

Preoperative Screening for COVID-19: Results from a Clinical Diagnostic Laboratory

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Cite this article as: Aydogan O, Gozun Saylan E, Guven O, Ayaz A, Yigitbasi T. Preoperative screening for COVID-19: Results from a clinical diagnostic laboratory. *Experimed* 2022; 12(3): 130-3.

ABSTRACT

Objective: The study aimed to determine what proportion of Turkiye's preoperative patient population has tested positive for COVID-19 and to ascertain whether the increasing or decreasing trend in the numbers of positive preoperative patients resembles the general population of Turkiye during the same period.

Materials and Methods: The study cohort involved of the 14,776 patients from various services between January 1-December 31, 2021 who needed preoperative COVID-19 test reports. The patient's SARS-CoV-2 RNA's were detected with real-time polymerase chain reaction (RT-PCR) technique.

Results: SARS-CoV-2 RT-PCR positivity was detected in 422 (2.86%) patients, of which 59.72% ($n = 252$) were female and 40.28% ($n = 170$) were male; their mean age was 40.2 years. Of the 422 positive cases, 84.12% were young adults (18-65 years), and 9% were middle-aged (66-79 years). Positive cases involving those under the age of 18 were found to account for 5.22% ($n = 22$) of the total. The highest positivity rate was observed in April 2021 at 8.28% of all test requests, while the lowest positivity rate was observed in June 2021, at 0.36% of all test requests. The highest positivity rate of April was followed by March (5.07%), October (4.74%), and August (3.13%).

Conclusion: In conclusion, the COVID-19 RT-PCR positivity rate in the series was detected as 2.85% in preoperative patients over the one-year period. Monthly positivity rates in screening results are consistent with the number of cases seen in the general population.

Keywords: COVID-19, preoperative screening, SARS-CoV-2, RT-PCR

INTRODUCTION

An ongoing outbreak of the Coronavirus Disease 2019 (COVID-19) was first identified in Wuhan, China at the end of 2019. As the spread of the novel coronavirus accelerated, person-to-person transmission in homes and hospitals as well as the intercity spread of the severe acute respiratory syndrome-Coronavirus-2 (SARS-CoV-2) also occurred. COVID-19 was named by the World Health Organization (WHO), which also declared it as a pandemic on March 11, 2020. On that same date, Turkiye reported its first confirmed COVID-19 case. As of October 2022, more than 620 million cases and more than 6.55 million deaths have

been reported worldwide, with COVID-19 having caused more than 16.5 million cases and more than 101,000 deaths in Turkiye (1, 2). Due to the lack of information about the prognosis of the disease in the early days of the pandemic, all operations and surgical interventions that were not life-threatening were postponed indefinitely. Although the widespread use of vaccines that largely prevent the disease and the necessary medical precautions being taken in hospitals bring comfort that operations can be performed safely, determining which of the patients will undergo surgery are SARS-CoV-2 carriers is essential. According to the Royal Australasian College of Surgeons, the common opinion is that each patient should be tested with real-time polymerase chain reaction (RT-PCR) before surgery,

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Submitted: 18.10.2022 **Revision Requested:** 04.11.2022 **Last Revision Received:** 18.11.2022 **Accepted:** 23.11.2022 **Published Online:** 30.12.2022



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due to the prevalence of asymptomatic and presymptomatic patients being unknown (3, 4). The COVID-19 RT-PCR test is performed approximately 48 hours before the operation date on preoperative patients, as suspected COVID-19 patients may pose a risk to healthcare workers and other patients. In Turkiye, RT-PCR tests for COVID-19 and chest computed tomography (CT) are requested when deemed necessary before even planning the operation. During the pandemic, treating all patients as if they were COVID-19 positive and using personal protective equipment that would limit contact with patients has been important (5).

The aims of this study were to determine the SARS-CoV-2 positivity rates of preoperative patients and whether the increasing and decreasing trends in the numbers of positive preoperative patients resembled the overall general population of Turkiye during the same period.

MATERIALS AND METHODS

The study included 14,776 patients whose clinical cases had been sent with a preoperative COVID-19 RT-PCR test request from various services between January 1-December 31, 2021.

Viral nucleic acid isolation was performed by treating the nasopharyngeal swab, bronchoalveolar lavage, and tracheal aspirate samples with the viral nucleic acid buffer (vNAT). SARS-CoV-2 RNAs were isolated from the Bio-Speedy® SARS-CoV-2 Double Gene RT-qPCR and Bio-Speedy® SARS-CoV-2 Triple Gene RT-qPCR kits (Bioeksen R&D Technologies Ltd., Istanbul, Turkiye) and performed in Bio-Rad CFX96 and Bio-Rad DX RT-PCR systems (Hercules, CA, USA).

This study was carried out with the approval of the Istanbul Medipol University Clinical Research Ethics Committee (Decision No. 156 dated February 17, 2022), and permission for the study was obtained from the Scientific Study Platform of the Ministry of Health (Application No: 2022-02-04T12_58_42 dated February 5, 2022). Next, the study retrospectively reviewed the results of the preoperative screening tests (all specialties & services) performed between January 1-December 31, 2021 at the Laboratory of Istanbul Medipol University Genetic Diseases Assessment Center. Because many patients have undergone multiple tests, having the study clearly make the unit of analysis the number of patients tested for COVID-19 instead of the number of tests performed is important.

RESULTS

The study includes $n = 14,776$ patients, of whom 9,933 (67.2%) are female and 4,843 (32.8%) are male. Of these, 422 (2.86%) patients tested positive with the RT-PCR test, 252 (59.72%) female, and 170 (40.28%) male, with an overall mean age of 40.2 years. According to age classification, 84.12% of patients were young adults (18-65 years), and 9% were middle-aged (66-79). The positivity rate for those under 18 years was 5.22% ($n = 22$; Table 1).

Table 1. Demographic features of the patients.

	ALL CASES n = 14,776	RT-PCR (+) n = 422 (%)
Gender		
Female	9,933 (67.2%)	170 (40.28%)
Male	4,843 (32.8%)	252 (59.72%)
Age		
0-2	69 (0.47%)	4 (0.95%)
3-11	360 (2.44%)	8 (1.9%)
12-17	175 (1.18%)	10 (2.37%)
18-65	12,544 (84.89%)	355 (84.12%)
18-30	4,406 (29.82%)	104 (24.64%)
31-40	3,647 (24.68%)	113 (26.78%)
41-50	2,346 (15.87%)	78 (18.48%)
51-65	2,145 (14.52%)	60 (14.22%)
66-79	1,338 (9%)	38 (9%)
80+	290 (%1.66)	7 (%1.66)

The highest percentage of positivity was found to be 8.28% in April 2021, while the lowest was found to be 0.36% in June. The positivity rates for 2021 by month are shown in Figure 1.

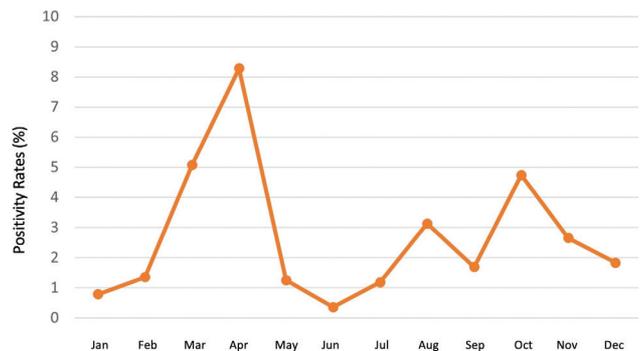


Figure 1. The positivity rates by month.

DISCUSSION

Preoperative risk assessment of patients has always been critical for safe surgical practice and has become even more important for the safety of patients and healthcare workers during the COVID-19 pandemic. Routine preoperative testing for COVID-19 helps distinguish patients with asymptomatic infections. This study detected a 2.85% SARS-CoV-2 RT-PCR positivity rate for 14,776 preoperative patients. Studies have shown surgical procedures to be associated with worse clinical outcomes, increased postoperative complications, and mortality with regard to SARS-CoV-2 positive patients (6-9). Current knowledge of SARS-CoV-2 and COVID-19 during the pandemic is rapidly being renewed and is based on limited available data. Therefore, local and global data,

protocols, and guidelines should be updated and published frequently (10).

Due to the low sensitivity of detecting SARS-CoV-2 during the incubation period using RT-PCR test, preoperative self-isolation and quarantining patients 14 days before the planned surgery date has been reported to be able to possibly eliminate the risk of it going undetected (11). However, the general opinion is that RT-PCR test screening should be performed to manage patients' pre-surgery (3, 4). Although the use of serological tests are frequently used for screening in the diagnosis of infectious agents, their use for SARS-CoV-2 infections is a controversial point, with complementary and epidemiological studies thought to be needed regarding the diagnosis of COVID-19 (12). In the report from 11 health institutions in the USA state of North Carolina, all patients were reported to have been preoperatively screened for SARS-CoV-2, with the opinion being that serological tests are unnecessary for asymptomatic patients. Of the tests that were run, these 11 institutions reported that 53,745 tests came back positive at rates ranging from 0.31% to 1.35% of the overall tests. Similarly, in the USA state of Florida, 85 (1.2%) RT-PCR tests were found to be positive out of 7,213 preoperative patients (7,13). Hendrickson et al. (14) performed SARS-CoV-2 screening with RT-PCR on 3,794 preoperative patients with a reported positivity rate of 0.69%. A study conducted in the USA state of Texas during the peak era of positive cases (May-June 2020) found positive RT-PCR results in 51 (1.4%) of the 3,563 preoperative patients (15).

SARS-CoV-2 RT-PCR positivity rates for preoperative patients are closely related to their treatment service, comorbidities, age, case rates in their region, and date. A study conducted in England reported the frequency of false negatives before orthopedic surgery to have been quite low (1:1,400) and the risk of death after infection to have been even lower (1:7,000). In addition, positive test rates were found to be higher in younger patients. Singer et al. showed asymptomatic COVID-19 positivity to have been detected in 0.13% of 4,739 preoperative patients, with the positive tested patients being under 60 years of age and the rate tends to increase as age decreases (16). Other studies have also reported higher positivity rates among younger patients (17-19). Similarly, the two groups with the highest positivity rates among the patients included in our study were the 31-40 (26.8%) and 18-30 (24.6%) age groups.

The present study should be viewed in light of several limitations. Firstly, despite having a large number of patients ($n = 14,776$), the hospital department information and clinical features of the patients are inaccessible, and secondly, this is a retrospective study.

In conclusion, the average rate of SARS-CoV-2 RT-PCR positivity among the preoperative patients studied here over a one-year period was not found to be high based on the course of the outbreak among the general population. However, peak periods were shown to be able to occur among preoperative patients.

Scientific Presentation: The study was presented as a poster presentation at the 22nd Turkish Society of Clinical Microbiology and Infectious Diseases Congress on March 9-12, 2022.

Ethics Committee Approval: This study was approved by the Clinical Research Ethics Committee of Istanbul Medipol University (Date: 17.02.2022, Decision Number: 156).

Peer-review: Externally peer-reviewed.

Author Contributions: Conception/Design of Study - O.A., E.G.Ş., Ö.G., A.A., T.Y.; Data Acquisition - O.A., E.G.Ş.; Data Analysis/Interpretation - O.A., E.G.Ş., Ö.G., A.A., T.Y.; Writing Manuscript - O.A., E.G.Ş., Ö.G., A.A., T.Y.; Critical Review: O.A., E.G.Ş., Ö.G., A.A., T.Y.

Conflicts of Interest: The authors declare no conflict of interest.

Financial Disclosure: The authors have no conflict of interest to declare.

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