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Decline in routine vaccination coverage in children during the Covid-19 pandemic from the perspective of Primary Health Care nurses

Queda da cobertura vacinal de rotina em crianças ao longo da pandemia de Covid-19 sob a percepção de enfermeiros da Atenção Primária em Saúde

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ABSTRACT

The study aimed to understand, from the perspective of nurses working in Primary Health Care, the main causes of the decline in routine vaccination coverage in children during the pandemic. This was a descriptive-qualitative study. Data collection took place in Miraíma and included seven nurses working in the five Family Health Units from July to November 2021, excluding other categories. Identifying the decline in vaccination coverage in the municipality through records from the Municipal Health Department of Miraíma, a semi-structured questionnaire was developed and administered via Google Forms®. The nurses' responses were grouped in the SWOT matrix, enabling situational strategic planning and facilitating literature search in line with their perceptions. Systematic reviews and clinical trials were examined in the Cochrane Library, Scielo, CINAHL, and PubMed, using the Mendeley reference manager. Misinformation and inequalities in Brazil contribute to vaccine hesitancy, exacerbated by the pandemic. This results in a lack of knowledge and influences attitudes towards vaccines. The themes addressed clearly allow care to be directed to the specific needs of each child, promoting innovative and scientifically based work, as well as ensuring more autonomy for nurses. More studies are needed to better understand the dynamics involved, given the complexity of the issue, and to identify effective solutions and strengthen public policies.

Keywords: child health; vaccination; coronavirus infections; primary health care.

RESUMO

A pandemia de covid-19 impulsionou os profissionais de saúde a um processo acelerado de construção de conhecimento e atualização. O estudo objetivou compreender, a partir da percepção de enfermeiros atuantes na





Atenção Primária em Saúde, quais as principais causas da queda da cobertura vacinal de rotina em crianças. Tratou-se de estudo observacional, transversal, de caráter qualitativo. A coleta de dados ocorreu em Miraíma, município cearense de pequeno porte. A população do estudo foi composta por sete enfermeiros atuantes nas cinco Unidades de Saúde da Família, no período de julho a novembro de 2021. Identificada a queda da cobertura vacinal no município, através de registros da Secretaria Municipal de Saúde de Miraíma, foi elaborado um questionário semiestruturado, aplicado via google forms®. As respostas dos enfermeiros foram agrupadas na matriz SWOT/FOFA, o que possibilitou um planejamento com base na real situação do município, viabilizando assim a busca literária em consonância com a percepção dos sujeitos ora indagados. Foi averiguado em revisões sistemáticas e ensaios clínicos na Cochrane Library, Scielo, CINAHL e PubMed. Foi utilizado o gerenciador de referências Mendeley. A desinformação e desigualdades no Brasil alimentam a hesitação vacinal, agravada pela pandemia. Isso resulta da propagação de informações imprecisas sobre vacinas, que geram conhecimento inadequado e influenciam atitudes por meio da internalização de crenças. Os enfermeiros ao perceberem a queda da cobertura vacinal, ofereceram insights cruciais sobre os desafios enfrentados na manutenção da imunização. Suas observações destacaram a necessidade de estratégias adaptativas para mitigar esses impactos.

Palavras-chave: Saúde da criança. Vacinação. Infecções por coronavírus. Atenção Primária à Saúde.

Introduction

In 2020, Brazil faced an epidemic of a systemic disease that affects the vascular and respiratory systems, discovered in 2019 and considered a pandemic by the World Health Organization (WHO). The Ministry of Health confirmed community transmission and recommended social distancing, but contagious diseases remained a concern.

There was an urgent need to combat the coronavirus and locate children with outdated health cards, ensuring the safety of immunization professionals. These initiatives had a positive impact on families, strengthening the bond between mother and child. Primary Health Care (PHC) adopts a two-way approach, involving families in the care of children, and must ensure training and effective implementation of vaccination activities. The research supported nurses in child health care, highlighting the importance of vaccination and standardizing procedures to minimize risks.

The low rate of childhood vaccination during the pandemic highlights the need for strategies to inform the population about the importance of vaccines and ensure universal access. This is crucial to prevent the resurgence of eradicated diseases, especially among vulnerable groups. Vaccination is essential to prevent diseases such as measles and polio, and guidance from health professionals is key to promoting vaccine adherence (Gomes; Andrade; Silva, 2023).



Immunization management at the state and municipal levels must guarantee training in immunization and cold chain management, ensuring the efficient execution of vaccination activities. This is essential to achieve high vaccination coverage and maintain control of vaccine-preventable diseases (Godinho; Silva; Pietrafesa, 2024).

The COVID-19 pandemic has brought unprecedented challenges to the Brazilian health system, affecting management and adherence to vaccination campaigns. There have been interruptions in services, reduced access to vaccination units and misinformation about vaccines, resulting in a drop in vaccination coverage (Oliveira *et al.*, 2024).

A collaborative approach between health, education and social care professionals is crucial in PHC to contain COVID-19 and protect the most vulnerable. The research supports measures that strengthen the actions of these professionals, ensuring effective management of health services, with an emphasis on vaccination.

2 Methodology

This was a descriptive study with a qualitative approach. Data collection took place in Miraíma, a municipality in the state of Ceará located in the Northwest Ceará Mesoregion, with a population of 14,196 inhabitants, a Human Development Index of 0.583, considered low, and a population density of 19.9 inhabitants/km² (IBGE, 2022).

The construct originated in the Graduate Program at the Federal University of Ceará, with the aim of producing and validating a quick reference guide to guide the work process focused on vaccination in early childhood, in the context of the covid-19 pandemic, the product of a Master's thesis in Women's and Children's Health.

To define the topics to be addressed, it was essential to understand the operational reality of the Family Health Units (or USF in Portuguese), especially the vaccination rooms, during this atypical period, and to identify the main challenges faced.

Seven nurses from the five USFs in Miraíma were included, making up the total population, and the other professional categories were excluded. The participants agreed to contribute to the research by signing the Informed Consent Form (ICF). Once the drop in vaccination coverage in the municipality had been identified through records held by the Miraíma Municipal Health Department, a semi-structured questionnaire was drawn up and applied to the nurses via Google Forms[®]. This instrument aimed to identify the main causes of this decline, in the perception of the professionals. The study took place from July to November 2021.



The answers were analyzed using the SWOT/FOFA matrix. Oliveira *et al.* (2021) saw it as an opportune tool for situational analysis of the processes that involve teaching-service integration, to contribute to the development of improvements in the dialogue between the actors involved and minimize conflicts and challenges. In addition, this tool can be used in other health training scenarios and programs.

When choosing the sampling method, the researcher must consider factors such as the type of research, accessibility to the population, availability of elements, desired representativeness and available resources. Purposive samples are used to understand the opinion or situation of specific individuals or services, prioritizing specificity over representativeness (Fontanella; Ricas; Turato, 2008).

To understand what the literature was saying, a broad search was carried out in books, scientific articles, dissertations and documents from bodies such as the Ministry of Health and Nursing Councils. Initially, a Google® search was made of municipalities that used nursing guides for childcare. This was followed by detailed readings of Ministry of Health manuals, including the "Primary Care Protocol: Child Health" and Primary Care Notebook No. 33 (BRASIL, 2012a), as these were the most recent.

Systematic reviews and clinical trials were carried out in the Cochrane Library, using cross-references of descriptors such as "childcare and nursing", "childcare and guidelines", "childcare and vaccine" and "vaccine and coronavirus". These cross-references were also made in the Scielo, CINAHL and PubMed databases. In the Virtual Health Library (VHL), descriptors such as "child health", "vaccination" and "coronavirus infections" were used, applying Boolean operators for searches.

After reading the material found, the most relevant and analogous studies to this research were selected, making summaries and paraphrasing the authors, creating a robust bibliographic base. The Mendeley reference manager was used to optimize the works.

Data collection and analysis was possible after approval by the Research Ethics Committee (CEP) of the Federal University of Ceará, in accordance with Opinion No. 4.864.181. Obedience to the bioethical principles of autonomy, risks and benefits, non-maleficence and protection of the research subject were considered (BRASIL, 2012b).



3 Results and discussion

The study began with an analysis of childcare consultations and identification of the demands most affected or harmed by the COVID-19 pandemic. For this stage, a bibliographic survey was carried out and relevant publications and works on the subject were consulted, in order to understand the concepts needed for the analysis and construction of the strategic planning model.

The main elements addressed in the preparation of guides for situational diagnosis are: the formation of a working group made up of experienced and technically trained professionals; analysis of the local epidemiological profile and locoregional specificities; clear definition of the objectives, target audience and nursing interventions, taking into account ethical and legal considerations and scientific evidence; structuring the material in a clear and concise manner, including elements such as flowcharts, tables and images to facilitate consultation by professionals. After drafting, it is crucial to review and validate its content, in addition to providing training to nursing teams for its effective implementation (Brasil, 2018).

Vaccination against vaccine-preventable diseases is essential to prevent spread and deaths, especially in the face of increasing cases. It is necessary to strengthen epidemiological surveillance systems and the National Immunization Program (PNI), as well as reinforcing field investigation teams. It is also essential to develop a broad communication strategy to inform health professionals and the population about the importance of vaccination, even during the pandemic, in order to achieve the goals of the NIP. (Carvalho *et al*, 2021).

Despite the universal access to childhood vaccination achieved by the PNI in the last decade, the impact of the drop in vaccination coverage has probably been greater among children from families with unfavorable socioeconomic conditions, due to lower access to health services and information (Sato, 2020).

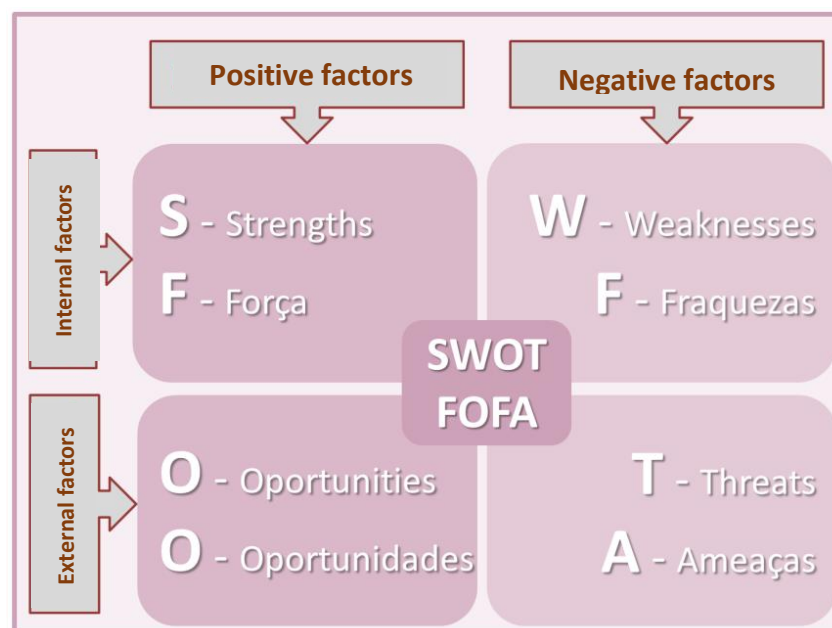
Disparities in vaccination coverage between different regions can be the result of a number of factors, such as unequal access to health services, poor infrastructure and lack of awareness about the importance of vaccination. Understanding these aspects is fundamental to designing effective strategies aimed at improving vaccination coverage in all locations. In addition, it is important to note that the pandemic may have further exacerbated these disparities in vaccination coverage between regions (Oliveira *et al.*, 2024).

As they are in direct contact with the population, it was decided that the nurses were fully competent to express in the questionnaire the real situation, from their point of view, of

vaccination coverage in each area covered by their FHU, as well as to give their opinion on the reasons why this was happening.

The answers were weighed up using the SWOT/FOFA matrix, as shown in Figure 1. This tool, widely used in the field of planning and management, facilitates the systematization and visualization of the strengths (Strengths and Opportunities) and weaknesses (Weaknesses and Threats) of a social collective, enabling the evaluation of its structure, performance and/or context, since it identifies what is proper (Strengths and Weaknesses), over which one has governability, from what is external (Opportunities and Threats), whose characteristics and particularities need to be recognized. In other words, the strengths of the human group under study are distinguished into their own Strengths and External Opportunities, and the weaknesses into their own Weaknesses and External Threats (Gomide *et al*, 2015).

Figure 1 – SWOT/ FOFA Matrix.



Source: Cruz (adapted), 2017.

It is important to note that in all stages of the NIP, the work of the nursing team, led by the nurse, plays a strategic role, from central planning to coordinating the local teams that work directly in the vaccination rooms. The team, duly trained and qualified, takes responsibility for the procedures carried out in the vaccination rooms, ranging from the handling, conservation, preparation and administration of vaccines to the proper recording and disposal of the waste generated during these activities. This team is also responsible for promoting continuing



education among its members, keeping a close eye on the population's vaccination coverage and monitoring the occurrence of adverse events (Godinho; Silva; Pietrafesa, 2024).

In this sense, by questioning the matrix that each person was able to visualize about their practice, they were also able to demonstrate whether or not these elements were more sensitive to individual, collective and/or institutional actions. Using the matrix, it was possible to identify how a certain strength could be boosted or how a certain weakness could be neutralized, depending on the working practice of the health workers, integrated with their proximity to the children's families.

Chart 1 shows the nurses' answers grouped in the SWOT/FOFA matrix; the number of times that answer was selected is shown in brackets, which made it possible to plan based on the real situation in the municipality, thus enabling the literature search to be carried out in line with the perception of the subjects being questioned. This search showed that the situation in the municipality studied was in line with many others located in the most diverse regions of the country.

Chart 1. SWOT/FOFA matrix applied to vaccination coverage in the municipality, as perceived by nurses.

	Internal (controllable) factors	External (uncontrollable) factors
Strengths	Strengths a. The willingness of parents/guardians to take their children for vaccination (3x). b. The individual perception of parents/guardians regarding the importance of vaccination (4x).	Opportunities a. The provision of free vaccines by SUS (7x). b. Fear of parents/guardians that the child will contract a vaccine-preventable disease and have to go to a hospital, a source of COVID-19 contamination (5x).
Weaknesses	Weaknesses a. Parents/guardians are unaware of the benefits of vaccines and/or the diseases they can prevent (6x). b. Parents/guardians do not feel the need for vaccines, considering them useless and unsafe (2x). c. Parents/guardians are afraid that the child will have a reaction to the vaccine (7x).	Threats a. Parents/guardians are afraid of contracting Covid-19 within the healthcare facility (5x). b. Parents/guardians are afraid of contracting Covid-19 on the way from home to the healthcare facility (5x).

Source: Survey data, 2021.

It was noteworthy that, despite the widespread dissemination of the importance of immunization in children, parents are still so unaware and uncertain about the real effectiveness



of vaccines, and how much they can prevent health problems in their children. Of course, the pandemic situation generated fear and discomfort when going to the USF, but not even the preventive behavior assumed by the professionals was enough to break this stigma.

In order to tackle parents' lack of knowledge about the benefits of vaccines, it is essential to promote educational campaigns that inform them about the importance of immunization and the diseases that can be avoided. For those who do not feel the need to be vaccinated, it is important to engage communities in discussions that highlight the safety and efficacy of vaccines, using testimonials from health professionals and the experiences of other parents.

To combat the fear of vaccine reactions, it is essential to clarify the myths and realities about possible adverse reactions, offering clear and transparent information. With regard to threats, it is necessary to guarantee security at the FHUs so that parents feel safe taking their children for vaccinations. This can include infection control measures and safety protocols. In addition, campaigns that address travel safety can help minimize the fear of contracting the disease while on the move.

When asked "what are the main causes of the drop in vaccination coverage among children aged 0 to 5 during the pandemic, according to your experience in the area where you work?", the nurses had the following options in addition to those indicated in the SWOT/FOFA matrix: Refusal for no apparent reason; Difficulty in accessing the USF (geographical and organizational barriers); Vaccination in the private network; Adherence to anti-vaccine movements; Negative and false information propagated on the internet and social media; The obligation to present the Child's Handbook for school enrollment and to keep the vaccination up to date in order to receive benefits from social programs such as Bolsa Família; The availability of parents and/or guardians to take children to vaccinate. These answers were not chosen.

Nursing, which has played a crucial role in the effectiveness of the PNI over time, applying its technical, scientific and ethical skills in its development, now faces a new challenge: vaccine hesitancy and refusal resulting from false information that seeks to undermine knowledge based on evidence and scientific methods. Given the leading role played by nurses in the program, it is essential that they base their work on the best and most recent foundations, taking into account the constant evolution of knowledge and being able to promote health education both inside and outside the USF. This implies appropriating and disseminating scientifically-based information on vaccination, adapting it to society's level of understanding (Godinho; Silva; Pietrafesa, 2024).



In Brazil, Moura *et al.* (2022) found that before the pandemic, the average childhood vaccination rate was 53.4 per 100,000. After February 2020, this rate fell to 50.4, representing a reduction of 9.4% compared to the pre-pandemic period, not reaching the targets in December 2020. In the North, vaccine delivery was below the expected ranges at the beginning of 2020, but recovered and reached the targets by the end of the year. In contrast, in the South and Southeast, initial vaccine delivery fell and remained below expected rates until the end of 2020.

In line with this, a study carried out in the United States indicated a drop in childhood vaccination coverage and delays in all age groups analyzed, compared to historical data from previous years (Brammer *et al.*, 2020). Another risk-benefit study in African countries showed that deaths preventable by routine vaccination outweigh the risk of death from COVID-19 related to going to health services for vaccination, highlighting the need to increase vaccination coverage in this period (Sato, 2020).

The role of nursing in this context should enable the adoption of health education measures (campaigns, lectures, dissemination), in addition to actively interacting with the target population. In short, measures need to be taken for comprehensive care related to immunization, especially in children and, for this, health professionals must work in an articulated and systematic way in order to intervene in the current reality seeking its improvement (Morais; Quintilio, 2021).

On the other hand, the professionals' responses led to the writing of a quick reference guide, with the aim of implementing it in vaccine rooms. Combining this information with the literature found, we discussed the main needs pointed out there. Immediately, the importance of continuing education for professionals became apparent, so that knowledge could then be multiplied in health education activities aimed at the parents and/or guardians of children.

Considerações finais

Misinformation and inequalities in Brazil contribute to vaccine hesitancy, aggravated by the COVID-19 pandemic. This results in the dissemination of inaccurate information about vaccines and affects the attitudes and knowledge of the population. There are challenges such as low vaccination coverage in some regions, lack of understanding about the importance of vaccination, operational problems and precariousness in the structure of PHC. Vaccination must be prioritized with strategies adapted to local realities.

It is essential to implement measures to mitigate the impacts of the pandemic on the NIP, such as strengthening health education, promoting home vaccination and actively seeking out



unvaccinated children. Although there are governmental efforts, more investment is needed to ensure continued protection against communicable diseases in children.

Nurses' perceptions of the drop in vaccination coverage during this period are essential to understanding the challenges in maintaining immunization. Their observations provide insights into the impacts of the health crisis on vaccination practices and highlight the need for adaptive strategies. Nurses are responsible for all stages of vaccination at USFs, from receiving vaccines to monitoring possible adverse events. Recognizing their concerns and experiences is key to developing effective approaches that promote vaccine adherence and protect public health.

It was clear that, through the topics covered, it is possible to direct nursing care towards the real needs of each child, thus contributing to innovative and scientifically based work. In addition to guaranteeing these health professionals more autonomy in their care.

More studies are needed to deepen our understanding of the dynamics involved, since the issue is complex and multifaceted, far from exhausting all the nuances and implications that still need to be explored. Further research can help identify effective solutions and form robust public policies.

REFERÊNCIAS

BRAMER, C. A. *et al.* Decline in child vaccination coverage during the COVID-19 pandemic: Michigan Care Improvement Registry, May 2016-May 2020. *MMWR: Morb Mortal Wkly Rep*, v. 69, n. 20, p. 630-631, 2020. DOI: 10.15585/mmwr.mm6920e1. Available from: <https://pubmed.ncbi.nlm.nih.gov/32437340/>. Cited: 16 jul 2024.

BRASIL. Conselho Federal de Enfermagem. **Diretrizes para elaboração de protocolos de Enfermagem na atenção primária à saúde pelos Conselhos Regionais**. Brasília: COFEN, 2018.

BRASIL. Conselho Nacional de Saúde. **Resolução CNS nº 466, de 12 de dezembro de 2012**. Diário Oficial da União. 12 dez. 2012.

BRASIL. Ministério da Saúde. **Protocolos da atenção básica: saúde da criança**. Brasília: Ministério da Saúde, 2016.

BRASIL. Ministério da Saúde. **Saúde da criança: crescimento e desenvolvimento**. Brasília: Ministério da Saúde, Cadernos de Atenção Básica nº 33, 2012.

CARVALHO, W. R. I. *et al.* Impacto na baixa vacinação contra o sarampo no cenário da pandemia de COVID-19 no Brasil. *Braz. J. Infect. Dis.* [online], 2021. DOI: 10.1016/j.bjid.2020.101529. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7936791/>. Cited: 11 jun 2024.



CRUZ, T. **Manual de planejamento estratégico**: ferramentas para desenvolver, executar e aplicar. São Paulo: Atlas, 2017.

FONTANELLA, B. J. B.; RICAS, J.; TURATO, E. R. Amostragem por saturação em pesquisas qualitativas em saúde: contribuições teóricas. **Cad. Saúde Pública**, Rio de Janeiro, v. 24, n. 1, p. 17-27, jan. 2008. DOI: 10.1590/S0102-311X2008000100003. Available from: <https://search.bvsalud.org/gim/resource/pt/lil-471806>. Cited: 15 jan 2024.

GODINHO, M. L. S. C.; SILVA, S. A.; PIETRAFESA, G. A. B. Nursing as a player in tackling vaccine hesitancy and refusal. **Rev. Bras. Enferm.** [Internet], v. 77, e77suppl101, 2024. DOI: 10.1590/0034-7167.202477suppl101article/view/1084. Available from: <https://pubmed.ncbi.nlm.nih.gov/38477718/>. Cited: 11 jun 2024.

GOMES, C. F.; ANDRADE, L. G.; SILVA, M. S. Vacinação infantil - Implicações da queda na cobertura vacinal infantil em Nova Iguaçu. **Ver. Ibero-Am. Hum. Ciên. Educ.**, São Paulo, v. 9, n. 10, p. 1902-1917, 2023. DOI: 10.51891/rease.v9i10.11605. Available from: <https://periodicorease.pro.br/rease/article/view/11605/5353>. Cited: 11 jun 2024.

GOMIDE, M. *et al.* Fortalezas, Oportunidades, Fraquezas e Ameaças (Matriz FOFA) de uma Comunidade Ribeirinha Sul-Amazônica na perspectiva da Análise de Redes Sociais: aportes para a Atenção Básica à Saúde. **Cad. Saúde Colet.**, Rio de Janeiro, v. 23, n. 3, p. 222-230, 2015. DOI: 10.1590/1414-462X201500030089. Available from: <https://doi.org/10.1590/1414-462X201500030089>. Cited: 12 mai 2024.

Instituto Brasileiro de Geografia e Estatística. **Perfil dos municípios brasileiros**. Rio de Janeiro: IBGE, 2023; v4.6.68. Available from: <https://cidades.ibge.gov.br/brasil/rj/rio-de-janeiro/pesquisa/1>.

MORAIS, J. N.; QUINTILIO, M. S. V. Fatores que levam à baixa cobertura vacinal de crianças e o papel da enfermagem: Revisão Literária. **Interfaces**, Botucatu, v. 9, n. 2, p. DOI: 1054-1063, 2021. Available from: <http://dx.doi.org/10.16891/2317-434X.v9.e2.a2021.pp1054-1063>. Cited: 15 jan 2024.

MOURA, C. *et al.* The impact of COVID-19 on routine pediatric vaccination delivery in Brazil. **Vaccine**, online, v. 40, n. 15, p. 2292–2298, 2022. DOI: 10.1016/j.vaccine.2022.02.076. Available from: <https://pubmed.ncbi.nlm.nih.gov/35287987/>. Cited: 16 jul 2024.

OLIVEIRA, A. M. F. *et al.* Análise da integração ensino-serviço para a formação de residentes em medicina de família e comunidade. **Rev. Bras. Educ. Méd.** [online], v. 45, n. 01, 2021. DOI: 10.1590/1981-5271v45.1-20200326. Available from: <https://doi.org/10.1590/1981-5271v45.1-20200326>. Cited: 08 nov 2023.

OLIVEIRA, J. M. S. *et al.* Estudo epidemiológico da cobertura vacinal contra o sarampo em menores de 01 ano pós pandemia do Covid-19 no Brasil e sua correlação com o ressurgimento dos casos de sarampo. **Rev. JRG Estud Acad.**, [online], v. 7, n. 14, 2024. DOI:10.55892/jrg.v7i14.1084. Available from: <https://revistajrg.com/index.php/jrg/article/view/1084>. Cited: 12 jun. 2024.



SATO, A. P. S. Pandemic and vaccine coverage: challenges of returning to schools. **Rev. Saúde Pública**, São Paulo, v. 54, p. 115, 2020. DOI: 10.11606/s1518-8787.2020054003142. Available from: <https://rsp.fsp.usp.br/artigo/pandemia-e-coberturas-vacinais-desafios-para-o-retorno-as-escolas/>. Cited: 16 jul 2024.

WERNECK, G. L.; CARVALHO, M. SÁ. A pandemia de COVID-19 no Brasil: crônica de uma crise sanitária anunciada. **Cad. Saúde Pública**, Rio de Janeiro, v. 36, n. 5, 2020. DOI: 10.1590/0102-311X00068820. Available from: <https://doi.org/10.1590/0102-311X00068820>. Cited: 15 mai 2024.

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