, as most vaccines in the national vaccination calendar are for children in this age group. These children were hospitalized in the medical clinic sector. The participants were selected through the following inclusion criteria: being parents, mothers, or any other relative responsible for the direct care of children up to five years old, whose vaccines were delayed. We excluded family members that were younger than 18, as well as those who did not have the child's vaccination booklet.

To select and invite the participants, we used a checklist of the vaccine situation of the child. The checklist included a copy of the national childhood vaccination calendar for children under five, and was filled in before interviews with the relatives of the children whose vaccines were delayed. Therefore, before the interview, we requested the participants of the study to hand over the child's vaccination booklet, to check which vaccines had been applied, considering the child's age.

Then, we carried out a semistructured inter-

view using a script divided in two stages. The first stage included characterization of the participants, such as age, gender, city of residence, degree of kinship, marital status, ethnicity, schooling, profession, and family income. In the second stage, participants were encouraged by the questions of the researcher to talk about the vaccination of their children: "Say what you know about vaccines", "I noticed your child did not receive all vaccines for this age, tell me about that", "Tell me how the vaccination routine of your child was during the social distancing caused by the pandemic".

The interviews took place during the hospitalization of the child. Since the researcher works on duty in the hospital investigated, she invited the children's relatives to participate during nursing visits to the children. After they showed interest in participating, the relatives, which were all mothers, were referred to a private room in the same sector where the child was hospitalized, in order to preserve anonymity and guarantee that the participants were comfortable. Mothers were invited to participate voluntarily, and the goals, data collection methods, and ethical aspects of the research were made clear. After agreeing to participate, they signed an informed consent, in which the same clarifications were written.

After the consent was signed, we requested the vaccination booklet of the child, in order to identify whether there were any vaccine delays. Then, we used the checklist. When it was found that the child had no vaccines delayed, the researcher thanked the mother for the availability, congratulated her on the fact vaccines were up to date, and explained that, in this case, it would not be necessary to carry out the next stage of the research, which would be the interview. We analyzed the vaccine booklets of 25 children, 5 of whom had their vaccinations up to date. Therefore, 20 participants continued onto the next stage.

When any case of vaccine delay was identified, the booklet was given back to the mother and an interview was scheduled for a time when the child could

receive the visit of some relative, or for a time when the person accompanying the child would be replaced, so the child would not be left alone during the interview.

Interviews took place in a private room in the hospitalization sector and lasted from 10 to 20 minutes. We adopted all preventive protocols recommended for COVID-19, such as a 2-meter social distance, the use of a mask by the researcher and by the participant, hand hygiene, and the use of alcohol gel before and after the interview. The cellphone used to record the interview and the pens used by participant and researcher were cleaned using alcohol 70% and involved in a plastic film.

To guarantee the confidentiality of the mothers, they were represented using the letter M, followed by a number indicating the order in which interviews were carried out (M1, M2, M3 etc.). Interviews were recorded with the aid of a smartphone to record the statements of the participants in their entirety. All data was managed and analyzed anonymously, never using the name of the participants of the research.

Data collection was concluded after data saturation was reached, that is, when no new topic or piece of information was emerging from the interviews. The transcription of the interviews was the primary source of the data submitted to lexicographical analysis, with the support of the software *Interface de R pour les Analyses Multidimensionnelles de Textes et de Questionnaires* (IRaMuTeQ). (This analysis was chosen because, when we group the most important word classes from the statements of the participants, it allows identifying the main topics emerging from each class.

Since this is a research involving human beings, it followed the determinations from Resolution 466/12 from the National Council of Health, which regulates research involving human beings. This work was approved by the Research Ethics Committee at the *Hospital Universitário Antônio Pedro*, of

the *Universidade Federal Fluminense*, under number 4,716,014/2021 and Certificate of Submission to Ethical Appreciation 45601021.1.0000.5243.

## Results

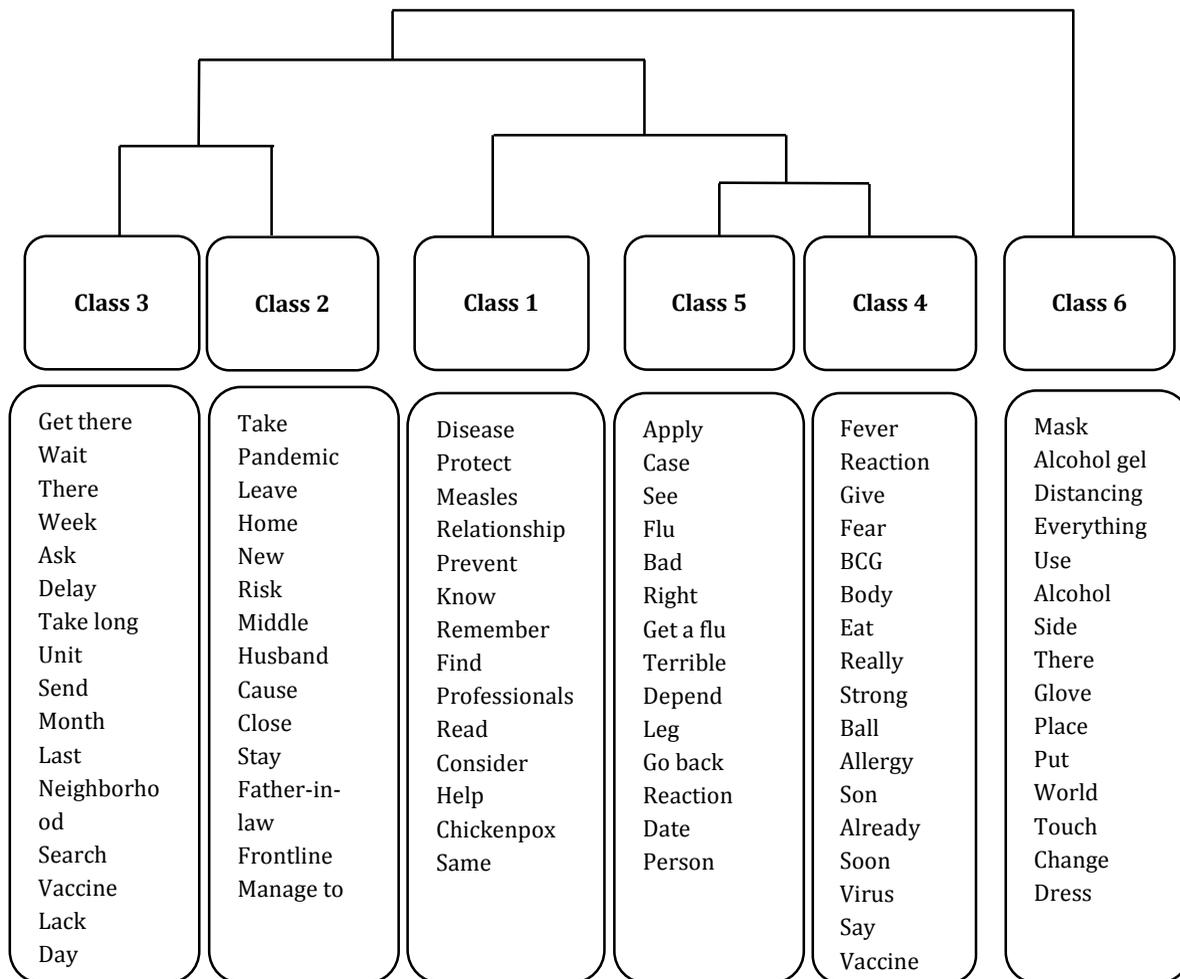
The study included 20 mothers with a mean age of 25.8. Most of them (8 - 40%) lived in Niterói, while the others lived in other cities in the state of Rio de Janeiro. 15 (75%) were single and the same number were black (self-declared black or brown), 5 (25%) self-declared white, and 12 (60%) declared being unemployed.

Regarding their educational level, 10 (50%) had completed high school, 5 (25%) had incomplete high school, 2 (10%) had incomplete higher education, 2 (10%) had incomplete elementary education, and 1 (5%) had complete elementary education, showing that 12 (60%) participants had finished high school.

Regarding the number of children, 11 (55%) had two, 6 (30%) had one, 2 (10%) had four children, and 1 had three (5%). Regarding religion, 9 (45%) were evangelical, 9 (45%) stated to follow now religion, and 2 (10%) were catholic.

The importation of the text corpus prepared for the program led, in 35 seconds, to the generation of 20 texts, 361 text segments, 1,479 forms, 12,757 occurrences, 824 active forms, and 102 supplementary forms. Number of active forms with frequencies  $\geq 3$ : 336. six classes were formed. It is worth noticing that, from 361 text segments, 303 were classified, corresponding to an 83.93% usage of the text segments found.

After processing and grouping the words according to their occurrence, the descending hierarchical classification (DHC) generated the class dendrogram. The dendrogram had six classes. The words that formed the classes are disposed according to the software generation, with no change. Figure 1 shows the classes and the connections between them.



**Figure 1** – Dendrogram of the descending hierarchical classification of the text corpus from the interviews with the mothers. Niterói, RJ, Brazil, 2021

To attend to the goals of this article, we will present and discuss the results of classes 2 and 3 only, which were named, respectively “Vaccine hesitancy associated with the fear of leaving home during the COVID-19 pandemic” and “Vaccine hesitancy associated with the lack of vaccine supplies during the COVID-19 pandemic”.

**Vaccine hesitancy associated with the fear of leaving home during the COVID-19 pandemic**

According to the data processing, the words with the strongest associations in this class were: take, pandemic, leave, home, new, risk, middle, close.

Mothers reported difficulties taking their children to vaccinate during the pandemic due to the fear the child would be infected with the COVID-19 virus and need to be hospitalized, and to the fear of the overcrowding in health units, especially in cases where the child already presented some comorbidity or used some device, such as a colostomy pouch: *It was a bit hard for me, because I got really scared of leaving home with him due to the pandemic, I got a bit scared. Since he uses a colostomy pouch, I got scared that he would get something or stay hospitalized due to COVID-19 (M1).*

They questioned themselves regarding the vaccination during the pandemic and reproduced negative feelings regarding the care for their children: *How*

*can I, in the middle of a pandemic, take all the children to vaccinate? That's why I'm late, it's not that I'm a terrible mother (M11).*

Some reports show that mothers and their children obeyed the social isolation recommended by health authorities and avoided leaving their homes as much as possible: *I almost didn't leave home, but when I did, I left and came back fast. I avoided leaving home a lot (M8). My son is not leaving home a lot due to the pandemic, its more when he goes to the health unit (M1).*

There were also mothers who mentioned the overcrowding of health units. A mother reported she would prefer checking whether the health unit was crowded before taking her daughter to vaccinate. Another associated the difficulties in vaccinating her son with the number of people in the health unit, and yet another reported she avoided staying close to other people in the health unit: *It was really complicated during the pandemic, because I'm afraid of everything, especially of this coronavirus stuff, that I know children can get too, so I was really scared of taking my daughter. When I went there and saw it was full, I came back and waited for it to empty so I could go and give her the vaccine (M3). It was really complicated taking my son to vaccinate during the pandemic, because the health unit had a lot of people (M10). I felt a bit scared of going to the unit. I did it really carefully, I went there really carefully. I avoided being close to people within the unit too (M2).*

Mothers felt afraid of bringing their children to vaccinate in the health unit environment, since it reflected the danger of infection by the COVID-19 virus, because many units had rearranged their activities, and most had become references for the care to the new disease: *It was an awful experience to have to take my son to the health unit during the pandemic. Where I live, the health unit became a COVID-19 unit. I got scared, I am scared (M19). It's really risky to take my daughter to the unit during the pandemic, there are a lot of people with COVID-19 symptoms in the unit (M9). Even my husband, due to this pandemic, he doesn't want me going into the unit, because my mother-in-law is 68, you see? (M1). I felt afraid of taking my son to vaccinate during the pandemic. At first I was afraid, but then I got to thinking, I am in the health unit, my son could end up getting COVID-19 (M17).*

## **Vaccine hesitancy associated with the lack of vaccine supplies during the COVID-19 pandemic**

In this class, the words with the greatest number of associations were: get there, wait, there, week, ask, delay, take long, and unit. Mothers reported that vaccine delays in their children were due to the lack of vaccines in the units. One mother said she needed to wait for the flu vaccine to arrive so she could update the vaccines of her son. Another mother reported she needed to wait for supplies of the vaccine against yellow fever, so her child could have it: *I delayed it because of the lack of vaccines, really (M15). I got there at the health unit, asked for the vaccine to see if they had it, they said they didn't, and then they ordered it. One of the vaccines, they said, was in really short supply (M19). There was no flu vaccine, they didn't have it, and another one, I can't recall which, that they also didn't have, and I had to wait for it to arrive (M18). There was no yellow fever vaccine at the unit, I had to wait for it to arrive so I could give it to her (M3).*

Some mothers stated that the reason for their delay in vaccination was that they needed to wait for the vaccine to arrive at the health units, and, therefore, they had to go back after a week to check if the vaccines had arrived. In their reports, they said that the workers in the units guided them in this regard: *I delayed the vaccine because, due to the pandemic, there were no vaccines in the health unit, so they always told me to go back on Monday. I went back on Monday, and they didn't have it. So I moved it to the other Monday (M15). I took my son to the health unit and there wasn't a vaccine, I had to go back the next week. There was no vaccine in the health unit. I went back the other week. That is why it ended up being delayed. All vaccines that were delayed, this is why (M6). They told us to send messages. Or told us to go back the other week, that the vaccine was going to arrive (M7). I went again, the health unit worker told me they didn't have the vaccine. She told me to go back the other week (M4).*

Due to the lack of vaccines in the health units, mothers had to wander from unit to unit, going to units in other neighborhoods to update the vaccination of their children: *There was no yellow fever vaccine in the*

*unit, they scheduled a date for me to go back to apply it. I went back and there still wasn't any, so they told me to vaccinate in Alcântara. But when I got there, there was no vaccine. They only had the COVID-19 vaccine (M5). I had to go to Alcântara, because it was the best health unit there was. The workers told me to go to another unit, because the vaccine was not getting there (M10). When I went to vaccinate, there was no vaccine. This delays things and none of the units had it, the vaccine, it was over in all places. When a health unit doesn't have the vaccine, I go to a unit in Alcântara (M9).*

## Discussion

It became clear that, regarding the delayed applications in the vaccination booklets of the children, the most delayed vaccine was the pneumococcal 10 (95%), and the one with the lowest number of delayed applications was the BCG (25%). Regarding the vaccinations recommended for the first year of life, the BCG was the most often applied, and the pneumococcal 10 was the least<sup>(12)</sup>. The pneumococcal 10 vaccine was among the most rejected by the mothers<sup>(13)</sup>.

The drops in vaccine coverage have been identified in the country for a few years. However, starting with 2020, this number increased in such a way that, if earlier the differences from one year to the next were of 6%, from 2019 to 2020 they drastically increased to 11.1%, on average. In some cases, such as hepatitis B, this number was even higher, nearly 20.4%<sup>(14)</sup>.

Extracts from the statements of the mothers who participated in this study showed that vaccine hesitancy was directly related to the fear of leaving the house during the pandemic. The fear of leaving home with a child and incur the risk of being infected by the virus was decisive in their choice to delay vaccination — a fact observed with the emergence of the pandemic, since the presence of users in the health units decreased significantly in several countries in the world, including for child vaccination, due to isolation measures and social distancing, to reduce the virus transmission<sup>(13)</sup>.

Parents were worried about exposing their children to the coronavirus, thus avoiding going to

the vaccination services and remaining in isolation, without leaving their homes, which led to a reduced vaccine coverage<sup>(15-16)</sup>. Recommended precautions led some parents to treat vaccination routine as if it was a non-essential form of care, reiterating the need for a more attentive professional communication during large disease outbreaks<sup>(16)</sup>.

In this regard, health authorities had to rethink their early recommendations regarding “staying home” and isolating socially due to COVID-19, and started to make new decisions, encouraging families/parents to search health services to continue child vaccination, in order to recover the vaccine coverage in this group<sup>(9)</sup>.

Therefore, health workers provided children health care through remote contact with the relatives of these children who missed vaccination dates, in order to encourage them to go to the unit for vaccination and guide them regarding COVID-19 signs and symptoms. Thus, there was a transitional period between in-person and remote care, making it possible to keep social distancing and preventive measures against COVID-19<sup>(17)</sup>.

The reports found in this study also showed that, once mothers overcame the fear of leaving home during the pandemic to vaccinate their children, they still had to deal with the lack of vaccines in the health units, which substantially contributed for vaccine hesitancy. Factors such as logistical questions define the delays in the transport of vaccines and greatly contributed for the delay and suspension of vaccinations<sup>(18)</sup>. Mothers continued to report that delays in the vaccination of their children were due to the fact there are no vaccines in health services<sup>(19)</sup>.

The lack of vaccine supplies, the difficulties with international orders, and the capacity of production of laboratories may be strongly related to the drop in vaccine coverage in Brazil<sup>(20)</sup>. Due to the pandemic, the provision of routine children vaccines was discontinued due to delays in deliveries or even to the suspension of vaccination, leading to an elevation in the number of infections and even to deaths caused

by vaccine-preventable diseases<sup>(18)</sup>. Nonetheless, we must keep in mind that the distribution of vaccines and the need to organize the cold chain are complex processes. The lack of availability of vaccines, stemming from the fact they were not distributed from the state to the municipalities, contributes to vaccination delays in children<sup>(20)</sup>.

This study showed that mothers had to wander from one health unit to another to guarantee the vaccination of their children. There are groups who, despite believing on the importance of vaccination, are not able to vaccinate their children. Therefore, issues such as the accessibility of vaccination and inflexible unit working hours must be evaluated. Considering vaccination delays, the availability of immunobiological substances in vaccination rooms is noteworthy, since the lack of vaccines is still common, and the lack of certain ones can lead to a missed opportunity to vaccinate<sup>(21)</sup>. We must make sure that no visit to a health unit is a lost opportunity by resorting to simultaneous vaccination, which leads to the best possible time usage in the completion of the child's vaccination booklets<sup>(22)</sup>.

In this study, mothers showed feelings such as fear and preoccupation regarding the pandemic when they had to leave home with their children in search of health care. Several individual measures, such as the use of masks, hand hygiene, distancing, and temperature measurements, in addition to collective measures, such as capacity, disposal, and cleanliness of the environments, are essential to mitigate coronavirus transmission<sup>(23)</sup>. These measures, in addition to weakening the effects of the virus, prevent health systems from becoming overcrowded.

The pandemic provoked internal changes in health services. To health workers, absence from health services was a preventive measure, since it aimed to reduce the risk of infection of the child and their relatives. However, these absences were a solution chosen by the municipalities to reduce infection risks, when they suspended attention to children<sup>(24)</sup>.

Fear and insecurity affected the care in health units, both for professionals and users. However, to

guarantee the continuity of vaccination, it was essential to understand that the need to care for the children is greater than the risk of going to a health unit, despite the need to prevent unnecessary exposures to the children and family. These visits, in addition, are relevant to maintain a bond with these children and their families<sup>(17)</sup>.

The visits or lack thereof of mothers with their children to vaccination rooms during the COVID-19 pandemic, shown in this study, confirm that vaccination is a priority action to maintain the control or eradication of illnesses that were once the cause of common diseases, hospitalizations, and deaths. It is absolutely necessary to understand vaccination as a form of integral care to children's health, as defined in the National Policy for the Integral Health Care to Children, in order to promote quality of life and reduce illness and death in children from vaccine-preventable diseases<sup>(25)</sup>.

The institutionalization of this policy shows an effort to increase the quality of actions targeted at early childhood and more vulnerable groups, based on the principles of universal right to life, equality, integral care, humanization of assistance, and participative management<sup>(26)</sup>.

## Study limitations

A limitation of the study is the fact that, as it only included mothers of hospitalized children, it was not possible to understand the behavior of other family members regarding vaccine hesitancy in children during the pandemic. Despite this limitation, the study advanced scientific knowledge as it reached the goal of verifying the reasons that lead children relatives to vaccine hesitancy during the COVID-19 pandemic.

## Contributions to practice

Once the reasons exposed in this study are apprehended, government bodies, managers, and nurses from health units, especially those from vaccine rooms, should be co-responsible in the making of effi-

cient decisions to implement health education in this public, in order to create bonds of trust that can lead to a reduction in vaccine hesitancy levels in the country, and to the consequent drop in vaccination rates.

## Conclusion

This study identified the reasons that lead to vaccine hesitancy in the families of children during the COVID-19 pandemic, which were fear of leaving the house and going to the health units, and the lack of vaccine supplies during the period. These reasons threaten advances in the struggle against vaccine-preventable diseases.

## Authors' contribution

Concept and project or analysis and interpretation of data; writing of the manuscript or relevant critical revision of the intellectual content; final approval of the version to be published; and agreement to being responsible for all aspects of this work, and guarantee the precision and integrity of any of its parts: Viana IS, Cursino EG, Silva LF, Machado MED, Vaz EMC.

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