





# Adherence of parents and/or guardians of children under five years of age to vaccination against COVID-19

## Adesão de pais e/ou responsáveis de crianças menores de cinco anos à vacinação contra COVID-19

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### ABSTRACT

**Objective:** to analyze adherence among parents and/or guardians children under five years of age to vaccination against COVID-19. **Methods:** a cross-sectional analytical study conducted with parents and/or guardians of children under five years of age in Brazil, using a self-reported electronic questionnaire. Data analysis included descriptive statistics and simple log-binomial regression to estimate prevalence ratios. **Results:** 397 parents and/or guardians participated in the study. Among the associations of the bivariate analyses, adherence to vaccination against COVID-19 was 50% higher among people who reported not being afraid of the vaccine ( $p < 0.010$ ). An 18% higher prevalence of vaccination was also identified among participants who reported not having sought to clarify doubts about the vaccine ( $p < 0.010$ ). **Conclusion:** the adherence of parents and/or guardians of children under five years of age to vaccination against COVID-19 may be influenced by factors such as fear and confidence in the vaccine, in addition to sociocultural factors. **Contributions to practice:** for epidemiological surveillance, the study identifies social and behavioral factors associated with low coverage. The role of nursing in health education and in building trust with families for vaccination adherence is highlighted.

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

### RESUMO

**Objetivo:** analisar a adesão de pais e/ou responsáveis de crianças menores de cinco anos à vacinação contra COVID-19. **Métodos:** estudo transversal e analítico, realizado com pais e/ou responsáveis de crianças menores de cinco anos no Brasil, por meio de questionário eletrônico autorrespondido. As análises dos dados incluíram estatística descritiva e regressão log-binomial simples para estimar razão de prevalência. **Resultados:** participaram do estudo 397 pais e/ou responsáveis. Entre as associações observadas nas análises bivariadas, destaca-se que a adesão à vacinação contra a COVID-19 foi 50% maior entre pessoas que referiram não ter medo da vacina ( $p < 0,010$ ). Também foi identificada uma prevalência de vacinação 18% maior entre participantes que referiram não ter buscado esclarecer dúvidas sobre a vacina ( $p < 0,010$ ). **Conclusão:** a adesão de pais e/ou responsáveis por crianças menores de cinco anos à vacinação contra a COVID-19 pode sofrer influência de fatores como medo e confiança na vacina, além de fatores socioculturais. **Contribuições para a prática:** para a vigilância epidemiológica, o estudo identifica fatores sociais e comportamentais associados à baixa cobertura. Ressalta-se o papel da enfermagem na educação em saúde e na construção de confiança com as famílias para a adesão à vacinação. **Descritores:** Vacinação; Recusa de Vacinação; Criança; COVID-19.

## Introduction

Childhood vaccination is one of the fundamental pillars of public health, recognized globally for its ability to prevent infectious diseases and save millions of lives. Despite this favorable history, vaccines against coronavirus disease 2019 (COVID-19), especially those intended for children, have faced resistance, hesitancy, and questioning<sup>(1)</sup>.

In this scenario, vaccine hesitancy is understood as the delay or refusal of vaccination despite the availability of immunization services. This phenomenon is complex and multifactorial, influenced by factors such as trust in immunobiologicals, perception of disease risk, access to vaccination services, sociodemographic characteristics and sources of information<sup>(2)</sup>. This vaccine hesitancy is not a recent phenomenon, but it has intensified in the pandemic scenario, driven by a series of factors, including the fear of side effects, the dissemination of misinformation on social media, as well as cultural, religious, ideological, and political issues<sup>(3)</sup>.

The World Health Organization identified vaccine hesitancy as one of the ten biggest threats to global health in 2019, even before the COVID-19 pandemic<sup>(4)</sup>. In the context of the pandemic, the speed of vaccine development, the initial uncertainty about the duration of immunity, and the disinformation campaigns associated with digital media contributed to increasing the fear of some population groups to adhere to vaccination, especially childhood vaccination<sup>(5)</sup>.

Factors related to childhood vaccine hesitancy are also associated with the lack of trust in health institutions and the influence of incorrect information propagated by unreliable sources<sup>(6)</sup>. Research conducted in the United Kingdom during the pandemic showed that parents were more likely to hesitate or refuse childhood vaccines when exposed to anti-vaccine content on social networks<sup>(7)</sup>. This scenario is also widely observed in Brazil, where the wide dissemination of false information and the polarized debate around pandemic control measures have affected the confidence of part of the population in vaccines<sup>(8)</sup>.

Another relevant aspect that affects parents' de-

cision regarding childhood vaccination is the fear of adverse reactions, often exacerbated by alarmist reports on social media and mismatched information. This concern is reinforced when there is a lack of adequate information or when health professionals are unable to establish a clear and empathetic dialogue with parents about the benefits and risks of vaccination<sup>(3)</sup>.

Although childhood vaccination against COVID-19 is a topic discussed in the field of public health, scientific production on the knowledge and adherence of parents and/or guardians remains limited. Despite studies on vaccine hesitancy in adults and adolescents<sup>(3,6-7)</sup>, there is a lack of analyses that investigate the factors that influence the perception and understanding of parents and/or guardians of children under five years of age about the COVID-19 vaccine, making it difficult to understand the factors that can influence the adherence to vaccination of this target audience. This gap contributes to a limitation in the creation of more effective and targeted strategies, both in the field of public health and in communication with the population.

Thus, this study aims to analyze the adherence of parents and/or guardians of children under five years of age to vaccination against COVID-19.

## Methods

### Type of study

This was a cross-sectional analytical study, which followed the guidelines and recommendations of the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) initiative.

### Study setting and population

The research population was composed of parents and/or guardians of children aged six months to four years, 11 months and 29 days in Brazil who agreed to participate in the study, and the following inclusion criteria were defined: I) be at least 18 years old; II) be a father, mother and/or guardian of children

from 6 months to 4 years, 11 months and 29 days. Also, as exclusion criteria, situations were defined in which parents and/or guardians of children who have a medical contraindication to receive the vaccine against COVID-19.

### Sample definition

The sample was by convenience, defined according to the feasibility of access to the participants during the collection period. No previous calculation of the sample size was performed, considering the operational limitations for recruiting this specific audience and the exploratory nature of the investigation.

### Procedure and data collection

Data were collected through a self-administered questionnaire via Google Forms, between February and April 2024. No completed questionnaire was excluded, as it contained all the information. The instrument for data collection was adapted from the previous research questionnaire<sup>(9)</sup>. The instrument consisted of 13 closed-ended questions, the variables refer to the characterization of the participant such as gender, age and education, and specific to the theme, such as the importance of vaccinating the child against COVID-19, factors that influenced the decision, fears regarding vaccination against COVID-19, means of information and whether they received guidance on vaccination.

The research was widely disseminated by the researchers' networks and social media, such as Instagram and Facebook; in addition to dissemination to schools and daycare centers through emails and telephone numbers available on public domain pages, in addition to dissemination by regional nursing councils.

### Study variables

Demographic variables include gender, age, and education. Among the specific variables on the theme are: child vaccinated against COVID-19, refusal to vac-

inate because they think it is unnecessary, guidance on vaccination, fear regarding vaccination against COVID-19, refusal to vaccinate because they believe it is harmful, and doubts about vaccination; and the following variables accepted more than one answer: factors that influenced the decision not to vaccinate, causes of fear of vaccination, means of information to answer questions, and health professionals consulted to seek information.

### Data analysis

Initially, the data were described through absolute and percentage frequencies (qualitative variables) and centrality and dispersion measures such as mean, standard deviation, minimum, median and maximum (quantitative variables).

To analyze the relationship of the variables of interest with the act of having vaccinated the child against COVID-19 and, consequently, to estimate the crude prevalence ratio, the simple log binomial regression model was used<sup>(10)</sup>. Tukey's post-test was used for multiple comparisons involving categorical independent variables with more than two levels. A significance level of 5% was adopted. Variables with  $p < 0.05$  were considered statistically significant. All analyses were performed using SAS 9.4 software.

### Ethical aspects

All participants signed the Informed Consent Form presented on the first page of the electronic form. To proceed with the completion of the questionnaire, the participant had to tick a box of agreement, stating that he had read the ICF and that he was aware of and in agreement with the conditions of participation. Only after this confirmation did the system allow access to the questions. The study was approved by the Research Ethics Committee of the Federal University of São Carlos, opinion 6,577,587/2023, Certificate of Presentation of Ethical Appreciation number 74979223.0.0000.5504.

## Results

The study included 397 parents and/or guardians of children up to 5 years of age, with a mean age of 39.8 years and a median of 39 years, 361 (90.9%) were women and 36 (9.1%) were men. In relation to the level of education, 179 (45.1%) reported having completed higher education and 149 (37.5%) had completed high school. Regarding vaccination, 65 (16.4%) did not vaccinate their children against COVID-19 and 44 (11.1%) stated that they had not vaccinated their children because they believed it was unnecessary (Table 1).

Regarding the factors that influenced the decision to vaccinate, 48 (67.6%) of the parents and/or guardians of children influenced by news published by the media opted for vaccination. On the other hand, 7 (46.6%) of those influenced by political, religious, or ideological factors chose not to vaccinate their child against COVID-19 (Table 2).

**Table 1** – Profile of parents and/or guardians of children under 5 years of age and adherence to childhood vaccination against COVID-19 (n=397). São Carlos, SP, Brazil 2024

Variable	n (%)
Gender	
Male	36 (9.1)
Female	361 (90.9)
Education level	
Illiterate	3 (0.8)
Incomplete primary education	6 (1.5)
Complete primary education	1 (0.2)
Incomplete elementary education	1 (0.2)
Complete elementary education	4 (1.0)
Incomplete high school	12 (3.0)
Complete high school	149 (37.5)
Incomplete higher education	42 (10.6)
Complete higher education	179 (45.1)
Child vaccinated against COVID-19	
No	65 (16.4)
Yes	332 (83.6)
Did you decide not to vaccinate your child against COVID-19 because you thought it was unnecessary?	
No	353 (88.9)
Yes	44 (11.1)

**Table 2** – Association between adherence to the childhood vaccine against COVID-19 and factors that interfere in the decision of parents and/or guardians. São Carlos, SP, Brazil 2024

Variable	Child vaccinated against COVID-19		Prevalence ratio	CI (95%)*	p-value†
	No n (%)	Yes n (%)			
Complete or incomplete higher education					
No (n=176)	24 (13.6)	152 (86.3)	1.06	0.97–1.16	0.180
Yes (n=221)	41 (18.5)	180 (81.4)	ref.‡		
Factors that interfered in this decision					
Political, religious, or ideological (n=15)	7 (46.6)	8 (53.3)	0.79	0.43–1.43	0.620
Familiar (n=35)	13 (37.1)	22 (62.8)	0.93	0.65–1.33	0.880
News published by the media (n=71)	23 (32.3)	48 (67.6)	ref.		
Have you received guidance on the importance of vaccination against COVID-19?					
No (n=58)	15 (25.9)	43 (74.1)	0.87	0.74–1.02	0.080
Yes (n=339)	50 (14.7)	289 (85.2)	ref.		
Are you (or were) afraid to take your child to be vaccinated against COVID-19?					
No (n=263)	15 (5.7)	248 (94.3)	1.50	1.32–1.72	<0.010
Yes (n=134)	50 (37.3)	84 (62.6)	ref.		
Have you ever had questions about vaccination?					
No (n=97)	5 (5.1)	92 (94.8)	1.18	1.10–1.28	<0.010
Yes (n=281)	56 (19.9)	225 (80.0)	ref.		
What is the most used means to clear your doubts?					
WhatsApp groups (n=6)	1 (16.6)	5 (83.3)	0.98	0.58–1.67	0.990
Books and/or scientific articles (n=42)	16 (38.1)	26 (61.9)	0.73	0.51–1.04	0.120
Traditional media (n=8)	1 (12.5)	7 (87.5)	1.03	0.70–1.53	0.990
Official pages of technical bodies such as the Ministry of Health (n=115)	12 (10.4)	103 (89.6)	1.06	0.93–1.20	0.800
Social media (n=23)	4 (17.4)	19 (82.6)	0.98	0.73–1.30	0.990
Health services (n=203)	31 (15.3)	172 (84.7)	ref.		

\*CI: Confidence interval; †Probability of significance; ‡ref. = reference group

The results indicate that those who are not afraid of the vaccine are 50% more likely to vaccinate their children (CI: 1.32–1.72;  $p < 0.010$ ); and, parents and/or guardians who did not clarify doubts about vaccination were 18% more likely to vaccinate their child (CI: 1.10–1.28;  $p < 0.010$ ) (Table 2).

Although there was no statistically significant result (CI=0.74–1.02;  $p = 0.080$ ), there was an apparent trend in the relationship between receiving guidance from health professionals and greater possibility of vaccination. In addition, health services were the main means sought to resolve doubts (Table 2).

Among those who sought health services to answer questions ( $n = 371$ ), 160 (43.1%) sought information from nurses, 134 (36.1%) from physicians and 58 (15.6%) from nursing technicians. Regarding hesitancy to vaccinate children because they believe it is harmful, 356 (89.7%) have never stopped vaccinating for this reason. Regarding being afraid of the vaccine ( $n = 133$ ), 74 (55.6%) indicated fear of the vaccine reaction, 38 (28.6%) stated that they were afraid that it would cause diseases, and 13 (9.8%) stated that it does not produce any protective effect (Table 3).

**Table 3** – Reasons for hesitancy of parents and/or guardians to vaccinate children under five years of age. São Carlos, SP, Brazil 2024

Variable	n (%)
If you did not vaccinate your child, what factors interfered with this decision?	
Family	35 (28.9)
Ideological	12 (9.9)
News published by social media	71 (58.7)
Political	2 (1.6)
Why are you afraid of the vaccine?	
Cause diseases	38 (28.6)
Die	8 (6.0)
Does not produce any protective effect	13 (9.8)
Vaccine reaction	74 (55.6)
Have you ever decided not to vaccinate your child because you thought the vaccine was harmful?	
No	356 (89.7)
Yes	41 (10.3)
In the case of seeking health services, which professional usually seeks information?	
Community Health Agent	3 (0.8)
Nurse	160 (43.1)
Physician	134 (36.1)
Nursing technician	58 (15.6)
Other	16 (4.3)

## Discussion

It was identified that the knowledge of parents and/or guardians of children under 5 years of age about the COVID-19 vaccine may be associated with different factors, including perceptions of risk and safety of the immunobiological, which are related to fear in relation to childhood immunization. The literature suggests that parents over 40 years of age tend to have greater acceptance of vaccination of their children when compared to younger fathers, possibly due to a greater perception of the risk of complications associated with the disease<sup>(11)</sup>. In addition, a higher level of education of parents and/or guardians may be related to greater acceptance of vaccination of their children, possibly due to greater health literacy and critical capacity in the face of available information<sup>(12-13)</sup>.

In the present study, a significant number of parents and guardians consider it unnecessary to vaccinate children up to 5 years old against COVID-19. The dissemination of fake news has caused resistance among families regarding the efficacy and safety of the vaccine against COVID-19, implying a reduction in vaccine adherence. Such news is disseminated mainly on social networks and quickly disseminated, causing a distortion of reality and manipulating public opinion<sup>(9,14)</sup>.

In Brazil, until the first half of 2025, there was low vaccination coverage against COVID-19 among children under 12 years of age. Complete immunization against COVID-19 among children aged 6 months to 2 years, a group at high risk for complications, was approximately 12%<sup>(15)</sup>. This phenomenon is not limited to Brazil hesitancy in childhood vaccination against COVID-19 is a worldwide phenomenon<sup>(1)</sup>. It was found that most participants did not intend to vaccinate their children against COVID-19<sup>(16)</sup>. In general, parents and guardians are afraid and suspicious of the safety of the vaccine, mainly because of the speed with which the immunizers were developed<sup>(3)</sup>.

Thus, it is essential to transmit clear and concise information to parents and guardians, through health professionals, which is a fundamental action

to improve adherence to vaccination. One of the ways to transmit knowledge safely is through consultation with health professionals, such as Community Health Agents and nursing staff, especially in the context of the Family Health Strategy, since these professionals are closer to the enrolled population<sup>(17)</sup>.

Nurses working in Primary Health Care have assumed a fundamental role in health education actions aimed at guiding parents and guardians of children under five years of age about the vaccine against COVID-19. Thanks to the bond established with the community and the position of reference as health professionals, they became key agents for clarifying doubts and promoting vaccine adherence<sup>(18)</sup>.

This professional involvement proved to be especially relevant in view of the insecurity manifested by many family members in relation to immunizers and their possible adverse effects<sup>(14)</sup>. The pandemic context was marked by an excess of information, often contradictory, and by the speed with which new facts emerged, which contributed to increasing fear in the population. In this scenario, the accelerated development of vaccines has also generated expected fears, which, however, cannot become barriers to immunization<sup>(19-20)</sup>. Therefore, it is essential to disseminate reliable and accessible evidence-based information widely and in order to overcome such resistance and favor vaccine acceptance<sup>(1)</sup>.

However, the opposition to vaccination is not a recent phenomenon the anti-vaccine movement emerged long before the COVID-19 pandemic. In the late nineteenth and early twentieth centuries, in response to laws requiring mandatory smallpox vaccination in the United States of America and the United Kingdom, groups opposing immunization emerged. The anti-vaccine movement in the United States has strengthened throughout the twentieth and twenty-first centuries, culminating in measles outbreaks concomitant with low adherence to vaccination among children<sup>(21)</sup>.

In Brazil, the most intense anti-vaccine movement was registered in 1904, in the city of Rio de Janeiro, with a violent response from the population

to compulsory vaccination against smallpox<sup>(22)</sup>. Consequently, at the end of 1973, the National Immunization Program was created, which aimed to coordinate actions that would expand immunization for the control of vaccine-preventable diseases in the country. The program was very successful, as it achieved the eradication of poliomyelitis, the elimination of the circulation of the autochthonous rubella virus and an important reduction in vaccine-preventable diseases<sup>(23)</sup>.

However, from 2016 onwards, there has been a downward trend in measles vaccination coverage in Brazil below the 95% target, reflecting the influence of vaccine hesitancy movements. As a consequence, the country saw measles, until then considered eliminated, being reintroduced with migratory flows<sup>(24)</sup>.

This anti-vaccine movement, which has never ceased to exist, gained new momentum during the COVID-19 pandemic. In Brazil, the vaccine response was strongly influenced by the federal government's stance at the time, which minimized the severity of the pandemic, promoted risky behaviors, disseminated false information, and publicly positioned itself against vaccination<sup>(25)</sup>. The intense political polarization has exacerbated doubts and fears regarding immunizers, especially for children under 12 years old. In December 2021, the National Health Surveillance Agency authorized the vaccine for children from the age of five, however, the skeptical position adopted by the federal government generated controversy and increased the population's concerns<sup>(3,25)</sup>.

In view of the above, it is observed that parents and guardians can be guided by fears and misgivings regarding childhood vaccination against COVID-19. Despite the availability of scientific information, many chose not to immunize their children, making it difficult to expand vaccination coverage and overcome severe cases of the disease.

## Study limitations

The present study has as a limitation the low adherence of parents and/or guardians to the survey,

even though it is widely disseminated in various communication channels. The sample was also composed of a large portion of participants with complete or incomplete higher education.

In addition, it is noteworthy that the child's vaccination status was obtained by self-report by parents and/or guardians, without verification in official immunization systems, such as the National Immunization Program Information System, or upon presentation of proof of vaccination.

## Contributions to practice

The study highlights the importance of strengthening informative and educational actions to combat misinformation about childhood vaccination against COVID-19. It was evident that clear dialogue with health professionals, facing fear, and combating misinformation are essential to increase vaccine adherence.

In nursing, especially in Primary Health Care, the central role of nurses in health education, in clarifying doubts and building trust with families is highlighted. For epidemiological surveillance, the study identifies social and behavioral factors associated with low coverage, allowing for more effective communication and intervention strategies, contributing to improving childhood immunization in the country.

## Conclusion

Parents and/or guardians of children under five years of age who reported not being afraid of the vaccine and who did not clarify doubts about vaccination are more likely to vaccinate their children. The decision to vaccinate or not their children has been influenced by several factors, in addition to the scientific, such as political, ideological and religious issues and the ease of access to information widely disseminated on social networks. On the other hand, trust in health professionals, especially nursing, proved to be decisive for clarifying doubts and encouraging childhood vaccination. Thus, it is essential to strengthen

informative and educational actions aimed at combating misinformation and answering questions about childhood vaccination against COVID-19 and other diseases, in order to contribute directly to the health of the child population.

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## Authors' contributions

Conception and design or analysis and interpretation of data; Writing the manuscript or relevant critical review of the intellectual content: **Galatti BC**. Writing the manuscript or relevant critical review of the intellectual content; Agreement to be responsible for all aspects of the manuscript related to the accuracy or completeness of any part of the manuscript are investigated and resolved appropriately: **Magno GD**. Writing the manuscript or relevant critical review of the intellectual content; Final approval of the version to be published. **Cano RN, Uehara SCSA**.

## Data availability

The authors declare that the data are available in full in the body of the article.

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