

# SARS-CoV-2 in pediatrics: an analysis of hospitalized patients with suspected COVID-19 in a hospital in the interior of Minas Gerais

*SARS-CoV-2 em pediatria: uma análise dos pacientes internados com suspeita de COVID-19 em um hospital do interior de Minas Gerais*

Camile Rabello Netto Gribel<sup>1</sup>, Navarro Santos Gribel<sup>2</sup>, Luara Isabela dos Santos<sup>1</sup>

## ABSTRACT

**Objective:** To analyze the main signs and symptoms, length of stay in the hospital, diagnoses found and clinical outcome of hospitalizations in pediatric patients with suspected COVID-19 in 2021. **Methods:** Retrospective descriptive observational study based on the medical records of patients with symptoms suggestive of COVID-19 between zero and 13 years incomplete, in 2021, who required hospitalization in an infirmary in a secondary care hospital, public/private, in the interior of Minas Gerais (MG). **Results:** In the 116 suspected pediatric patients evaluated, the clinical presentation was mostly with fever (70.7%), breathing difficulties (57.1%), cough (55.6%) and gastrointestinal symptoms (51.8%). Due to good clinical evolution, the median number of days the patients remained hospitalized was three days (2,0-4,0), and were discharged after clinical improvement with the recommendation of home isolation. Regarding the outcome of hospitalization, 92.5% of 116 patients evolved with improved discharge. Despite the suspicion of COVID-19, 93.2% of 116 patients tested negative and were diagnosed with other pathologies such as bronchiolitis (18%), asthma exacerbation crisis (18%), gastroenteritis (15%) and community pneumonia (12.8%). **Conclusion:** Our data showed that although a similar clinic, there was a higher prevalence of other pathologies to the detriment of COVID-19 in pediatric patients hospitalized in the hospital of interior of MG in 2021.

**Keywords:** COVID-19; Respiratory tract infections; Pediatrics; Length of stay; Patient isolation.

<sup>1</sup> Faculdade Ciências Médicas de Minas Gerais (FCM-MG), Belo Horizonte, Minas Gerais, Brazil.

<sup>2</sup> Universidade Federal de Ouro Preto (UFOP), Ouro Preto, Minas Gerais, Brazil.

### Associate Editor Responsible:

Dr. Cassio Ibiapina  
Faculdade de Medicina da  
Universidade Federal de Minas Gerais.  
Belo Horizonte/MG, Brazil.

### Corresponding Author:

Camile Rabello Netto Gribel  
Faculdade Ciências Médicas de Minas  
Gerais (FCM-MG)  
E-mail: camilegribel@gmail.com  
Luara Isabela dos Santos  
Faculdade Ciências Médicas de Minas  
Gerais (FCM-MG)  
E-mail: luara.santos@cienciasmedicasmg.  
edu.br

### Conflict of Interest:

The authors declare that there are no conflicts of interest

### Funding source:

This research project received support from the Fundação de Amparo à Pesquisa do Estado de Minas Gerais (FAPEMIG) through the granting of a scientific initiation scholarship from the Programa Institucional de Bolsas de Iniciação Científica (PIBIC) of the Faculdade Ciências Médicas de Minas Gerais (FCM-MG).

## RESUMO

**Objetivos:** Analisar os principais sinais e sintomas, tempo de permanência em internação hospitalar, diagnósticos encontrados e desfecho clínico das hospitalizações em pacientes pediátricos com suspeita de COVID-19 no ano de 2021. **Métodos:** Estudo observacional descritivo retrospectivo com base nos prontuários médicos dos pacientes com sintomas sugestivos de COVID-19 entre zero e 13 anos incompletos, no ano de 2021, que necessitaram de internação em regime de enfermagem em hospital de atenção secundária, público/ privado, do interior de Minas Gerais/MG. **Resultados:** Nos 116 pacientes pediátricos suspeitos avaliados, a apresentação clínica, em sua maioria, foi de quadros com febre (70,7%), dificuldade respiratória (57,1%), tosse (55,6%) e sintomas gastrointestinais (51,8%). Mediante boa evolução clínica, a mediana de dias que os pacientes permaneceram internados foi de três dias (2,0-4,0), recebendo alta após melhora clínica com recomendação de isolamento domiciliar. Em relação ao desfecho da internação, 92,5% dos 116 pacientes evoluíram com alta melhorada. Apesar da suspeita de COVID-19, 93,2% dos 116 pacientes testaram negativo, sendo diagnosticados com outras patologias como bronquiolite (18%), crise de exacerbação asmática (18%), gastroenterites (15%) e pneumonia comunitária (12,8%). **Conclusão:** Nossos dados demonstraram que apesar de clínica semelhante, houve maior prevalência de outras patologias em detrimento da COVID-19 nos pacientes pediátricos internados no hospital do interior de MG em 2021.

**Palavras-chave:** COVID-19; Infecções respiratórias; Pediatria; Tempo de internação; Isolamento de pacientes.

## Opinion number:

4.894.549

Received on: May 22, 2023.

Approved on: October 14, 2023.

Publication Date: April 02, 2024.

DOI: 10.5935/2238-3182.2024e34102-en

## INTRODUCTION

Faced with the COVID-19 pandemic, announced in March 2020, health institutions needed to organize themselves to care for suspected and confirmed patients by SARS-CoV-2 in a safe way to prevent the spread of the virus in the in-hospital environment since direct respiratory transmission is the main means of virus contamination<sup>1-3</sup>.

The clinical spectrum of SARS-CoV-2 infections in the pediatric population varies from asymptomatic to severe, with most patients having favorable clinical outcomes<sup>1,4-7</sup>. The symptomatic clinical presentation of COVID-19 in children is variable. It includes nonspecific signs and symptoms such as fever, cough, shortness of breath, myalgia, rhinorrhea, sore throat, headache, nausea/vomiting, abdominal pain, diarrhea, and loss of smell or taste. Therefore COVID-19 clinical manifestations are common to other pathologies prevalent in childhood, such as pneumonia, bronchiolitis, asthmatic exacerbation crisis and gastroenteritis. Thus, one of the challenges of pediatric

clinical practice included the accurate diagnosis and clinical management of these patients<sup>1-3,5,7</sup>.

In this study we analyze the hospitalizations of pediatric patients considered suspected of COVID-19 identifying the main symptoms, the length of stay in isolation and the results of diagnostic tests for COVID-19 performed by reverse transcription polymerase chain reaction test (RT-PCR). In addition, through the collected data, it was also possible to analyze hospitalized patients' profiles and the main differential diagnoses identified.

## METHODS

This research is a retrospective descriptive observational study performed through the analysis of medical records. The participants of this study were pediatric patients hospitalized in the Monsenhor Horta Hospital (MHH), in Mariana/MG, throughout 2021, due to symptoms common to COVID-19. The MHH is the only hospital in the city of Mariana and has ten pediatric beds. The town of Mariana

has located 110 km from the capital Belo Horizonte. It had an estimated population of 61,830 inhabitants in 2021, being 11,544 (18,7%) of inhabitants aged zero -13 years, in 2016, according to the Brazilian Institute of Geography and Statistics (IBGE)<sup>8</sup>. The inclusion criteria were patients from zero to 12 years 11 months and 29 days who required hospitalization in the hospital with symptoms classified as suspected of infection by the new coronavirus. Cases considered suspicious include those with similar presentation to a flu-like syndrome with clinical manifestations of fever, chills, prostration, cough, sore throat, pharyngeal erythema, headache, runny nose, anosmia, ageusia, nasal obstruction, and may be accompanied by abdominal pain, diarrhea and vomiting. The suspected symptoms could also include severe acute respiratory syndrome (SARS), which includes dyspnea, respiratory distress, bronchospasm/crackles, tachycardia, chest pressure, O<sub>2</sub> saturation <95% in ambient air (AA), lip cyanosis, dehydration and lack of appetite<sup>4,7</sup>. Therefore, the exclusion criteria was the non-retrieval of demographic, clinical and laboratory data from the patients medical record. Even those who obtained an “undetected” report by public or private laboratories were kept in hospital isolation until the resolution of the clinical picture. When released, they were instructed to remain in home isolation until they completed ten days after the onset of symptoms.

Descriptive analysis of continuous variables was performed, using a mean  $\pm$  standard deviation and median (interquartile range), and categorical variables through absolute and relative frequencies, categorical and dichotomous frequencies. Pearson's correlation test was performed when the two variables presented normal Gaussian distribution to verify the correlation between the continuous variables. In addition, when the continuous variable showed normal Gaussian distribution, the t-student test was performed to ascertain the association of continuous variables with binary categorical variables. When the distribution of the variable was not normally distributed, we used the Mann-Whitney nonparametric test. Pearson's chi-square test was used to verify the association between two categorical variables. The strength of the associations between the variables in logistic regression was measured by odds ratio and confidence intervals (CI=95%). The analyses were performed in software R version 4.0.3 and considered a significance level of 5%.

The study was approved by the Ethics and Research Committee of the Medical Sciences College of Minas Gerais (CEPCM-MG - 4,894,549). The integrity of the participants who had their medical records analyzed was guaranteed through the confidential evaluation of the documents by the authors who identified patients from data collection with numbers preventing identification. The exemption from the free and informed consent form/ term of assent due to the retrospective nature of the study, it led to the difficulty in contacting the respective guardians in order to request the signature of the terms.

## RESULTS

A total of 116 participants were included in the study, and 133 medical records were analyzed of patients aged 0 to 12 years 11 months and 29 days, who sought medical care in MHH throughout 2021 with suspicion compatible with SARS-CoV-2 infection and requiring hospitalization under isolation for investigation and treatment of the condition presented. In the evaluation of the data obtained from medical records, 103 patients with one medical record were found, 11 patients with two medical records, one with three medical records and one with five medical records due to repeated hospitalizations at different times, constituting a total of 116 patients contributing 133 events.

In the characterization of the population, it was observed that most of the pediatric population was male, representing 58.6% of the patients, and the median age was 26 months (10,0-50,0) (Table 1). When comorbidities were evaluated, 48 (36.1%) of the children indicated some previous clinical condition in their medical records, and asthma was the most prevalent precondition in 29 of patients (60.4%).

The median of days these patients remained hospitalized in isolation in the HMH was three (2,0-4,0). They were later released to continue isolation at home until ten days after the onset of symptoms. The vast majority of patients, despite symptoms common to SARS-CoV-2 infection, when performing the RT-PCR test between the 3rd and 5th day of symptom onset, presented a negative result, corresponding to 124 (93.2%) of 133 hospitalizations. Regarding the outcomes of hospitalization, it is noted that a minority of patients showed unfavorable outcomes, such as death and transfer to another specialized care hospital. One patient died with a diagnosis of septic shock and COVID-19, and one child died with a diagnosis of meningitis with a negative result for SARS-CoV-2 infection.

When assessing the reasons related to hospitalization and initial clinical suspicion, the signs and symptoms presented in more than half of hospitalizations due to suspected COVID-19 were fever (70.7%), O<sub>2</sub> saturation  $\leq$ 95% in ambient air and dyspnea (57.1% each), cough (55.6%), gastrointestinal symptoms — nausea/vomiting, diarrhea and/or abdominal pain — (51.8%) and tachycardia (51.1%) (Table 2).

From the follow-up of patients and definition of diagnoses based on the tests performed and clinical presentations, the medical records show that the highest prevalence of diagnosis was for bronchiolitis and asthma exacerbation crisis, reported in equal proportion (18%) among hospitalizations. Following these conditions, the third most prevalent diagnosis was gastroenteritis (15%), and the fourth was community pneumonia (12.8%) (Table 3). Although all patients were hospitalized with the suspicion of COVID-19, it is noticed that only 9 (6.8%) of 133 hospitalizations corresponded to this diagnosis, through confirmation by positive RT-PCR test. It is essential

**Table 1.** Clinical data, RT-PCR for SARS-CoV-2 and outcome of 133 hospitalizations of 116 pediatric patients with suspected COVID-19.

	Statistics N (%)
<b>Patient</b>	
Female	55 (41,4)
Male	78 (58,6)
<b>Age (months)</b>	26,0 (10,0 – 50,0) <sup>a</sup>
<b>Comorbidities</b>	
Yes	48 (36,1)
No	85 (63,9)
<b>What?</b>	
Asthma	29 (60,4)
Heart disease	4 (8,3)
Wheezing infant	4 (8,3)
GERD	3 (6,2)
Gastrostomy	3 (6,2)
Down syndrome	3 (6,2)
Sickle cell anemia	2 (4,2)
Prematurity	2 (4,2)
West syndrome	2 (4,2)
TQT	2 (4,2)
Atopic dermatitis	1 (2,1)
Ischemic hypoxic encephalopathy with severe neurological sequelae	1 (2,1)
Severe pulmonary hypertension	1 (2,1)
Microcephaly	1 (2,1)
Obesity	1 (2,1)
Rhinitis	1 (2,1)
ASD	1 (2,1)
Congenital tracheomalacia	1 (2,1)
<b>Days of hospitalization</b>	3,0 (2,0 – 4,0) <sup>a</sup>
<b>RT-PCR</b>	
Positive	9 (6,8)
Negative	124 (93,2)
<b>Death</b>	
Yes	2 (1,5)
No	131 (98,5)
<b>Transfer</b>	
Yes	10 (7,5)
No	123 (92,5)

**Legend:** COVID-19 = Coronavirus disease 2019; GERD = Gastroesophageal reflux disease; TQT = Tracheostomy; ASD = Autism spectrum disorder; RT-PCR = Reverse transcriptase polymerase chain reaction; amedian (interquartile range).

**Table 2.** Descriptive analysis of the signs and symptoms presented by 116 patients before and during of 133 hospitalization.

Symptoms	Statistics N (%)
Fever	94 (70,7)
SatO <sub>2</sub> ≤ 95% AA	76 (57,1)
Dyspnea	76 (57,1)
Cough	74 (55,6)
Gastrointestinal symptoms	69 (51,8)
Tachycardia	68 (51,1)
Runny nose	64 (48,1)
Bronchospasm or crackles	48 (36,1)
Signs of respiratory effort	46 (34,6)
Nasal obstruction	38 (28,6)
Inappetite	34 (25,6)
Prostration	32 (24,1)
Other findings	31 (23,3)
Pharyngeal erythema	14 (10,5)
Dehydration	12 (9,0)
Chills	5 (3,8)
Sore throat	5 (3,8)
Headache	4 (3,0)
Chest pain	4 (3,0)
Central cyanosis	3 (2,3)
Hyposmia/ anosmia or ageusia	0 (0,0)

**Legend:** SatO<sub>2</sub> ≤ 95% ambient air, O<sub>2</sub> saturation ≤ 95% in ambient air.

to highlight that the same patient may have received more than one diagnosis during hospitalization due to coexisting pathologies.

Regarding the diagnosis of COVID-19 by the positive result of the RT-PCR test, it is noticed that the majority of 133 hospitalizations were male patients (77.8%), and the median age was 42 months (32,0-99,0), older than patients with negative tests, where the median age was 25 months (9,8-46,2). Among patients with SARS-CoV-2 positive results, 33.3% had previous comorbidities as multiple conditions (West syndrome and trisomy of 21 with gastroesophageal reflux disease, tracheostomized and gastrostomized), obesity and ischemic hypoxic encephalopathy with neurological sequelae. Most of the 9 patients coronavirus-infected (55.6%) did not require transfer because they presented clinical conditions compatible with those of management in infirmary inpatient units. Furthermore, 8 (88.9%) of these patients did not progress to death, demonstrating that pediatric patients with COVID-19, for the most part, presented a favorable outcome in their hospitalization (Table 4).

The most clinical manifestations presented by patients with COVID-19 confirmed by the RT-PCR test were fever (88.9%), followed by SatO<sub>2</sub> ≤ 95% in ambient air, gastrointestinal symptoms and tachycardia (66.7% each), demonstrating a variety of clinical symptomatology.

## DISCUSSION

Hospitalizations for non-COVID-19 respiratory causes in 2021, evaluated in the present study, were equivalent to 91 of 133 hospitalizations (68.4% of the diagnoses), with pneumonia without specified etiology corresponding to 25 of 133 hospitalizations - 18.8% (with 17 hospitalizations diagnosed as community pneumonia, six as viral pneumonia and two as atypical germ pneumonia), followed by bronchiolitis and asthma exacerbation crisis, with 24 hospitalizations. This finding is in line with the studies conducted by Caetano et al. (2002)<sup>9</sup>, Oliveira et al. (2012)<sup>10</sup>, Oliveira et al. (2012)<sup>11</sup>, Araújo et al. (2019)<sup>12</sup> and Durão et al. (2021)<sup>13</sup> in pediatric populations from different Brazilian locations in the years prior to coronavirus pandemic. These

**Table 3.** Descriptive analysis of the diagnoses of pediatric patients with initial suspicion of COVID-19 hospitalized in the pediatric sector of the Monsenhor Horta Hospital of Mariana/MG

Diagnosis	Statistics N (%)
Bronchiolitis	24 (18,0)
Asthma exacerbation crisis	24 (18,0)
Gastroenteritis	20 (15,0)
Community pneumonia	17 (12,8)
Upper airway infection	11 (8,3)
COVID-19	9 (6,8)
1 <sup>st</sup> bronchospasm crisis	7 (5,3)
Fever of undetermined origin	7 (5,3)
Viral pneumonia	6 (4,5)
Anemia	2 (1,5)
Bacteremia	2 (1,5)
Urinary tract infection	2 (1,5)
Lymphadenitis	2 (1,5)
Mononucleosis	2 (1,5)
Atypical pneumonia	2 (1,5)
1 <sup>st</sup> episode of febrile seizure	1 (0,8)
Cluster headache	1 (0,8)
False pain crisis	1 (0,8)
Acute dehydration	1 (0,8)
Laryngomalacia	1 (0,8)
Meningitis	1 (0,8)

studies showed that respiratory diseases were the leading cause of hospitalization in children, with pneumonia being the most significantly responsible for these occurrences<sup>9,10-13</sup>. Also, as found in our data, according to studies by Pedraza et al. (2017)<sup>14</sup>, Araújo et al. (2019)<sup>12</sup> and Durão et al. (2021)<sup>13</sup>, gastroenteritis ranks second in the causes of hospitalizations of pediatric patients<sup>12,13</sup>.

Regarding clinical manifestations of children who required hospital care, according to Ranti et al. (2013)<sup>15</sup> and Araújo et al. (2019)<sup>12</sup>, the main clinical manifestations in scenarios prior to the onset of COVID-19 were fever and respiratory system symptoms such as cough and breathing difficulties<sup>12,15</sup>. In the present study, the most prevalent clinical findings in hospitalizations were fever, O<sub>2</sub> saturation ≤ 95% in ambient air, dyspnea and cough.

In addition, the profile of the hospitalized patients found in our study corroborates the data in the literature regardless coronavirus pandemic. Studies show a higher percentage of male patients in pediatric hospitalizations as described by Peixoto et al. (2013)<sup>16</sup> and Araújo et al. (2019)<sup>12</sup> with, respectively, 52% and 55,49% of total children hospitalizations in different regions of Brazil

prior to COVID-19. Here, we showed a higher prevalence of hospitalizations of pediatric patients of the same sex, equivalent to 58.6% of the total number of patients seen at HMH in 2021 with a suspected clinical presentation for COVID-19<sup>12,16</sup>.

Since the beginning of the pandemic in the first half of 2020 in the UK, Swann et al. (2020)<sup>17</sup> described pediatric COVID as a rare condition corresponding to 1 to 2% of the world's cases and with very rare mortality in which only 0.6% of pediatric patients evolved to severity<sup>16</sup>. In the second half of 2021, according to Nehab et al. (2021)<sup>18</sup>, this scenario was maintained even as the pandemic progressed. Pediatric asymptomatic cases during 2021 corresponded to 40 to 50% of the total reported cases in children, and the symptomatic most were from mild infections, and only 1 to 6% progressed with severity<sup>18</sup>. From the data collected in the present study, it is noted that children, despite presenting COVID-19 symptoms, in more than 90% of hospitalizations, did not test positive for SARS-CoV-2. It is perceived that, even in the face of the pandemic scenario of COVID-19, the leading cause of hospitalizations in pediatrics in the MHM in 2021, despite the initial symptomatology common to that of SARS-CoV-2 infection, maintained the patient profile, clinical presentation and diagnosis of hospitalizations pediatric public in scenarios that did not involve the pandemic.

Regarding the diagnosis of COVID-19 and the time of hospitalization, it is noticed that patients with negative or positive tests did not present a significant difference in the number of days hospitalized in the ward.

The data of our study were analyzed in a scenario of stricter social isolation, in which the children maintained a lower conviviality with society, given the traffic restrictions imposed by the municipality. This factor is directly involved in the lower exposure to the virus and, consequently, lower contamination rates. Therefore, in scenarios of social isolation, COVID-19 in pediatrics did not change the profile of hospitalizations.

Based on the findings described in our study and evidenced by the importance of social isolation in containing infection by SARS-CoV-2, further studies with pediatric patients in scenarios of greater social exposure, such as through the return to daycare centers and schools, may show a different scenario from that found.

It is also important to emphasize that, although COVID-19 is a new diagnosis to be considered in the pediatric age group, the differential diagnoses cannot be disregarded, since COVID-19 did not replace them, but added to the other etiological agents of the diseases childhood common.

Regarding the study's limitations, it is important to mention that it is based on clinical information in the medical records of children with suspected COVID-19. Another limitation concerning the transferred patients is that, after the transfer to tertiary care hospitals, we had no information about the follow-up that these individuals had.

**Table 4.** Comparison of patients diagnosed and not diagnosed with COVID-19 by RT-PCR test collected between the 3rd and 5th day of symptoms in 133 episodes of hospitalization.

	RT-PCR		<i>p</i> -valor <sup>Q</sup>
	Positive (N=9)	Negative (N=124)	
<b>Patient</b>			0,309
Female	2 (22,2)	53 (42,7)	
Male	7 (77,8)	71 (57,3)	
<b>Age (months)</b>	42,0 (32,0 – 99,0)	25,0 (9,8 – 46,2)	0,089 <sup>M</sup>
<b>Comorbidities</b>			>0,999
Yes	3 (33,3)	45 (36,3)	
No	6 (66,7)	79 (63,7)	
<b>Days of hospitalization</b>	2,0 (1,0 – 3,0)	3,0 (2,0 – 4,0)	0,339 <sup>M</sup>
<b>Death</b>			0,131
Yes	1 (11,1)	1 (0,8)	
No	8 (88,9)	123 (99,2)	
<b>Transfer</b>			0,003
Yes	4 (44,4)	6 (4,8)	
No	5 (55,6)	118 (95,2)	
<b>Symptoms</b>			
Fever	8 (88,9)	86 (69,4)	0,298
SatO <sub>2</sub> ≤ 95% in ambient air	6 (66,7)	70 (56,5)	0,736
Dyspnea	5 (55,6)	71 (57,3)	>0,999
Cough	4 (44,4)	70 (56,5)	0,520
Gastrointestinal symptoms	6 (66,7)	63 (50,9)	>0,999
Tachycardia	6 (66,7)	62 (50,0)	0,485
Runny nose	4 (44,4)	60 (48,4)	>0,999
Bronchospasm or crackles	2 (22,2)	46 (37,1)	0,500
Signs of respiratory effort	2 (22,2)	44 (35,5)	0,510
Nasal obstruction	1 (11,1)	37 (29,8)	0,286
Inappetite	4 (44,4)	30 (24,2)	0,231
Prostration	4 (44,4)	28 (22,6)	0,216
Other findings	4 (44,4)	27 (21,8)	0,207
Pharyngeal erythema	2 (22,2)	12 (9,7)	0,248
Dehydration	2 (22,2)	10 (8,1)	0,205
Chills	1 (11,1)	4 (3,2)	0,296
Sore throat	1 (11,1)	4 (3,2)	0,287
Headache	2 (22,2)	2 (1,6)	0,026
Chest pressure	1 (11,1)	3 (2,4)	0,242
Central cyanosis	0 (0,0)	3 (2,4)	>0,999
Hyposmia/ anosmia or ageusia	0 (0,0)	0 (0,0)	-

**Legend:** <sup>Q</sup>Chi-square test; <sup>M</sup>Mann-Whitney test.

It is concluded, therefore, that the present study is relevant for identifying the low prevalence of this COVID-19 in children in 2021 to the detriment of the higher differential diagnoses of SARS-CoV-2 infection.

Overall is recommended that even in the pandemic scenario of the new coronavirus, pediatricians expand their research spectrum in the face of a patient with a nonspecific clinic. Given the presentation of any symptoms considered

suspected of infection by SARS-CoV-2, the hypothesis of COVID-19 must be considered and proceeded with appropriate propaedeutics and the adoption of isolation measures to prevent the spread of the virus.

## ACKNOWLEDGMENTS

To Hospital Monsenhor Horta in the city of Mariana/ MG for supporting the study.

## AUTHOR CONTRIBUTION

Authors' collaboration in preparing the manuscript:

We describe contributions to the papers using the taxonomy (CRediT) provide above: Conceptualization, Investigation, Methodology, Visualization & Writing – review & editing; Project administration, Supervision & Writing – original draft; Validation & Software; Resources & Funding acquisition; Data curation & Formal Analysis: Gribel CRN, Gribel NS, Santos LI.

## COPYRIGHT

Copyright© 2020 Gribel et al. This is an Open Access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original article is properly cited.

## REFERENCES

1. Deville JG, Song E, Ouellette CP. COVID-19: Clinical manifestations and diagnosis in children. UpToDate [Internet]. 2022 Aug 22; [cited 2022 Sep 10]. Available from: [https://www.uptodate.com/contents/covid-19-clinical-manifestations-and-diagnosis-in-children?search=Covid19&source=search\\_result&selectedTitle=6-150&usage\\_type=default&display\\_rank=6#H2167437221](https://www.uptodate.com/contents/covid-19-clinical-manifestations-and-diagnosis-in-children?search=Covid19&source=search_result&selectedTitle=6-150&usage_type=default&display_rank=6#H2167437221)
2. Empresa Brasileira de Serviços Hospitalares (EBSERH). Guia sobre isolamento em coorte de pacientes no contexto da pandemia da COVID-19. Brasília (DF): EBSERH; 2020.
3. Agência Nacional de Vigilância Sanitária (ANVISA). Nota Técnica GVIMS/GGTES/ANVISA N°04/2020. Orientações para serviços de saúde: medidas de prevenção e controle que devem ser adotados durante a assistência aos casos suspeitos ou confirmados de infecção pelo novo coronavírus (SARS-CoV-2). Atualizada em 27 Oct 2020. Brasília (DF): ANVISA; 2020.
4. Safadi MAP. As características intrigantes da COVID-19 em crianças e seu impacto na pandemia. J Pediatr (Rio J). 2020;96(3):265-8.
5. Dias VMCH, Carneiro M, Vidal CFL, Corradi MFDB, Cunha CA, Chebabo A, et al. Orientações sobre Diagnóstico, Tratamento e Isolamento de Pacientes com COVID-19. J Infect Control. 2020;9(2):1-20.
6. Sociedade Brasileira de Pediatria (SBP). Sociedade Alagoana de Pediatria (SAP). Protocolo de Manejo Clínico de Pacientes Pediátricos com COVID-19. Rio de Janeiro: SBP; 2020.
7. Sociedade Brasileira de Pediatria (SBP). Departamento Científico de Pneumologia. Nota de Alerta. COVID-19 em crianças: envolvimento respiratório. Rio de Janeiro: SBP; 2020.
8. Instituto Brasileiro de Geografia e Estatística (IBGE). Panorama da cidade de Mariana, Minas Gerais, Brasil [Internet]. Brasília: IBGE; 2022; [access in 2022 Sep 10]. Available from: <https://cidades.ibge.gov.br/brasil/mg/mariana/panorama>
9. Caetano JRM, Bordin IAS, Puccini RF, Peres CA. Fatores associados à internação hospitalar de crianças menores de cinco anos. Rev Saúde Pública (S Paulo). 2002;36(3):285-91.
10. Oliveira RR, Costa JR, Mathias TAF. Hospitalizações de menores de cinco anos por causas evitáveis. Rev Latino-Am Enfermagem. 2012;20(1):1-8.
11. Oliveira BRG, Vieira CS, Furtado MCC, Mello DF, Lima RAG. Perfil de morbidade de crianças hospitalizadas em um hospital público: implicações para a Enfermagem. Rev Bras Enf. 2012;65(4):1-8.
12. Araújo VLL, Moura MCL, Silva RP, Alencar MFB, Moraes EJS, Silva MJS, et al. Causas de internação hospitalar das crianças de 0 a 9 anos no estado do Piauí: análise descritiva. Braz J Surg Clin Res. 2019;27(2):20-4.
13. Durão LG, Freitas BC, Queluz DP. Hospitalizações de crianças menores de 05 anos no Brasil: uma revisão sistemática [Internet]. In: XXIX Congresso de Iniciação Científica UNICAMP, 2021. Campinas; Unicamp; 2021; [access in 2022 Sep 11]. Available from: <https://www.prp.unicamp.br/inscricao-congresso/resumos/2021P18227A35910O201.pdf>
14. Pedraza DX, Araújo EMN. Internações das crianças brasileiras menores de cinco anos: revisão sistemática de literatura. Epidemiol Serv Saúde. 2017;26(1):169-82.
15. Ranti RMS, Goulart LMHF, Alvim CG, Mota JAC.. “Criança não pode esperar”: a busca de serviços de urgência e emergência por mães e suas crianças em condições não urgentes Cien Saúde Colet. 2013;18(12):3663-72.
16. Peixoto BV, Piazzetta E, Rischini FA, Guimarães MNC, Cuziol M, Lodo PB, et al. A difícil realidade do pronto atendimento infantojuvenil mostrando a situação de saúde de uma cidade. Rev Paul Pediatr. 2013;31(2):1-6.
17. Swann OV, Holden KA, Turtle L, Pollock L, Fairfield CJ, Drake TM, et al. Clinician characteristics of children and young people admitted to hospital with covid-19 in United Kingdom: prospective multicentre observacional cohort study. BMJ. 2020;370:m3249.
18. Ministério da Saúde (BR). Fundação Oswaldo Cruz, Instituto Nacional de Saúde da Mulher, da Criança e do Adolescente Fernandes Figueira. COVID-19 e a Saúde da Criança e do Adolescente. 2021:1-150.



This is an open access article distributed under the terms of the Creative Commons Attribution License.