



## **Clinical Picture of SARS-Cov-2 Infection in Children in Guanajuato State, Mexico: A Cross-Sectional Study**

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### **Authors' contributions**

This work was carried out in collaboration among all authors. Author NPR designed the study and wrote the manuscript. Author GFV performed the statistical analysis of the data. Author CSS designed the study and wrote the manuscript. Author ENO reviewed the literature and analysed the data. Author MJGL obtained the information of SINAVE/DGE and participated in writing the manuscript. Author ELL designed the tables and figures. Author FJMV obtained the information from WHO and another references and participated in writing the manuscript. Author DADM participated in design the study and wrote the first draft. All authors approved the final version of manuscript.

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## ABSTRACT

**Aims:** To compare the signs and symptoms in COVID-19 and another respiratory virus, among children.

**Study Design:** A cross-sectional study was designed based on data from the National Epidemiological Surveillance System of the General Directorate of Epidemiology.

**Place and Duration of Study:** All registries in database of confirmed and discarded cases of COVID-19 from Guanajuato State, Mexico in the period March-July 2020.

**Methodology:** A confirmed case was one with clinical data mainly fever, cough and dyspnea, who had traveled to a country affected by the pandemic or had had contact with a confirmed case, and a positive rRT-PCR test for SARS-CoV-2. The cases discarded were those with the negative rRT-PCR test. The presence of clinical data among those under 18 years of age, of confirmed and discarded cases in the state of Guanajuato, was compared with Z for two proportions and P-value.

**Results:** The sample included 446 confirmed cases and 2,134 discarded cases. The average age of those confirmed was  $9.60 \pm 5.46$  years and  $8.01 \pm 5.39$  years, among those discarded ( $P < .05$ ). In both groups, male predominated ( $P = .91$ ). Fever, myalgia, arthralgia, and conjunctivitis show statistically significant differences between confirmed and discarded cases ( $P < .05$ ).

**Conclusion:** There are not differences in signs and symptoms in COVID-19 and another respiratory virus. It is concluded that since the characteristics of COVID-19 are like the ones of other viral infections, the diagnosis cannot be made merely based on signs and symptoms.

*Keywords: SARS-CoV-2; COVID-19; children; population; clinical data.*

## 1. INTRODUCTION

In December 2019, in Wuhan, China, cases of pneumonia of unknown cause were reported to the office of the World Health Organization (WHO) [1]. By February 2020, it was determined that the origin of pneumonia was a new coronavirus and the WHO called it respiratory distress syndrome coronavirus 2 (SARS-CoV-2), due to its similarity to SARS-CoV [2]. The disease was called coronavirus infectious disease-19 (COVID-19) [3].

By March 2020, the virus was isolated, its morphology described, and its genome sequenced. Zhou et al. [4], reported that the new coronavirus shared 79.5% of the SARS-CoV sequence and uses the same receptor for entry into the cell, the angiotensin-converting enzyme (ACE2).

The first case detected in Mexico was on January 8, 2020 and the first deaths were reported on March 18, 2020 [5].

The state of Guanajuato is located in the center of the Mexican Republic [6] and had 5,486,372 inhabitants, which represented 4.88% of the Mexican population (112,336,538 inhabitants) according to the 2010 census [7]. The first confirmed case of COVID-19 was on March 10, 2020 and the first two deaths were reported on April 5, 2020 [8].

In most of the countries affected by the presence of SARS-CoV-2, the disease caused by the new coronavirus predominates in adults and with greater severity in the elderly [9-11].

Although the number of COVID19 cases in children are increasing, there are still gaps of knowledge, especially in clinical characteristics of the disease in pediatrics. Moreover, previous studies report contrary findings in this field [12,13].

The objective was to compare the clinical data in those under 18 years of age, who had COVID-19, confirmed with a positive rRT-PCR test, with those whose test was negative.

## 2. MATERIALS AND METHODS

A descriptive cross-sectional study was designed, with data on confirmed and discarded cases of COVID-19 from the National Epidemiological Surveillance System of the General Directorate of Epidemiology of the Ministry of Health, in people under 18 years of age, until July 3, 2020, and included all subjects under 18 years old with clinical data of suspected respiratory viral infections and with a Real Time - Polymerase Chain Reaction (rRT-PCR) test result.

All the records of confirmed and discarded cases in the database were included. Those with incomplete records were eliminated.

Suspected cases that did not have a rRT-PCR result were excluded.

The collected data was age, sex, type of patient (hospitalized or ambulatory), symptoms and signs, and date of death (if it happened). Age was categorized into age groups according to pediatric ages (0 to 2, 3 to 5, 6 to 11, and 11 to 17 years).

The diagnostic test was the rRT-PCR test.

The data collection is done in each Primary Care Unit and registries are reported to the National Epidemiological Surveillance System [8].

The sample was divided in two groups: negative or positive to the rRT-PCR test.

For statistical analysis, descriptive statistics were used; Z for differences of two proportions was calculated and the corresponding P value ( $< 0.001$ ). The level of statistical significance was set to 0.05. The analysis was performed in STATA 13.0® (Stata Corp., College Station, TX, USA).

### 3. RESULTS AND DISCUSSION

2,580 complete records were reviewed, of which 446 (17.29%) were confirmed as COVID-19 and 2,134 (82.71%) as discarded cases, in children under 18 years of age, in the state of Guanajuato [Table 1].

The number of confirmed cases by day of symptom onset is shown in Fig. 1. In the pediatric population of the state of Guanajuato, the number of cases per day showed little variation until May 25, where, as of that day, the number of cases increased. The highest peaks have been in the month of June.

There was not missing data among the confirmed cases. Among the discarded cases, for all signs or symptoms, less than 0.5% of data was missing.

Clinical data of the confirmed and discarded cases are shown in Table 2. The predominant signs and symptoms among the confirmed cases of COVID-19 were cough, fever, odynophagia, myalgia, and rhinorrhea, with similar percentages to the clinical data reported among the discarded cases. Statistically significant differences were found for fever, myalgia, arthralgia, conjunctivitis, and polypnea ( $P < .05$ ).

Among the confirmed cases, 21 (5.34%) reported anosmia, while, among the discarded cases, it was reported in 14 (1.22%) ( $P < 0.05$ ). Regarding dysgeusia, among the confirmed cases, 21 (5.36%) reported it, and 17 (1.61%) among the discarded cases ( $P < 0.05$ ).

The veracity and quality of the data depends on who collected the information and therefore could be biased. As in other series published in the general population of Mexico, the predominant gender was male [9,10].

It is possible that the measures taken by the state government, in terms of social isolation, closure of public places, have helped to keep the number of new cases low during the month of April (Fig. 1). The slight increase in new cases in May can be a result of breaking social isolation on holidays in Mexico, such as Mother's Day. Although civil authorities introduced new COVID-19 restrictions after this increase, the number of new cases grew notably by June.

The clinical data between confirmed and discarded cases was similar, statistically significant difference was only seen in myalgia, arthralgia, and conjunctivitis, which were more frequent in confirmed cases of COVID19. These symptoms are also common in other viral infections.

In Su et al. [12], only 22.2% of the patients with COVID-19 presented fever and 11.2% cough, contrary to the results of our study where these symptoms were the most frequent among confirmed cases.

Xia et al. [13] reported in a series of 20 patients between 1 and 14 years of age. They described fever in 60%, cough in 65%, diarrhea in 16%, sore throat in 5%, vomiting in 10%; These percentages are alike those found among Guanajuato children (Table 2).

According to Lu et al. [14], among 171 children under 15 years of age with COVID-19, 68.8% were male, 48.5% had a cough, and 41.5% had a fever. In Guanajuato, under 18 years old, 53.36% were male, 87.58% reported cough and 69.93% fever (Tables 1 and 2).

In this type of study design, it is impossible to take control on some biases, since the data collection depends on other people, but it is official data. It is known that, in Mexico, to

undergo the rRT-PCR test, patients of any age must be symptomatic; therefore, asymptomatic carriers will be left without a certain diagnosis of having SARS-CoV-2 infection.

As rRT-PCR tests have shown false negatives in diagnosing COVID, especially in the early stage of the disease, we cannot always rule out COVID infection by a negative rRT- PCR test result. In the case where symptoms strongly suggest a SARS-CoV-2 infection, and an rt-PCR test result is negative, chest CT-scan is helpful in diagnosis.

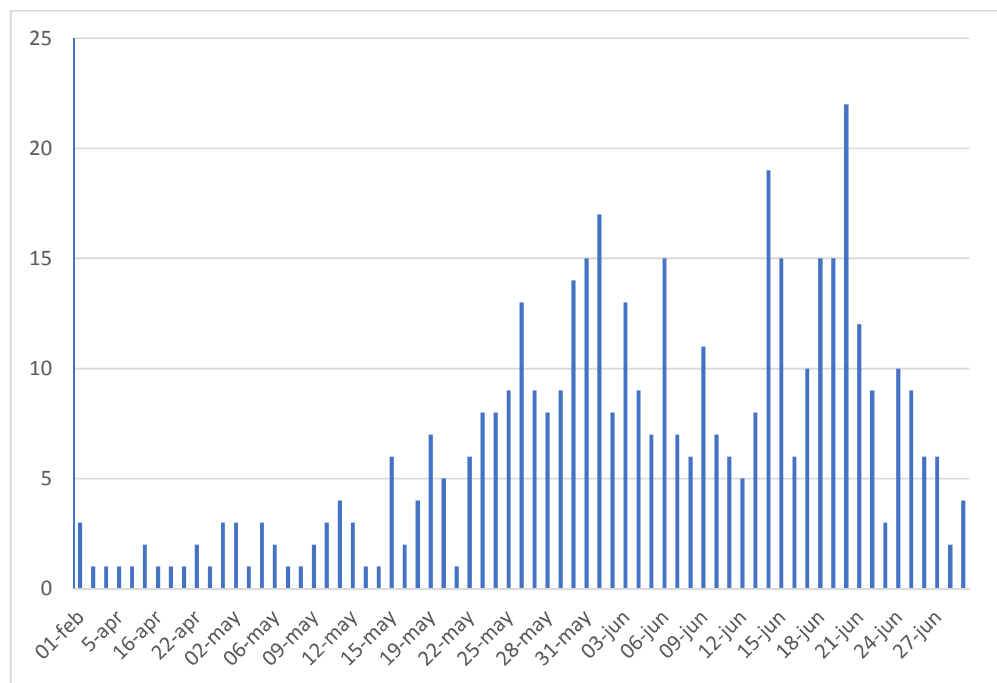
The clinical data for COVID-19 of Guanajuato children are different from those reported in infected children in China.

The clinical data reported in patients with COVID-19 are similar to those reported in other viral diseases, for which there is not pathognomonic clinical data of COVID-19 and that is present in many other viral infections, data alone cannot be relied upon clinical trials for diagnosis, which must be confirmed with the rRT-PCR test.

**Table 1. Distribution of age and sex, among confirmed and discarded cases of COVID-19 in Guanajuato state**

Variable	Confirmed cases (n=446)		Discarded cases (n=2,134)		
	n	%	n	%	
<b>Sex</b>					<b>X<sup>2</sup>=0.59 gl 1</b>
Male	238	53.36	1,096	51.36	P=.44
Female	208	46.64	1,038	48.64	
<b>Age group (years)</b>					<b>X<sup>2</sup>= 36.95 gl 3</b>
0 - 2	62	13.90	477	22.35	P=.0001
3 - 5	70	15.70	346	16.21	
6 - 11	140	31.39	758	35.52	
12 - 17	174	39.01	583	25.91	

Source: SINAVE/DGE [8]



**Fig. 1. Distribution of confirmed cases of COVID-19 by onset of signs and symptoms**

Source: SINAVE/DGE [8]

**Table 2. Clinical data of confirmed and discarded cases of COVID-19 in patients under 18 years old**

Variable	Confirmed cases (n=446)		Discarded cases (n=2,134)		Chi-squared test (gl)	P
	n	%	n	%		
<b>Cough</b>					0.13 (1)	
Yes	388	87.00	1,843	86.36		0.72
No	58	13.00	291	13.64		
<b>Fever</b>					6.15 (1)	
Yes	306	68.61	1,586	74.32		0.01
No	140	31.39	548	25.68		
<b>Odynophagia</b>					1.64 (1)	
Yes	267	59.87	1,202	56.56		0.2
No	179	40.13	923	43.44		
<b>Myalgias</b>					15.38 (1)	
Yes	232	52.02	891	41.89		0.0001
No	214	47.98	1,236	58.11		
<b>Rhinorrhea</b>					0.05 (1)	
Yes	222	49.78	1,049	49.20		0.82
No	224	50.22	1,083	50.80		
<b>Arthralgia</b>					6.11 (1)	
Yes	172	38.57	691	32.49		0.01
No	274	61.43	1,436	67.51		
<b>Conjunctivitis</b>					6.87 (1)	
Yes	63	14.13	211	9.92		0.009
No	383	85.87	1,917	90.08		
<b>Diarrhea</b>					0.25 (1)	
Yes	53	11.88	236	11.06		0.62
No	393	88.12	1,897	88.94		
<b>Vomit</b>					0.83 (1)	
Yes	34	7.62	191	8.96		0.36
No	412	92.38	1,940	91.04		
<b>Abdominal pain</b>					1.87 (1)	
Yes	33	7.40	201	9.45		0.17
No	413	92.60	1,927	90.55		

Variable	Confirmed cases (n=446)		Discarded cases (n=2,134)		Chi-squared test (gl)	P
	n	%	n	%		
<b>Thoracic pain</b>					0.13 (1)	
Yes	23	5.16	119	5.59		0.72
No	423	94.84	1,250	93.84		
<b>Polypnea</b>					10.64 (1)	
Yes	18	4.04	183	8.59		0.001
No	428	95.96	1,947	91.41		
<b>Cyanosis</b>					1.06 (1)	
Yes	8	1.79	56	2.63		0.30
No	438	98.21	2,073	97.37		

Source: SINAVE/DGE [8]

#### 4. CONCLUSION

Since the characteristics of COVID-19 infection are like the ones in other viral infections, the diagnosis cannot be made merely based on signs and symptoms. It should be supported by diagnostic tests such as the rRT-PCR test or a chest CT-scan.

#### DISCLAIMER

The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

#### CONSENT

It is not applicable.

#### ETHICAL APPROVAL

The study was approved by Bioethics Committee of Campus Celaya-Salvatierra of the University of Guanajuato, with registry: CBCCS-05130042020

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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