Pulmonary consequences of Covid-19 in children: A literature review

Consequências pulmonares da Covid-19 em crianças: Uma revisão da literature

Maria Eduarda Valerio Costa
Undergraduate student of the Medicine Course, UNAERP-SP

Eloisa Maria Gatti Regueiro
Professor of the Medicine Course, UNAERP-SP
Professor of the Physiotherapy Course, CBM-SP

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1 INTRODUCTION

The COVID-19 pandemic, initially declared by the World Health Organization (WHO) as a State of Public Health Emergency of International Concern and later as a pandemic scenario, was responsible for the death and infection of millions of people. Just over three years, the end of the State of International Emergency was declared, May 5, 2023; however, the systemic consequences of the disease, are still present. The identification and sequencing of the virus responsible for COVID-19 was done by Chinese groups who named it Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). A novel coronavirus was determined that shared high sequence identity with the bat-derived SARS coronavirus, suggesting a zoonotic origin. In Brazil, the first announcement published by the WHO was made on March 11, 2020, in order to clarify to the population that the epidemic that started in Asia had reached pandemic proportions. The ranking of countries with the highest mortality rate from COVID-19 was led by the United States, with Brazil in 5th place. The first cases of COVID-19 in children were reported at the Shanghai Children's Medical Center in China in March 2020.

Regarding the epidemiological contingency, studies with the target audience in the child population were carried out during the period when schools were closed and minors were in home confinement; in this context, it was evidenced that the potential incidence of COVID-19 infection in children was high, as in adults, although the intrinsic transmissibility among children was lower. Although children and adolescents were less affected by the pandemic compared to adults, the adoption of social isolation measures reached the child and adolescent population and impacted mainly those living in

vulnerable situations. The overall lethality was 0.3%, but more concentrated in children under 5 years old.

The most severe forms of the disease did not affect most children; however, the number of hospitalizations for COVID-19 followed the pattern seen in adults. Although they were less likely to develop severe complications, children developed sequelae that, in some cases, led to death. The risk factors for the development of these sequelae post-COVID are the same as in adults (obesity, hypertension, diabetes); however, with regard to pulmonary complications, the rates, in the long term, may become higher, due to the incomplete development of the lungs up to the age of 10. Such complications are considered part of respiratory impairment, which accounts for about 16% of symptoms in this age group.

It is known that the main system of the human body affected by the virus is the respiratory system, both in adults and in children. In these, the involvement can be exemplified by SARS-CoV-2 pneumonia and multisystem inflammatory syndrome (MIS), causing cardiac and cardiorespiratory lesions. Both are related to childhood lung involvement. Previous studies have defined MIS cases according to diagnostic certainty levels, within four different groups, as definite, probable, possible and cases with insufficient evidence. In these cases, children are cited with the initial criterion of being younger than 21 years.

In this context, it is worth mentioning that COVID-19 has affected a large number of children and has brought respiratory sequelae that must be treated continuously and in a multidisciplinary manner. Among the proposals for non-drug treatment for this population, is the practice of physical exercises, in order to improve cardiorespiratory conditioning, justifying this review.

2 OBJECTIVE

To verify, through a literature review, the evidence on the practice of physical exercise for children who have been affected by COVID-19 and have lung involvement.

3 METHODOLOGY

This is a literature review, developed with articles published from 2019 to 2023 in the electronic databases: SciELO, Periódico CAPES and PubMed, using the descriptors: COVID-19, children, pulmonary impairment, post-COVID complications and their respective synonyms, in Portuguese and English. Only scientific articles and

published reviews were included, which dealt with the topic and were available in full, *online*. Articles outside the proposed period, not dealing with the topic, not available *online*, case studies and repeated articles found in different databases were excluded.

4 DEVELOPMENT

Most of the publications on the practice of physical exercise in children affected by COVID-19 are integrative reviews and do not specifically report on pulmonary disorders and the practice of programs such as pulmonary rehabilitation (PR). Dong *et al*. (2020) report cases of hospitalization in children, but not intervention. Siddiqi *et al*. (2020) proposed a stage classification system for symptomatic COVID-19 disease, including increasing severity corresponding to different clinical manifestations, response to treatment and clinical course. Children who were affected by the third stage should undergo the PR program. This condition has an indication for PR, in an individualized and gradual way, aiming to mitigate and / or reverse the consequences of the disease; in addition, due to the multisystemic impairment caused by COVID-19, a multidisciplinary team should conduct rehabilitation.

5 FINAL CONSIDERATIONS

It is known that COVID-19 has affected adults and children, bringing respiratory sequelae that must be treated continuously; however, there are few reports in the literature on lung involvement in the child population, as well as non-drug treatment. Thus, it is considered that this finding should be better investigated by a multiprofessional and multidisciplinary team, in order to enable a specific physical training program.

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