

Research Article

Prevalence of Severe Acute Respiratory Syndrome Coronavirus 2 in Asymptomatic Surgical Paediatric Patients in Makkah, Saudi Arabia

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ABSTRACT

Objectives: Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) is generally asymptomatic in children but is still contagious. This study estimated the prevalence of asymptomatic SARS-CoV-2 infection in pediatric surgical patients in a tertiary hospital in Makkah city.

Methods: A cross-sectional study was conducted involving children less than 18 years of age who were scheduled for surgical procedures under sedation or general anesthesia at the Security Forces Hospital in Makkah (SFHM) between August 1, 2020, and August 31, 2021. Before admission, each patient was screened for symptoms of SARS-CoV-2 and subsequently categorized as a low or high-risk patient. Asymptomatic, low-risk patients underwent nasopharyngeal swab via polymerase chain reaction (PCR) to detect SARS-CoV-2 infection.

Results: A total of 497 asymptomatic pediatric patients were included in this study. The overall prevalence of SARS-CoV-2 positive cases was 1.4%. About 66% of the sample patients were aged eight or less, 66% were males, 76% had elective surgery, and 79% had surgery with general anesthesia.

Conclusion: Screening for SARS-CoV-2 without swabbing did not appear to exclude all positive

1. INTRODUCTION

The coronavirus disease 2019 (COVID-19) is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). First reported in December 2019 in Wuhan, China, COVID-19 continues to spread worldwide. With nearly 330 million confirmed cases as of January 15, 2022, the World Health Organization (WHO) declared the COVID-19 outbreak a pandemic.¹ However, the incidence of the disease in children is less known since widespread testing and screening usually targets adult populations.^{2,3} COVID-19 instances were reported to be 1.7% in individuals aged four years or younger and 7.7% in those aged five to seventeen years, according to the Center for Disease Control and Prevention (CDC).⁴ In two studies conducted in the United States, the positivity rate of COVID-19 among dental and oncological asymptomatic pediatric patients was 2.3% and 2.5%, respectively.^{5,6} A higher prevalence rate of 9.5% was reported in a study with 35,186 asymptomatic pediatric patients from Los Angeles.⁷ About half of the confirmed COVID-19 cases were asymptomatic.^{8,9} However, the risk of transmission from the pediatric population

remains largely unknown. Recently, the CDC recommended that children aged five and older get a COVID-19 vaccination to decrease the spread of the disease.⁴

The Saudi public health authority published policies and procedures prior to performing surgical procedures to reduce the risk of infection, including pre-operative assessment and COVID-19 testing.¹⁰ To better control the COVID-19 pandemic, minimize the risk of infection among health care workers (HCW), and guide infection control protocols, it is imperative to assess the magnitude of the infection. Therefore, this study aimed to measure the prevalence of COVID-19 infection in asymptomatic pediatric patients undergoing surgical procedures at the Security Forces Hospital in Makkah (SFHM), Saudi Arabia.

2. METHODS

A cross-sectional study was conducted at the Security Forces Hospital (SFH) in Makkah. This tertiary hospital receives patients from multiple health care sites across western Saudi Arabia. Approval was obtained from

Institutional Review Board (IRB) to conduct the study (IRB # 0427-010521).

Approval was obtained from Institutional Review Board (IRB) to conduct the study (IRB # 0427-010521). Eligible subjects included all pediatric patients younger than 18 years of age undergoing surgical procedures under sedation or general anesthesia between August 1, 2020, and August 31, 2021. Before admission, each patient underwent a universal pre-operative screening for COVID-19 to categorize them as a low- or high-risk patient (Figure 1). Then, only low-risk patients (scored <10) underwent nasopharyngeal swab via polymerase chain reaction (PCR) assay by trained clinicians to detect SARS-CoV-2 infection before proceeding to surgery, as advised by Saudi public health authority public health authority. High risk patients and children who their parents refused the nasopharyngeal process were excluded from the study. High risk patients and children who their parents refused the nasopharyngeal swab process were excluded. The following variables were collected from the included patients: COVID-19 laboratory results (positive or negative), age in years, sex, surgical procedure type (elective or emergency), type of anesthesia (general or non-GA), and surgical procedure by department (dental, ear, nose and throat (ENT), pediatric, orthopedic, general surgery, ophthalmic, obstetrics and gynecology or urology).

Date:	Time:	MRN:
Name:	ID#:	Hospital:
Circle the number reflecting the patient's condition (exposure and clinical picture) and calculate the final score:		
Risks for COVID-19	Score	
A. Exposure Risks		
Close physical contact with suspected case* of COVID-19 in the past 14 days.	5	
Close physical contact with a confirmed case* of COVID-19 in the past 14 days.	10	
Working or visiting a healthcare facility.	5	
B. Clinical Signs and Symptoms		
1. Fever or recent history of fever.	10	
2. Cough (new or worsening).	10	
3. Shortness of breath (new or worsening).	10	
4. Nausea, vomiting, and/or diarrhea.	5	
5. Positive lab result of COVID-19 within 2 weeks	10	
6. Positive lab result of COVID-19 more than 2 weeks	5	
Total Score		
* Patient or household		
High risk	≥10	
Low risk	<10	
Staff name: _____	ID number: _____	
Note:		
The patient must be evaluated twice:		
(a) With preoperative assessment.		
(b) Day of surgery (or day prior, surgeon's discretion)		
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Figure 1: Preoperative COVID-19 checklists before Surgical procedure

3. STATISTICS

Descriptive statistics were calculated as frequency and percentage for the outcome and other descriptive variables.

4. RESULTS

A total of 497 pediatric patients were included in this study. The overall prevalence of COVID-19 positive cases was 1.4%. Approximately 66% of the sample were less than or equal to age eight; 66% were males; 76% had elective surgery; 79% had surgery with GA. The following departments represented the surgical cases: dental (25%), ENT (24%), pediatric surgery (21%), orthopedic (13%), with ophthalmology, Obstetrics and Gynecology and urology representing the rest of the cases (Table1).

Table 1: Characteristics of pediatric patients scheduled for surgical procedure at Security Forces Hospital in Makkah, Saudi Arabia

Variable	Whole sample, N = 497
SARS-CoV-2 * test status, "No." (%)	
Positive	07 (01.40%)
Negative	490 (98.60%)
Age, "No." (%)	
≤8	327 (65.79%)
>8	170 (34.20%)
Gender, "No." (%)	
Male	328 (65.99%)
Female	169 (34.10%)
Type of surgical procedure, "No." (%)	
Elective	379 (76.20%)
Emergency	118 (23.70%)
Type of anesthesia, "No." (%)	
General anesthesia	392 (78.87%)
Non-general anesthesia	105 (21.10%)
Department, "No." (%)	
Dental	123 (24.74%)
ENT (Ear, Nose, and Throat)	121 (24.34%)
Pediatric Surgery	106 (21.30%)
Orthopedic	64 (12.87%)
General surgery	44 (08.85%)
Ophthalmic	24 (04.80%)
Ob-Gyn (Obstetrics and Gynecology)	8 (01.60%)
Urology	7 (01.40%)

* Severe Acute Respiratory Syndrome Coronavirus 2

5. DISCUSSION

The current global spread of SARS-CoV-2 infection necessitates ongoing research into the epidemiology and clinical features of COVID-19. Few studies of asymptomatic pediatric patients infected with SARS-CoV-2 have been published so far. This study estimated the overall prevalence of SARS-CoV-2 to be very low among asymptomatic surgical pediatric patients. Despite the increasing number of publications on SARS-CoV-2, the cause of asymptomatic or mild symptomatic cases in children infected with SARS-CoV-2 remains unspecified. However, asymptomatic patients can spread the infection to others.¹¹

The positivity rate in our study was 1.4%, which was around the prevalence reported in other studies. In a study by Lamberghini et al. that included 921 pediatric patients in Chicago, USA, the prevalence was 2.3%.⁵ In another study by Shah et al., the prevalence among

pediatric oncological patients was 2.5%.¹² Nevertheless, the lower prevalence rate described by Sola et al. varied by location and ranged from 0% to 2.2%, with a pooled prevalence of 0.65%.¹³ However, recent study from Catalonia, Spain reported similar prevalence rate of 1.0% among children, and significantly lower rate among adult population 0.27%. These findings reinforce that pediatric patients have at least the same probability to be infected with SARS-CoV-2.¹⁴ Approximately 75% of children and adolescents in the United States had serologic evidence of prior SARS-CoV-2 infection as of February 2022. However, recent study from Catalonia, Spain reported similar prevalence rate of 1.0% among children, and significantly lower rate among adult population 0.27%. These findings reinforce that pediatric patients have at least the same probability to be infected with SARS-CoV-2.¹⁴ Approximately 75% of children and adolescents in the United States had serologic evidence of prior SARS-CoV-2 infection as of February 2022.¹⁵ However, recent study from Catalonia, Spain reported similar prevalence rate of 1.0% among children, and significantly lower rate among adult population 0.27%. These findings reinforce that pediatric patients have at least the same probability to be infected with SARS-CoV-2.¹⁴ Approximately 75% of children and adolescents in the United States had serologic evidence of prior SARS-CoV-2 infection as of February 2022.¹⁵ The available data suggested a slight variation in prevalence rate depending on the region. For that reason, prevalence data on specific areas might hold greater utility in establishing guidelines and protocols by local health authorities to suppress the spreading of the SARS-CoV-2 infection. However, prevalence data on asymptomatic pediatric populations at the local and regional levels is limited.

In our study, seven cases tested positive despite being asymptomatic and categorized as low-risk patients by a universal pre-operative screening tool. Although universal pre-operative screening for COVID-19 has its advantages, including other screening methods into pre-operative screening might enhance infection control measures such as hospital isolation practices and bed assignments.^{1 6} In a recent survey by the Pediatric

Anesthesia Leadership Council, 41 participating facilities found that 56% of them had implemented universal pre-operative screening (Thomas Long, MD, email communication, April 19, 2020).

Limitations of our study exist. A single measure of PCR assay with a sensitivity of 78% was used.¹⁷ Secondly, children's cooperation with the nasopharyngeal swab technique could have affected the quality of the collected sample and, possibly, the positivity rate. Saliva testing is expected to be more acceptable in a pediatric population. Thirdly, we could not obtain any bigger sample size due to protocol changes in COVID-19 vaccines for children which subsequently changed the hospital protocol about COVID-19 testing. It is noteworthy that we planned to recruit subjects from the biggest hospital in Makkah city but unfortunately we could not obtain the data due to administrative reasons. However, these drawbacks are alleviated by several factors. Nasopharyngeal swabs were collected by trained clinicians. The screened cases were referred from primary care centers covering a wider network beyond the Makkah region. Therefore, our findings are likely to reflect our community, helping local hospitals better control the COVID-19 pandemic and, particularly, reducing the risk of SARS-CoV-2 infection among health care workers (HCW). More studies should be conducted in a multi-center study with a larger sample size to obtain a higher level of generalization.

5. CONCLUSION

Despite the low prevalence of COVID-19 positive cases in an asymptomatic pediatric population, every effort should be made to suppress the spread of SARS-CoV-2 infection and improve infection control measures.

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CONFLICT OF INTEREST

The authors have no conflicts of interest to declare.

ETHICAL APPROVAL

SFHM IRB, 0427-070527, 5-23-2021

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