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Prevalence of asymptomatic SARS-CoV-2 infection in children in Sivas province, Central Anatolia

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ABSTRACT

Objectives: Transmission from asymptomatic patients is one of the biggest challenges in controlling the Coronavirus disease 2019 (COVID-19) outbreak because these cases are a potential source for disease spread. Based on this situation, the aim of our study is to determine the prevalence of COVID-19 in asymptomatic pediatric dental patients representing Sivas and surrounding provinces.

Methods: The population of the study consists of pediatric patients between the ages of 0-14 who applied to Sivas Oral and Dental Health Hospital General Operating Room for dental treatments between July 2020 and August 2021.

Results: Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection was detected in only 5 patients (approximately 1.80%) out of 278 asymptomatic pediatric patients.

Conclusions: It is thought that the COVID-19 infection, which threatens the whole world, can progress asymptomatically in children, and therefore it may be a risk factor for the spread of the infection. To tackle the COVID-19 pandemic, it is recommended to maintain a high level of infection control measures in schools and day-care and to implement widespread testing on a global scale targeting the pediatric population.

Keywords: COVID-19, SARS-CoV-2, asymptomatic infection, children

Coronavirus disease 2019 (COVID-19) is an infectious caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), affecting 234 million people worldwide as of October 2021 [1]. SARS-CoV-2 is transmitted primarily by salivary droplets or nasal discharge that occurs when and patient sneezes or coughs [2]. The most common findings of the disease are cough, fever, myalgia, fatigue, dyspnea, anosmia and loss of taste. Also, some patients have headache, hemoptysis, diarrhea, myalgia and increased sputum production [3]. However, none of the aforementioned disease findings are sufficient to diagnose COVID-19 alone without microbiological tests. In addition, the overall estimate of the proportion of people infected with SARS-CoV-2 and remaining asymptomatic throughout the infection has been reported to be 20% [4].

Transmission from asymptomatic patients is one of the biggest challenges in controlling the COVID-19 outbreak because these cases are a potential source for disease spread [5]. The replication of SARS-CoV-2 in the upper respiratory tract is a factor for the high infectivity of the virus, and unlike SARS, SARS-CoV-2 can be communicated by asymptomatic individuals [6, 7]. Although asymptomatic SARS-CoV-2 infections have been reported worldwide in recent months,

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little data are available on the infectivity, epidemiological significance, virological characteristics and mechanism of infections in people with asymptomatic COVID-19 [4, 7, 8]. It is thought that people with asymptomatic COVID-19 may be less contagious than symptomatic patients [5, 8]. However, transmission from asymptomatic cases is estimated to account for > 50% of all transmissions [9]. In a study conducted in Turkey, it was reported that 22.7% of pediatric patients diagnosed with COVID-19 were asymptomatic [10]. In order to be able to effectively control the spread of the infection; In addition to identifying and isolating people with symptomatic COVID-19, it also requires reducing the risk of transmission from asymptomatic patients [9].

COVID-19 infection is a disease that can be seen in all age groups [11]. Although children are thought to be less affected by COVID-19 than adults, their rates of being infected may be similar to adults [12, 13]. This inconsistency in data was attributed to the fact that children may be asymptomatic during the disease or have symptoms so mild that they do not require medical attention [13]. Also, a meta-analysis conducted in 2021 reported that children tent to have mild SARS-CoV-2 infection with a good prognosis compared to adults [11]. In conclusion, the prevalence of the infection among undiagnosed children is also not fully known, since the symptoms are usually less severe [14] or absent [15] in pediatric patients. Also, the susceptibility levels of children or the transmission rates of COVID-19 are still important research topics for researchers.

SARS-CoV-2 seroprevalence may differ between various variables such as geographical regions and ethnic groups [16]. Therefore, it is also important to detect regional seroprevalences as well as the global seroprevalence of the infection.

Consequently, the aim of the this study is to determine the prevalence of asymptomatic SARS-CoV-2 infection in healthy children without lower or upper respiratory tract symptoms and signs of infection who applied for dental treatment under general anesthesia from Sivas and surrounding provinces.

METHODS

Sample Size and Selection

The population of the study consists of pediatric patients between the ages of 0-14 who applied to Sivas Oral and Dental Health Hospital General Operating Room for dental treatments between July 2020 and August 2021. The preoperative evaluation record of the related cases were reviewed retrospectively. Demographic data (age, gender) obtained from patient records, presence-absence of systemic disease or any syndrome, consultations requested for patients, preoperative assesments records including the signs of infection and lower-upper respiratory tract symptoms of the relevant patients, the record of whether the relevant patient is in contact or not with a COVID-19 patient and polymerase chain reaction (PCR) test to detect SARS-CoV-2 results will be evaluated.

Ethical Commitee Approval

The present study was carried out with the the permission of the Republic of Turkey Ministry of Health, General Directorate of Health Services (Date: July 28,2021, Decision No: 2021-07-28T14_02_57) and approval of the Ethics Committee of Sivas Cumhuriyet University Non-Interventional Clinical Research (Approval number: 2021-08/31).

Statistical Analysis

The data were analyzed using the Statistical Package for the Social Sciences (SPSS) Version 22.0 (IBM Corporation, USA). In the present descriptive study, the results were given as numbers and percentages for categorical variables, and as mean and standard deviation for numerical variables.

RESULTS

Since Sivas Oral and Dental Health Hospital is one of the few dental hospitals that has a general operating room, Anesthesia and Reamination and Pediatric dental specialists in its own staff; It is an institution where patients from Sivas and surrounding provinces apply for dental treatments under general anesthesia.

When the patient's preoperative assesment records of 278 asymtomatic patients who applied to the Sivas Oral and Dental Health Hospital General Operating Room for dental treatments under general anesthesia within the specified date range were evaluated; it was detected that only 5 patients (approximately 1.80%)

Table 1. Age, gender, systemic disease, date of diagnosis and the variation status of the SARS-CoV-2 virus of children diagnosed with COVID-19

Patient	Age (years)	Gender	Systemic disease	Date of diagnosis (dd.mm.yyyy)	Presence of SARS-CoV-2 delta variant
No. 1	4	Girl	None	13.07.2020	-
No. 2	13	Girl	Cerebral palsy	30.10.2020	-
No. 3	4	Girl	None	10.04.2021	-
No. 4	6	Boy	None	23.08.2021	+
No. 5	7	Boy	None	31.08.2021	+

with a mean age of 6.8 ± 3.7 years were diagnosed with COVID-19.

The age, gender, systemic diseases, date of diagnosis and the variation status of SARS-CoV-2 were shown in Table 1.

DISCUSSION

Although operative and anaesthetic strategies should be personalized for each case, in clinical practice many pre-operative strategies and routine tests are used generally. These tests and protocols, whether or not guided by the case's clinical and medical history, have been part of pre-operative clinical practice for many years [17]. The anesthesiologist reviews the child's respiratory, cardiological and medical conditions and, when deemed necessary, requests the consultations based on the child's relevant medical anamnesis. In order to minimize the complications of anesthesia; It is necessary to provide optimal conditions for dental treatment, which is an elective surgery. Therefore, it is not desired for the patient to have active lower and upper respiratory tract symptoms, cardiological symptoms, fever and fatigue etc. findings. Symptoms such as fever, cough, pulmonary auscultation findings or oxygen saturation are the most&first easily accessible diagnostic data in COVID-19 infection [18]. However, diagnostic tests play an important role in the diagnosis of diseases, since there are no specific clinical signs that can reliably distinguish COVID-19 from other viral respiratory infections and the possibility of the infection being asymptomatic [5, 18]. Serological testing can have an important role in detecting cases with milder disease that may not have been noticed by other surveillance tests, or in diagnosing convalescents [19]. Therefore, these tests are applied to most people who have potential for infection to determine the probable duration of SARS-CoV-2 infection, to contribute to the epidemiological studies and to prevent the spread of the infection [5, 19]. In the present study, the prevalence of COVID-19 in asymptomatic children was investigated, albeit indirectly, with the results of PCR tests for COVID-19 requested from asymptomatic children without any respiratory tract infection for the administration of general anesthesia.

The Infectious Diseases Society of America (IDSA) panel agrees that pre-surgery COVID-19 diagnostic testing could be applied to asymptomatic individuals based on available evidence supporting that asymptomatic cases may have similar transmission potential and viral loads as symptomatic patients. Therefore, IDSA recommends SARS-CoV-2 RNA testing in asymptomatic population who will undergo a time-sensitive aerosol generation procedure and who have no known exposure to virus [20]. Similarly, during the pandemic period, retrospective screening was possible because PCR test for SARS-CoV-2 RNA was requested from patients before aerosol-generating surgical and dental procedures to be performed under general anesthesia in Sivas Oral and Dental Health Hospital.

COVID-19 patients who are not in a severe systemic conditions and individuals who have been in contact with any COVID-19 patients are quarantined at home to prevent the spread of the SARS-CoV-2 [21]. The follow-ups of the patients who are quarantined during the quarantine period regarding their systemic diseases or any ailments are observed through telemedicine applications, home health care services or emergency health services. All of the children who

applied to Sivas Oral and Dental Health Hospital with the request of general anesthesia at the time intervals specified in the present study were outpatients. Therefore; It may be possible to say that the asymptomatic COVID-19 cases detected in this study did not have any known contact with COVID-19 patients before.

When the literature on COVID-19 infection is evaluated, the literature on pediatric patients is not as numerous as in adult patients. In a study conducted in 2021, the frequency of PCR positivity for COVID-19 in Fortaleza/Brazil was found to be 3.5% and 3.6% in children and adolescents, respectively [22]. However the incidence of COVID-19 in asymptomatic children is unknown due to the lack of widespread testing and priority given to testing adults and severely ill cases [23]. In other words, the detection of the prevalence of especially asymptomatic children is important for public health because of its effects on transmission and control measures. As a result of the assessment of studies evaluating the prevalence of SARS-CoV-2 among asymptomatic individuals [24-26], the IDPA stated that the prevalence of infection in asymptomatic patients in the general population would be between < 1 and 10% [20]. In the present study; the prevalence of asymptomatic pediatric patients was found 1.8%, similar to the reported prevalence range [20]. Similar to the results of the present study, Patel *et al*. [27] reported the prevalence of SARS-CoV-2 infection among asymptomatic children to be 1-2% in Chicago.

COVID-19 seroprevalence is related to climate or/and geographic latitudes, human development indices, income levels and varies significantly between geographic regions [16]. Longitudinal studies to continuously monitor seroprevalence worldwide are critical to control efforts and support infection prevention and can demonstrate levels of endemic stability or instability in certain regions/countries [16]. When the literature was reviewed, it was reported that the number of SARS-CoV-2 cases detected in children was rarely documented in the daily reports of most countries outside of Asia [11]. In this context, the present study only represents the pediatric dental patient population from Sivas and its surrounding provinces, namely the central Anatolia region.

It has been reported that most young children have been infected with COVID-19 by family members [28]. However, the Center of Diaseas Control and Prevention reported that community mitigation measures and school closures may have reduced COVID-19 transmission among children and so opinions about SARS-CoV-2 infection in children may change after schools open [23]. In this context, we would like to state that the schools were closed at the time the data of the present retrospective study was obtained.

The infection risk of COVID-19 can be affected by various parameters such as the age, gender and underlying comorbidities of the patient concerned, or the variants of SARS-Cov-2 [29-31]. It has been reported that the Delta variant of SARS-CoV-2 may be more transmissible than the Alpha variant and pose the highest risk among any currently available SARS-CoV-2 variants [30]. In addition, the Delta variant was associated with higher viral RNA loads and greater infectivity in both fully vaccinated and unvaccinated people [32]. It is catchy that two patients detected in the same month in this study were infected with the Delta variant and were male. However, since the number of cases in the present study population is limited; There is a need for long-term clinical studies with larger population, especially in the pediatric population.

Detecting the asymptomatic COVID-19 children may be possible by a universal screening policy that tests all hospital admissions. Without a hospital-wide screening policy, these children may pose a risk to hospital staff and other patients [28]. If we consider this risk in terms of households; Children with asymptomatic COVID-19 can be a source of SARS-CoV-2 infection, which infects their parents, caregivers and social circles. On the other hand, socializing among children with the opening of schools can be a major concern for the spread of SARS-CoV-2 [33]. For this reason, it is important to establish social screening policies in terms of detecting asymptomatic cases, especially in pediatric patients.

Limitations

The limitation of the present study is the limited number of asymptomatic patients who participated in this retrospective study, as PCR tests for SARS-CoV-2 were requested from pediatric patients who applied to Sivas Oral and Dental Health Hospital only for general anesthesia. In addition, the study only represents the pediatric patient population from Sivas and surrounding provinces. Therefore, studies in larger populations are needed to determine the universal prevalence of asymptomatic pediatric patients.

CONCLUSION

It is thought that the COVID-19 infection, which threatens the whole world, can progress asymptomatically in children, and therefore it may be a risk factor for the spread of the infection. In this context, taking into account that children can never be completely free from the risk of contagious diseases, it is necessary to take the maximum possible precautions for their care. To tackle the COVID-19 pandemic, it is recommended to maintain a high level of infection control measures in schools and day-care and to implement widespread testing on a global scale targeting the pediatric population. However, more robust and well-designed studies are still needed to have a relevant public health intervention.

Authors' Contribution

Study Conception: MC; Study Design: MC, SY; Supervision: MC, SY; Funding: MC, SY; Materials: N/A; Data Collection and/or Processing: MC, SY; Statistical Analysis and/or Data Interpretation: MC, SY; Literature Review: MC, SY; Manuscript Preparation: MC and Critical Review: MC, SY.

Conflict of interest

The authors disclosed no conflict of interest during the preparation or publication of this manuscript.

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REFERENCES

1. WHO Coronavirus (COVID-19) Dashboard. (https://covid19.who.int). Accessed 5 October 2021.
2. Coronavirus. (https://www.who.int/westernpacific/health-topics/coronavirus). Accessed 23 July 2021.
3. Izda V, Jeffries MA, Sawalha AH. COVID-19: a review of therapeutic strategies and vaccine candidates. Clin Immunol 2021;222:108634.
4. Buitrago-Garcia D, Egli-Gany D, Counotte MJ, Hossmann S, Imeri H, Ipekci AM, et al. Occurrence and transmission potential of asymptomatic and presymptomatic SARS-CoV-2 infections: a living systematic review and meta-analysis. PLoS Med 2020;17:e1003346.
5. Sayampanathan AA, Heng CS, Pin PH, Pang J, Leong TY, Lee VJ. Infectivity of asymptomatic versus symptomatic COVID-19. Lancet 2021;397:93-4.
6. Salzberger B, Buder F, Lampl B, Ehrenstein B, Hitzenbichler F, Holzmann T, et al. Epidemiology of SARS-CoV-2. Infection 2021;49:233-9.
7. Rothe C, Schunk M, Sothmann P, Bretzel G, Froeschl G, Wallrauch C, et al. Transmission of 2019-nCoV infection from an asymptomatic contact in Germany. N Engl J Med 2020;382:970-1.
8. Gao M, Yang L, Chen X, Deng Y, Yang S, Xu H, et al. A study on infectivity of asymptomatic SARS-CoV-2 carriers. Respir Med 2020;169:106026.
9. Johansson MA, Quandelacy TM, Kada S, Prasad PV, Steele M, Brooks JT, et al. SARS-CoV-2 transmission from people without COVID-19 symptoms. JAMA Netw Open 2021;4:e2035057.
10. Karbuz A, Akkoc G, Bedir Demirdag T, Yilmaz Ciftdogan D, Ozer A, Cakir D, et al. Epidemiological, clinical, and laboratory features of children with COVID-19 in Turkey. Front Pediatr 2021;9:172.
11. Mantovani A, Rinaldi E, Zusi C, Beatrice G, Saccomani MD, Dalbeni A. Coronavirus disease 2019 (COVID-19) in children and/or adolescents: a meta-analysis. Pediatr Res 2021;89:733-7.
12. Yasuhara J, Kuno T, Takagi H, Sumitomo N. Clinical characteristics of COVID-19 in children: a systematic review. Pediatr Pulmonol 2020;55:2565-75.
13. Mehta NS, Mytton OT, Mullins EWS, Fowler TA, Falconer CL, Murphy OB, et al. SARS-CoV-2 (COVID-19): what do we know about children? A systematic review. Clin Infect Dis 2020;71:2469-79.
14. Dong Y, Mo X, Hu Y, Qi X, Jiang F, Jiang Z, et al. Epidemiology of COVID-19 among children in China. Pediatrics 2020;145:e20200702.
15. Bhuiyan MU, Stiboy E, Hassan MZ, Chan M, Islam MS, Haider N, et al. Epidemiology of COVID-19 infection in young children under five years: a systematic review and meta-analysis. Vaccine 2021;39:667-77.
16. Rostami A, Sepidarkish M, Leeflang MMG, Riahi SM, Nourollahpour Shiadeh M, Esfandyari S, et al. SARS-CoV-2 seroprevalence worldwide: a systematic review and meta-analysis. Clin Microbiol Infect 2021;27:331-40.
17. García-Miguel FJ, Serrano-Aguilar PG, López-Bastida J. Preoperative assessment. Lancet 2003;362:1749-57.
18. Struyf T, Deeks JJ, Dinnes J, Takwoingi Y, Davenport C, Leeflang MM, et al. Signs and symptoms to determine if a patient presenting in primary care or hospital outpatient settings has COVID−19 disease. Cochrane Database Syst Rev 2020;2020:CD013665.
19. Yong SEF, Anderson DE, Wei WE, Pang J, Chia WN, Tan CW, et al. Connecting clusters of COVID-19: an epidemiological and serological investigation. Lancet Infect Dis 2020;20:809-15.
20. Infectious Diseases Society of America Guidelines on the Di-

agnosis of COVID-19. (https://www.idsociety.org/practice-guideline/covid-19-guideline-diagnostics/). Accessed 31 August 2021.
21. Temaslı Takibi, Salgın Yönetimi, Evde Hasta İzlemi ve Filyasyon. (https://covid19.saglik.gov.tr/TR-66339/temasli-takibi-salgin-yonetimi-evde-hasta-izlemi-ve-filyasyon.html). Accessed 23 September 2021.
22. Júnior VCP, Moura LFWG, Cavalcante RC, Lima JRC, Bezerra AS, Dantas DR de S, et al. Prevalence of COVID-19 in children, adolescents and adults in remote education situations in the city of Fortaleza, Brazil. Int J Infect Dis 2021;108:20-6.
23. Healthcare Workers. (https://www.cdc.gov/coronavirus/2019-ncov/hcp/pediatric-hcp.html). Accessed 1 September 2021.
24. Gudbjartsson DF, Helgason A, Jonsson H, Magnusson OT, Melsted P, Norddahl GL, et al. Spread of SARS-CoV-2 in the Icelandic population. N Eng J Med 2020;382:2302-15.
25. Sutton D, Fuchs K, D'Alton M, Goffman D. Universal screening for SARS-CoV-2 in women admitted for delivery. N Eng J Med 2020;382:2163-4.
26. Yu J, Ouyang W, Chua MLK, Xie C. SARS-CoV-2 transmission in patients with cancer at a tertiary care hospital in Wuhan, China. JAMA Oncol 2020;6:1108-10.
27. Patel AB, Clifford A, Creaden J, Kato K, Malakooti MR, Muller WJ, et al. Severe acute respiratory syndrome coronavirus 2 point prevalence among asymptomatic hospitalized children and subsequent healthcare worker evaluation. J Pediatr Infect Dis Soc 2020;9:617-9.
28. Martins MM, Prata-Barbosa A, da Cunha AJLA. Update on SARS-CoV-2 infection in children. Paediatr Int Child Health 2021;41:56-64.
29. Gao Y-D, Ding M, Dong X, Zhang J-J, Kursat Azkur A, Azkur D, et al. Risk factors for severe and critically ill COVID-19 patients: a review. Allergy 2021;76:428-55.
30. Farinholt T, Doddapaneni H, Qin X, Menon V, Meng Q, Metcalf G, et al. Transmission event of SARS-CoV-2 delta variant reveals multiple vaccine breakthrough infections. BMC Med 2021:19:255.
31. Haitao T, Vermunt JV, Abeykoon J, Ghamrawi R, Gunaratne M, Jayachandran M, et al. COVID-19 and sex differences. Mayo Clin Proc 2020;95:2189-203.
32. Luo CH, Morris CP, Sachithanandham J, Amadi A, Gaston D, Li M, et al. Infection with the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) delta variant is associated with higher recovery of infectious virus compared to the alpha variant in both unvaccinated and vaccinated individuals. Clin Infect Dis 2022;75:e715-25.
33. Alsohime F, Temsah M-H, Al-Nemri AM, Somily AM, Al-Subaie S. COVID-19 infection prevalence in pediatric population: etiology, clinical presentation, and outcome. J Infect Public Health 2020;13:1791-6.