

“In the name of God”

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Epidemiological characteristics of COVID-19 in children in

Al-Batool hospital of Diyala

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اوصي باستلام و قبول بحث التخرج للطالب محمد كرم ابراهيم بعد اكماله
متطلبات البحث كاملة و دون اي نقص و اكماله جميع الاحصائيات و
التعديلات المطلوبة منه.

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Abstract:

Background:

Coronaviruses are a large family of viruses that cause a variety of diseases such as SARS, MERS and COVID-19. COVID-19 is a viral disease caused by SARS-CoV-2. The virus's symptoms vary from a patient to another, where some could show no symptoms at all, while others require intensive care and some of them face death. The common symptoms of COVID-19 are fever, fatigue, dry cough and occasionally gastrointestinal symptoms such as nausea, vomiting and diarrhea. Children are just as likely as adults to become infected with SARS-CoV-2 but have fewer symptoms and less severe disease, as well as a much lower case-fatality rate.

Objective:

Aim of the present study was to analysis the epidemiological statistics of COVID-19 in children in Al-Batool hospital of Diyala.

Materials and Methods:

We gathered all the positive PCR testing data of children under the age of 10 from General Health laboratory of Diyala from January of 2022 until April 2023 and then selected ones that were hospitalized in Al-Batool hospital of Diyala. After that we gathered all their data and done statistical analysis on them program SPSS version 2023 to calculate P

values, medians and percentages to understand some of the epidemiological statistics of COVID-19 in children in Al-Batool hospital.

Results:

The results showed that cough and shortness of breath are the most common symptoms in children hospitalized due to COVID-19 in Al-Batool hospital of Diyala Province. Boys are involved more than girls and there are some minor differences between genders here and there.

Conclusion:

Based on the results of this study we concluded that COVID-19 in children hospitalized in Al-Batool hospital of Diyala has many similarities with that of the worldwide. Cough, shortness of breath are the most common symptoms and there are some tiny differences between genders but not significant enough.

Keywords: COVID-19, Children, Cough, Shortness of breath

Introduction:

Coronaviruses are a large family of viruses that cause a variety of diseases such as SARS, MERS and COVID-19¹. COVID-19 is a viral disease caused by SARS-CoV-2 that was reported for the first time in Wuhan, China in December 2019. In Iraq, the first imported case was reported on 24 February 2020. The Iraqi authorities announced that an Iranian citizen, who entered Iraq before the Iraqi government decided to restrict Iranian citizen's entry, was infected by COVID-19².

The virus's symptoms vary from a patient to another, where some could show no symptoms at all, while others require intensive care and some of them face death³. The common symptoms of COVID-19 are fever, fatigue, dry cough and occasionally gastrointestinal symptoms such as nausea, vomiting and diarrhea⁴. The World Health Organization (WHO) declared the outbreak a public health emergency of international concern on 11 January 2020 and a pandemic on 11 March 2020⁵.

¹ Jiehao C, Jin X, Daojiong L, Zhi Y, Lei X, Zhenghai Q, et al. A case series of children with 2019 novel coronavirus infection: clinical and epidemiological features. *Clin Infect Dis* 2020;71:1047-51.

² Lee P.; Hu Y.; Chen P.; Huang Y. and Hsueh P.; "Are children less susceptible to COVID-19?", *J. Microbiol Immunol Infect.* 03(3), 371-372, 2020.

³ Alsayed R.; Kadhom M.; Yousif E. and Sabir; "An Epidemiological Characteristic of the COVID-19 Among Children", *Lett. Appl. Nano Bio Science*, 9(3), 1106-1114, 2020.

⁴ Turnier JL, Anderson MS, Heizer HR, Jone P-N, Glod' e MP, Dominguez SR. Concurrent respiratory viruses and Kawasaki disease. *Pediatrics* 2010;126: e69-14.

⁵ WHO. Event as they happen 2020. Updated 1 June 2020. Available from: novel-coronavirus-2019/events-as-they-happen. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/events-as-they-happen>

Modes of transmission of disease are direct inhalation of infected droplets and direct contact with surfaces and fomites soiled by infected respiratory secretions¹. Many protection ways were suggested to reduce the number of transmission, including wearing masks, washing and cleaning hands and keeping social distance².

During the early stages of the outbreak, it was thought that children were rarely affected by SARS-CoV-2 which could have been as a result of their lower nosocomial exposure and less frequent contact with animals³. However a number of reports suggested that children are just as likely as adults to become infected with SARS-CoV-2 but have fewer symptoms and less severe disease, as well as a much lower case-fatality rate⁴. This is because children have a larger number of naïve T-cells that can be programmed to protect them against the disease⁵.

¹ Wang W, Xu Y, Gao R, et al. Detection of SARS-CoV-2 in different types of clinical specimens. JAMA. 2020. <https://doi.org/10.1001/jama.2020.3786>.

² Chan K.; Malik Peiris J.; Lam S.; Poon L.; Yuen K. and Seto W.; "The effects of temperature and relative humidity on the viability of the SARS coronavirus", Adv. Virus, 2011(734690), 1-7, 2011.

³ Wu Z, McGoogan JM. Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China: summary of a report of 72 314 cases from the Chinese center for disease control and prevention. JAMA. 2020.

⁴ Bi Q, Wu Y, Mei S, et al. Epidemiology and transmission of COVID-19 in Shenzhen China: analysis of 391 cases and 1,286 of their close contacts. medRxiv. 2020. <https://doi.org/10.1101/2020.03.03.20028423>.

⁵ Ahmadpoor P, L, Rostaing, Why the immune system fails to mount an adaptive immune response to a Covid-19 infection. Transplant International, 2020. doi: 10.1111/tri.13611.

Children however may have asymptomatic infection and also prolonged fecal-shedding, which may contribute to the spread of the pandemic¹¹.

In the case series of 141 children with RT-PCR confirmed SARS-CoV-2 infection, signs and symptoms included cough (88.0%), pharyngeal erythema (86.2%), fever (81.0%), fast breathing (78.7%), diarrhea (8.8%), rhinorrhea (7.6%), fatigue (7.6%) and vomiting (6.4%)¹².

Diagnosis is confirmed by demonstration of the virus in respiratory specimen by using specific RT-PCR¹³.

Materials and Methods:

We gathered all the positive PCR testing data of children under the age of 10 from General Health laboratory of Diyala from January of 2022 until April 2023 and then selected ones that were hospitalized in Al-Batool hospital of Diyala. After that we gathered all their data and done statistical analysis on them program SPSS version 20.23 to calculate P values, medians and percentages to understand some of the epidemiological statistics of COVID-19 in children in Al-Batool hospital.

¹¹ Cai J, Xu J, Lin D, et al. A case series of children with 2019 novel coronavirus infection: clinical and epidemiological features. *Clin Infect Dis.* 2020. <https://doi.org/10.1093/cid/ciaa198>.

¹² Lu X, Zhang L, Du H, et al. SARS-CoV-2 infection in children. *N Engl J Med.* 2020. <https://doi.org/10.1056/NEJMc200573>.

¹³ Ai T, Yang Z, Hou H, et al. Correlation of chest CT and RT-PCR testing in coronavirus disease 2019 (COVID-19) in China: a report of 1014 cases. *Radiology.* 2020. <https://doi.org/10.1148/radiol.2020200642>.

Results:

The results are categorized into two major categories; Epidemiological stats and symptoms. In epidemiological category we have shown the results of variables like sex, age and residence. In symptoms category we have talk about variables such as cough, fever, hoarseness of voice, crackles, etc. After that, in symptom category we also compared each symptom in each gender.

1. Epidemiological:

In this category, first we are going to see the distribution of gender in samples:

Out of total 56 patients, 32 (57%) were boys and 24 (43%) were girls. There is not a significant difference between the two genders.

The age distribution has shown in the below table:

Age	<1	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Number of patients	1	1	3	2	3	3	2	4	3	3	0	6	0	7	8

Table 1: Age distribution

As shown in the table 1, as the age goes up, the number of hospitalization also increases. The most cases of hospitalization occurred at the age of 14 years (8 cases and 14.3%). The least number

of hospitalization is in the age group of less than two years old (1 case and 1,78% each).

The table 4 below shows the residence distribution of patients in Diyala province:

City	Baquba	Al-Khalis	Al-Muqdadaya	Baladrooz	Khaneqin	Kufri	Other
Number of patients	21	11	8	6	5	3	2

Table 4: Residence distribution

As shown in table 4, most of the cases (21 cases and 37,0%) were from Baquba which is not surprising, because Al-Batool hospital is in the Baquba. The least number of hospitalization (2 cases and 3,07%) was from other cities, like Baqdad and Sulaimaniya.

4. Signs and Symptoms:

There are a total of 18 signs and symptoms here. Table 5 below shows the data about all of signs and symptoms:

Table 5: Signs and Symptoms

As seen above, the most common symptoms of all are cough and shortness of breath (44 cases and 78,06% each). After these, there are fever (34 cases and 60,71%), sore throat (32 cases and 57,14%) and fatigue (29 cases and 51,78%) with more incidence respectively. The

Signs and Symptom	Positive			Negative		
	Boys	Girls	Total	Boys	Girls	Total
Fever	19	10	29	13	9	22
Wheezing	13	11	24	19	13	32
Sore Throat	20	12	32	12	12	24
Crackles	6	8	14	26	16	42
Cough	20	19	39	7	0	12
Bronchial Breathing	2	4	6	30	20	50
Cyanosis	3	2	5	29	22	51
Rhinorrhea	7	6	13	20	18	38
Convulsions	0	0	0	32	24	56
Shortness of Breath	24	20	44	8	4	12
Fatigue	18	11	29	14	13	27
Diarrhea	7	10	17	20	14	34
Nausea and/or Vomiting	3	0	3	29	19	48
Headache	12	9	21	20	10	30
Excitation and/or Confusion	0	2	2	32	22	54
Acute Flaccid Paralysis	0	0	0	32	24	56
History of Travelling	10	4	14	22	20	42
History of Contact with Pet	1	0	1	31	24	55

least common symptoms are acute flaccid paralysis and convulsions (zero case each).

As to gender-specific signs and symptoms, in boys, still cough is the most common symptom (20 cases and 51.5%) and in girls shortness of breath is more common (21 cases and 52.5%).

All of signs and symptoms are relatively higher in boys than in girls, except for some that we are going to discuss here a bit.

Diarrhea and nausea and/or vomiting are relatively higher in girls which can suggest a higher incidence of gastrointestinal tract involvement among girls.

Also confusion (3 cases) only reported in girls which can also suggest somehow higher incidence of central nervous system involvement in girls. Although there are no reported cases of convulsions.

Keep in mind that these tiny differences are not significant enough to deduce gender-specific differences about COVID-19 in children.

Discussion:

COVID-19 is a threat to the health of the public, especially the children. So getting enough information about that can prepare us to deal better with it.

As showed above, epidemiologic statistics of COVID-19 in Diyala has many similarities with that of worldwide population. Cough, shortness of breath, fever and sore throat are all the most common signs and symptoms in children who had COVID-19.

Boys are at a little more risk of getting COVID-19 but that is not significantly higher. The signs and symptoms of COVID-19 in boys and

girls are somehow the same, although there are some minor differences in the statistics.

Conclusion:

COVID-19 is still a threat to the health of the community especially the children. With this study we aimed to bring to light how this virus presented in children in Al-Batool hospital of Diyala so we have an understanding of what to expect in the future in the possible upcoming episodes of COVID-19 in children.

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