ABSTRACT

Objective: to synthesize current information on the impact of Coronavirus infections on children's health. Method: this is a mixed, descriptive, informative study in which the theme was reviewed in order to answer: “What is the magnitude of this pandemic? What are the characteristics of COVID-19 in children? What are the measures to reduce the impact?”. Results: it is reported that, in Brazil, as of July 5, 2020, there were 106,523 confirmed cases and 429 deaths among children and adolescents and the states with the most deaths were: Amazonas, São Paulo and Pará. It is revealed that the symptoms that differ from the usual respiratory infections are: headache, loss of taste and/or smell. It is added that the measures to reduce the damages include: social distancing; access to health services; drinking water; housing; food; vaccination; availability of financial aid and information. Conclusion: it is concluded that children's health will be influenced during and after the pandemic, whose impact can be minimized by planning public health actions.

Descriptors: Epidemiology; Coronavirus infections; Public Health; Children's Health; Pandemics; Information.

RESUMO

Objetivo: sintetizar informações atuais sobre o impacto das infecções por Coronavírus na saúde da criança. Método: trata-se de um estudo misto, descritivo, tipo informativo, no qual se revisou o tema de modo a responder: “Qual a magnitude desta pandemia? Quais as características da COVID-19 em crianças? Quais medidas para reduzir o impacto?”. Resultados: informa-se que, no Brasil, até 05 de julho de 2020, havia 106.523 casos confirmados e 429 óbitos entre crianças e adolescentes e os Estados com mais mortes foram: Amazonas, São Paulo e Pará. Revela-se que os sintomas que diferem das infecções respiratórias habituais são: dor de cabeça, perda de paladar e/ou olfato. Acrescenta-se que as medidas para reduzir os danos incluem: distanciamento social; acesso a serviços de saúde; água potável; moradia; alimentação; vacinação; disponibilização de auxílio financeiro e informação. Conclusão: conclui-se que a saúde das crianças será influenciada
durante e após a pandemia, cujo impacto poderá ser minimizado pelo planejamento de ações de saúde pública.

**Descritores:** Epidemiologia; Infecções por Coronavírus; Saúde Pública; Saúde da Criança; Pandemias; Informação.

**RESUMEN**

**Objetivo:** sintetizar información actual sobre el impacto de las infecciones por Coronavirus en la salud infantil. **Método:** es un estudio mixto, descriptivo e informativo, en el que se revisó el tema para responder: “¿Qué tan grande es esta pandemia? ¿Cuáles son las características del COVID-19 en los niños? ¿Qué medidas para reducir el impacto?”. **Resultados:** se informa que, en Brasil, hasta el 5 de julio de 2020, hubo 106.523 casos confirmados y 429 muertes entre niños y adolescentes y los estados con más muertes fueron: Amazonas, São Paulo y Pará. Se revela que los síntomas que se diferencian de las infecciones respiratorias habituales son: dolor de cabeza, pérdida del gusto y / o del olfato. Se agrega que las medidas para reducir los daños incluyen: distancia social; acceso a los servicios de salud; el agua potable; hogar; alimentación; vacunación; prestación de asistencia financiera e información. **Conclusión:** se concluye que la salud de los niños se verá influida durante y después de la pandemia, cuyo impacto se puede minimizar mediante la planificación de acciones de salud pública.

**Descritores:** Epidemiología; Infecciones por Coronavirus; Salud Pública; Salud del Niño; Pandemias; Información.

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**INTRODUCTION**

A new pandemic is known to have recently emerged and in February 2020 the World Health Organization (WHO) decreed a Public Health Emergency of International Importance, naming the SARS-CoV-2 virus and COVID-19 disease as the first cases identified in China in December 2019.
The first confirmed case of the new Coronavirus (COVID-19) occurred in Brazil on February 26, 2020 and, according to WHO, the cases in the country grew exponentially from March 23, causing numerous deaths whose underreporting cannot be precise.\textsuperscript{2} It is detailed that the official registration of the first death of a child in Brazilian territory by COVID-19 took place on April 7, in the city of Natal, Rio Grande do Norte: a newborn male.\textsuperscript{3}

There were approximately 11,301,850 confirmed cases and 531,806 deaths by the new Coronavirus by July 6, 2020. Brazil, in relation to the number of confirmed cases, is in the second position, with 1,577,004 confirmed cases and 64,265 deaths.\textsuperscript{4}

It is warned that this scenario may not reflect all cases, since information systems have gaps in information transfer and population stratification in relation to age. The health reports indicate that the adult and elderly population, with obesity, diabetes, cardiovascular disease and respiratory disease, is the most affected by the severe form of the disease, and the child population is indicated with a reduced rate of confirmed cases and deaths.\textsuperscript{2}

It is noticeable that most children infected with the virus occurred after contact with a family member positive for the pathology, and the average incubation period is five days\textsuperscript{5} and, in relation to the clinical spectrum, varies from asymptomatic to severe cases. Symptoms include prodromal fever, dry cough, malaise, and diarrhea, which are non-specific. It is therefore difficult to differentiate between common flu syndromes in childhood and COVID-19 infection only by signs and symptoms.\textsuperscript{6}

Children's health is influenced by social, emotional, economic, relational and physiological issues, among others, in a special phase of life in which individuals are in franc growth and development. It is considered that, besides absolute numbers of confirmed cases and deaths, the analysis of the impact of this pandemic is necessary for the planning of actions that contemplate integral care.

This scenario will reflect additional challenges in the health of children for an undetermined period of time, especially for those who are more vulnerable to socioeconomic and chronic diseases.

It is believed, therefore, that paying attention to the behavior of this pandemic seems to be essential to minimize the spread of the virus and to elaborate coping strategies based on actions recommended by national and international scientific agencies.

**OBJECTIVE**

To synthesize current information on the impact of Coronavirus infections on children's health.

**METHOD**
This is a mixed, descriptive, informative type study based on publications on the impact of COVID-19 on the health of Brazilian children. In order to do so, we sought to answer the following research questions: “What is the magnitude of this pandemic in the child population? What are the characteristics of COVID-19 in children? What measures deserve to be rethought to reduce the health impacts on children?”.  

From May to July 2020, the bibliographic search for relevant publications on the epidemiology of cases was carried out, in addition to national and global actions in terms of prevention, health promotion and diagnosis at this atypical and calamitous time of public health services.

Among the documents, the majority of the recommendations published by the World Health Organization (WHO) and the Brazilian Society of Pediatrics (BSP) were used as basis. In addition, the Health Secretariats of each Brazilian federative unit were listed as data source for epidemiological analysis.

**RESULTS**

Magnitude of the COVID-19 pandemic in the population of children and adolescents in Brazil

According to the data presented by the State Health Departments of the 27 Federative Units of Brazil, 106,523 confirmed cases of the new Coronavirus among young people aged 0-19 years, until July 5, 2020 (Figure 1), and in the State of Pernambuco, of the 1,545 patients <10 years of age who tested positive for the virus, 316 evolved to Severe Acute Respiratory Syndrome (SARS) and 1,229 presented the mild configuration of the disease. 

Total No. of cases (0-19 years)  
**106,523**
It is revealed that, among the states that presented the largest number of confirmed cases in children and adolescents in the country, are: São Paulo (16,900/15.87%); Amazonas (13,746/12.90%); Ceará (9,053/8.50%); Pará (8,723/8.19%) and Bahia (6,707/6.30%). It became possible, in the State of Paraíba and in the Federal District, to analyze the number of confirmed cases of COVID-19 between 0-19 years, in relation to the total number of confirmed cases, until July 3rd.

A total of 429 deaths were confirmed in Brazil, among children and adolescents, with prevalence for the following states: Amazonas (58); São Paulo (57); Pará (49); Ceará (39) and Pernambuco (39) (Table 1).

Table 1. Distribution of deaths by COVID-19 among children and adolescents from zero to 19 years in Brazil, according to the Federative Unit. Natal (RN), Brazil, 2020.
Of the 429 cases of deaths, 213 were from patients aged < 10 years and 180 were from patients aged 10-19 years (Table 1). In the states of Amapá, Rondônia and Sergipe, two, 12 and 22 cases of evolution to death were reported by the Health Secretariats, respectively; however, in these states the age classification differs from that recommended by the WHO (children: <10 years; adolescents: 10-19 years), which did not allow the categorization of these cases in the model proposed by the study, according to the other states.\textsuperscript{15-7}

It is warned that in Rio Grande do Norte, the state where the first death of a child by COVID-19 was recorded in Brazil, there were ten deaths, of which two were a newborn male without comorbidities and a girl under two years with comorbidities.\textsuperscript{18} The São Paulo government informed that of the 57 patients who died of SARS, 43 (twenty children and twenty-three adolescents) presented some associated risk factor.\textsuperscript{8}

It is noteworthy that in Ceará, there were 3,496 confirmed cases in children under ten years of age and, of these, 2,016 patients were up to four years old.\textsuperscript{10} Considering the national absolute frequency, it is noticeable that Acre (0.33%), Amapá (0.44%), Mato Grosso do Sul (0.74%), Rio Grande do Sul (1.25%) and Tocantins (1.27%) were the Federative Units with the lowest number of confirmed cases of the new Coronavirus in children and adolescents.\textsuperscript{15,18-21}

The Acre Health Department presented inconsistency between the data presented, since in the same site there were different counts for the same category, as well as, due to the presentation of the data, it was possible to include, in this study, only confirmed patients who comprised the age group between zero and 14 years old,\textsuperscript{19} while, in the State of São Paulo, despite the updated data, the numbers of confirmed cases by age group could only be evaluated approximately by means of estimates, since they were presented in graph format without specific values by age.\textsuperscript{8}

This demonstrates the difficulty of following the advance of the pandemic in the child population in a more reliable way, as well as, at the national level, it was not described if there were and which comorbidities were associated to the cases of death in this age group.

Characteristics of COVID-19 in children

It is known that the symptoms in children, as well as in adults, appear between the 2nd and 14th day after infection. The symptoms vary from mild to more severe cases, being more common cough

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and breathing difficulty; but, the presence of fever, headache, chills, repeated agitation with chills, muscle pain, sore throat and loss of taste or smell may also appear. In patients with comorbidities, pneumonia and other more serious illnesses can occur, which can trigger death.\textsuperscript{34-5}

The differential diagnosis is based on the analysis of laboratory and radiological data, the main test for the diagnosis of infections by COVID-19 being the real time polymerase chain reaction (PCR-RT) of upper or lower airway secretion. This method was recommended for the identification of cases after the discovery of the genetic sequencing of the virus, because the diagnosis is made by the analysis of RNA.\textsuperscript{6}

However, according to WHO guidelines, chest radiography and computed tomography (CT) are the main diagnostic components,\textsuperscript{36} and diagnosis is essential to know the frequency of cases in the population and plan health actions.

Therefore, professionals should be aware of the main differences observed in the radiological manifestations of several etiological agents of respiratory disease in childhood, such as low-density infiltrates, frosted glass appearance and halo lesions present in COVID-19, which are uncommon in etiological groups of other flu syndromes such as adenovirus, influenza and atypical pneumonias. It is noteworthy that high density infiltrates, peri-bronchial thickening and sub-pleural lesions, which are typical of adenovirus and influenza, were not observed in cases of COVID-19.\textsuperscript{37}

\textbf{DISCUSSION}

The National Center for Health Statistics (NCHS) assessed that, as of July 1, there were approximately 58 deaths in patients aged 5-14 years in the United States,\textsuperscript{38} while in Brazil, in children aged <10 years, approximately 213 deaths were recorded.\textsuperscript{7-33} It is pointed out that a hypothesis to be addressed in the next studies concerns the analysis of the presence or absence of comorbidities or underlying diseases in patients who have evolved to the severe form of the disease and death.

This situation highlights a possible difficulty in the process of notification of cases. It is believed that due to the mild manifestations of the pathology and its non-inclusion among risk groups, for children, there is less availability for testing and a consequent underreporting.

This scenario is worrying, since recognizing the real magnitude of the pandemic is essential to plan public health actions; also, not knowing that the child population has a risk of becoming infected and dying may represent a difficulty in adhering to protective measures against COVID-19, due to the lack of understanding about the seriousness of the problem for all age groups. The number of confirmed cases and future deaths is directly affected by the population's behavior.
Some studies have pointed out that the development of the pathology in children has a lower incidence because the immune system is less developed with respect to the inflammatory response and, moreover, that the ACE2 receptors are not mature to have the recognition of the virus, thus making its invasion difficult.\textsuperscript{37}

It is pointed out that, although the studies present data proving the low severity of pediatric cases, most of which are classified as mild, children have the same probability of contagion as adults and newborn children presented a greater vulnerability to infection, however, there are no statistical data proving significant differences for the predisposition to the disease among female or male children.\textsuperscript{34}

**Recommendations to minimize the impact of COVID-19 on children’s health**

It is known that the impacts of COVID-19 on children's lives go beyond infection. At the same time, they face serious problems in access and quality of health and education services, and are the guideline for projects such as the 17 Sustainable Development Goals established by the United Nations.\textsuperscript{39}

In the face of the current pandemic, priority was given to actions to prevent the rapid spread. Among the countries that have adopted rigorous forms of prevention, India stands out, which, despite its population contingent, remains among the lowest rates of confirmed cases and deaths. The virus transmission rate in the country was severely controlled, with a reduction from 2.3 people to less than 0.2 after lockdown and social isolation measures.\textsuperscript{40}

These measures appear to be the safest to slow the spread of the disease, however, the economic crisis will be a legacy of the pandemic and it is believed that some 46 million children will enter the extreme poverty group, with a substantial increase in child malnutrition, child and youth vulnerability in detention institutions and places of conflict, and an increased risk of children witnessing or suffering violence and abuse.\textsuperscript{41}

The United Nations Children's Fund (UNICEF) has established immediate actions to control child mortality, including guaranteeing basic hygiene conditions with water distribution. The concern with the abrupt closure of schools was also highlighted, considering that these institutions represent the place that provides learning and access to food to millions of children.\textsuperscript{41-2}

Government measures of economic support become indispensable to ensure that families have basic living conditions met, such as emergency decrees for the release of cash amounts to vulnerable families.\textsuperscript{43}

It is informed that, in Brazil, besides the provision of emergency financial aid for informal workers, the unemployed and people with monthly income of up to half minimum wage, or three minimum wages per family, the government has also been working on the creation of provisional
measures to help the population financially, such as the early release of the Severance Premium Reserve Fund (FGTS).⁴⁴

It is recommended that, in addition to financial measures, other basic measures be adopted, such as food, water, basic sanitation, housing and health services, these being the main steps for health promotion and disease prevention actions to be perpetuated during and after the pandemic.⁴⁵

With regard to violence prevention, the importance of producing preventive material and advertising campaigns aimed at children is considered, with the purpose of ensuring care in institutions for denunciation, agility in judgment and support to institutions that offer psychological, social, legal and health care and counseling.⁴⁶

On the main measure of isolation that directly affected the routine of children in Brazil, in March 2020, the state governors began to publish ordinances for the suspension of school activities, with the justification of avoiding agglomeration, which impacts the teaching-learning of 80% of children around the world, reflecting on their lives in a negative way, since they affect social coexistence and can trigger problems involving physical and mental wellbeing.⁴²,⁴⁷-⁸

It is pointed out that the forms of education have gone through adaptations, being necessary the digital medium as a form of propagation of knowledge, however, not all children have access to quality internet and computer, increasing the gap of social inequalities existing in the country.⁴²

In view of the public health emergency situation and in order to avoid overcrowding of hospitals, as well as to reduce the risk of contamination of the population by the health services, telecare is sought. It is expected, in Brazil, with this service, to identify suspect patients, through the analysis of symptoms presented, meet their demands via telephone or internet, sensitize them to the isolation of other relatives and request testing, if necessary; however, only families with access to telephone line, fixed or mobile, are contemplated.⁴⁹-⁵⁰

It should be noted that the recommended social distance, combined with the suspension of classes, tends to decrease the frequency of children in Primary Health Care, which can result in a decrease in vaccination coverage, putting the health of the entire population at risk, especially for cases of measles, yellow fever and pertussis.⁵¹

It is also considered that the problem with children's health is not of today and does not occur only in Brazil, because before the COVID-19 pandemic, about 20 million children under one year of age were without access to many vaccines, such as measles and polio; and more than 13 million children in the world, in this same age group, did not receive any vaccine in 2018.⁵²

UNICEF, the Brazilian Society of Pediatrics (BSP) and the Brazilian Society of Immunization (BSIm) recommended that vaccination should be maintained on a regular basis, encouraging the updating
of the vaccination calendar, since there is no evidence of interaction between the new Coronavirus and the immune response to vaccines.\textsuperscript{51}

However, it is oriented to the optimization of the calendar, in which, in each meeting, the largest number of vaccines is applied, following the minimum recommended doses and intervals, aiming to decrease the number of visits to the Basic Health Unit.\textsuperscript{53,54}

It is also encouraged to look for the nearest Health Units and at times with less agglomeration, and different timetables are recommended among the age groups. It is also recommended to encourage the use of spaces such as churches, schools and clubs for vaccination.

However, during this period, home vaccination should be promoted whenever possible. Remember that if the child is a suspect or confirmed case of COVID-19, or still has respiratory symptoms or fever, she can only be vaccinated after 14 days from the resolution of symptoms. \textsuperscript{51}

It is pointed out that general preventive measures indicated for children are not different from those indicated for adults. It is necessary, with the child audience, only to have a simple and adequate language so that they can understand the reason for the preventive measures. \textsuperscript{55}

It is important to note that the necessary measures to prevent children from being infected or being transmission vehicles are to wash their hands frequently, with soap and water, and when it is not possible to use alcohol-based hand disinfectant, especially when there is contact with other people; avoid touching your eyes, mouth and nose with dirty hands; cover your mouth when coughing or sneezing; stay away from symptomatic people and wear the mask when you need to leave home.\textsuperscript{56}

\textbf{CONCLUSION}

It is understood that the magnitude of this pandemic in the child population, in Brazilian territory, is a reason for warning, since there are an increasing number of confirmed cases and deaths among children. It has been shown, in view of the above, that the impact of COVID-19 on children's health will go beyond strictly physiological issues.

It is necessary to rethink public health strategies in order to guarantee integral care: slowing down the transmission of the virus, disseminating information in adequate language and access to basic living conditions, such as health services, drinking water, vaccination, housing, minimum income for families, prevention and intervention in cases of violence.

Finally, it is important to point out that attention to the behavior of this pandemic in the child population is essential to slow down the spread of the virus and to elaborate coping strategies based on actions recommended by national and international scientific bodies.

\textbf{CONTRIBUTIONS}
It is informed that all authors contributed equally in the conception of the research project, collection, analysis and discussion of the data, as well as in the writing and critical review of the content with intellectual contribution and in the approval of the final version of the study.

CONFLICT OF INTERESTS

No conflict of interests.

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