



ORIGINALES

The prevalence of SARS-coV-2 infection in a public university of Paraná: an observational study

Prevalência de infecção por SARS-coV-2 em uma universidade pública do Paraná: um estudo observacional

Prevalencia de infección por SARS-coV-2 en una universidad pública de Paraná: un estudio observacional

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<https://doi.org/10.6018/eglobal.507361>

Received: 12/01/2022

Accepted: 29/06/2022

ABSTRACT:

Introduction: COVID-19 is a disease caused by the SARS-CoV-2 virus that spread worldwide in early 2020. One year and seven months after the beginning of the global spread of the disease, the number of confirmed cases in Brazil exceeds 21 million and 601 thousand deaths recorded. The aim of this study was to assess the prevalence of SARS-CoV-2 infection in an academic community.

Method: Observational study, with a cross-sectional design, carried out in the academic community of a Public State University in Northern Paraná. 157 people participated, including professors, academics and university agents. The dependent variable was the presence of total antibodies against SARS-CoV-2.

Results: The prevalence of antibodies against SARS-CoV-2 in academics and employees of a public university in the North region of Paraná was 7%. In the bivariate analysis of factors associated with the presence of antibodies, teachers, people who had close contact with a confirmed case of COVID-19, fever, muscle pain, cough, sore throat, anosmia and ageusia, were the characteristics that were most associated with the disease. presence of antibodies.

Conclusion: It was found that 7% of the academic community studied had antibodies against COVID-19.

Key words: Pandemic; COVID-19; Prevalence

RESUMO:

Introdução: A COVID-19 é uma doença causada pelo vírus SARS-CoV-2 que se espalhou

mundialmente no início de 2020. Após um ano e sete meses do início da disseminação mundial da doença, o número de casos confirmados no Brasil, ultrapassam 21 milhões e 601 mil óbitos registrados. O objetivo deste estudo foi avaliar a prevalência de infecção por SARS-CoV-2 em uma comunidade acadêmica.

Método: Estudo observacional, com delineamento transversal, realizado na comunidade acadêmica de uma Universidade Estadual Pública do Norte do Paraná. Participaram 157 pessoas, incluindo professores, acadêmicos e agentes universitários. A variável dependente foi a presença de anticorpos totais contra SARS-CoV-2.

Resultados: A prevalência de anticorpos contra SARS-CoV-2 em acadêmicos e servidores de uma universidade pública da região Norte do Paraná foi de 7%. Na análise bivariada dos fatores associados a presença de anticorpos, professores, pessoas que tiveram contato próximo com caso confirmado para COVID-19, febre, dor muscular, tosse, dor de garganta, anosmia e ageusia, foram as características que mais apresentaram associação com a presença de anticorpos.

Conclusão: Foi constatado que 7% da comunidade acadêmica estudada apresentaram anticorpos contra a COVID-19.

Palavras-chaves: Pandemia; COVID-19; Prevalência.

RESUMEN:

Introducción: COVID-19 es una enfermedad causada por el virus SARS-CoV-2 que se propagó por todo el mundo a principios de 2020. Un año y siete meses después del inicio de la propagación mundial de la enfermedad, el número de casos confirmados en Brasil supera los 21 millones y 601 mil muertes registradas. El objetivo de este estudio fue evaluar la prevalencia de la infección por SARS-CoV-2 en una comunidad académica.

Método: Estudio observacional, con diseño transversal, realizado en la comunidad académica de una Universidad Pública Estadual del Norte de Paraná. Participaron 157 personas, entre profesores, estudiantes y agentes universitarios. La variable dependiente fue la presencia de anticuerpos totales contra el SARS-CoV-2.

Resultados: La prevalencia de anticuerpos contra el SARS-CoV-2 en estudiantes y empleados de una universidad pública de la región Norte de Paraná fue del 7%. En el análisis bivariado de factores asociados a la presencia de anticuerpos, docentes, personas que tuvieron contacto cercano con caso confirmado de COVID-19, fiebre, dolor muscular, tos, dolor de garganta, anosmia y ageusia, fueron las características que más se asociaron con la enfermedad presencia de anticuerpos.

Conclusión: Se encontró que el 7% de la comunidad académica estudiada tenía anticuerpos contra el COVID-19.

Palabras clave: Pandemia; COVID-19; Prevalencia.

INTRODUCTION

COVID-19 is caused by coronavirus (SARS-CoV-2), being first identified in Wuhan, China ⁽¹⁾. The outbreak of the disease quickly spread nationally and internationally in a few months, which led to the pandemic declaration by the World Health Organization (WHO) on March 11, 2020 ⁽²⁾.

Since then, the effects have been devastating. One year and seven months after the beginning of the worldwide spread of the disease, the number of infected people exceeds 230 million and more than four million lives lost from the complications of the disease ⁽³⁾. In Brazil, data published by the Ministry of Health are alarming, involving more than 21 million diagnosed cases and 601,000 deaths recorded during this period⁽⁴⁾.

Once exposed to the SARS-CoV-2 virus, a cellular and humoral immune response occurs in the individual, with activation of inflammatory markers. The intensity of inflammatory activity and the clinical conditions of the host determine the clinical course of the disease, from an asymptomatic or oligosymptomatic form, with clinical

manifestations such as fever, fatigue, dry cough and dyspnea, to its most severe form, which is Severe Acute Respiratory Syndrome (SARS), which requires hospitalization and intensive care, presenting high lethality ⁽¹⁾.

The RT-PCR test is considered the gold standard for the diagnosis of COVID-19, by viral identification. In turn, for the evaluation of the immune response, there is a greater availability for evaluation of the humoral response for identification of IgM and IgG antibodies. These tests are recommended for use in epidemiological studies for the purpose of evaluating pandemic advancement ⁽⁵⁾.

During this period marked by major changes, it became necessary to implement measures to contain the virus and reduce the burden of the health system. Actions such as physical distancing, hand hygiene and the use of masks were instituted by the Ministry of Health (2021) as non-pharmacological prevention measures for pandemic control ⁽⁶⁾.

The restriction of movement of people caused a stoppage or reduction of activities considered non-essential, such as commercial, industrial, school and academic activities ⁽⁷⁾. In the context of the public higher education network of Paraná, after a lengthy period of classes taught remotely, some academic activities, especially health courses, were resumed in person. The testing of antibodies against COVID-19 performed in the members of the academic community composed one of the strategies for this return, since it provides greater clarity in the identification of individuals susceptible or immune by natural exposure to the virus in a period in which there was still no availability of vaccines ⁽⁸⁾.

Therefore, this study aimed to evaluate the prevalence of SARS-CoV-2 infection in an academic community.

MATERIAL AND METHOD

This is an observational study, with a cross-sectional design, carried out in the academic community of a Public State University of Northern Paraná.

The observational study is characterized by the action of the researcher being only of spectator and not performing any type of intervention during the course of the research, although it can perform analyses and other procedures for data collection, provided that there is no influence on the environment ⁽⁹⁾.

In the second half of December 2020, an approximate period in which data were collected for this study, the moving average of 7 days in Paraná was 3,109. The pioneer north of the state was going through the worst moment of the pandemic so far, where 96% of the municipalities had an increase in the number of cases of COVID-19 and the region was in the worst week in relation to the number of deaths since June 2020 ⁽¹⁰⁾.

The population eligible for this study were people aged 18 or older, with a link with the University. Those who did not attend the day of collection or refused to participate were excluded from the study. The sample consisted of 157 people, being professors, academics and university agents. The sampling was non-probabilistic, and those who

were in face-to-face activity during the pandemic period were invited to participate.

The independent variables of the study were: gender, race, occupation, environment in which they live, close contact with people with COVID-19, history of fever with at least one respiratory symptom, obesity, age, pulse, oxygen saturation and temperature. The dependent variable was the presence of total antibodies against SARS-CoV-2.

Data were collected by self-reports and biological measures, through clinical evaluation and free and informed consent of the participant. The variables collected by self-reports were recorded in a questionnaire. The presence of antibody was verified from the participant's biological sample (blood) by puncture of the digital pulp and analyzed by rapid test with lateral flow and immunochromatographic reaction, of the brand TR DPP® COVID-19 IgM/IgG Bio-Manguinhos, with registration in ANVISA N 80142170039. The test has sensitivity of 93.5% and specificity of 92.7%, according to the manufacturer.

The results were interpreted after 15 minutes of sample processing by health professionals, in reagent or non-reagent. The result was informed to the participant, with counseling and referral of the recommended sanitary and clinical measures for those with reactive results.

The data were digitized in an Excel software spreadsheet, where the quantitative variables were presented in average, standard deviation, median, maximum and minimum. The qualitative variables were presented in absolute number and percentage.

The study was approved by the Ethics Committee on Research with Human Beings and approved with opinion n. 4,029,737 on May 15, 2020.

RESULTS

A total of 157 people participated in this study. The characterization of the research participants is presented in table 1.

Table 1 – Characterization of the participants of the research. Southern Region of Brazil, 2021.

Categorical variables	N	%
Sex		
Female	137	87.3%
Male	20	12.7%
Race		
White	111	70.7%
Black	8	5.1%
Brown	20	12.7%
Indigenous	2	1.3%
Other	6	3.8%
Not informed	10	6.4%
Occupation		
Academic	126	80.2%
Professor	24	15.3%

University agent	7	4.5%		
Environment in which you live				
Urban	151	96.2%		
Rural	5	3.2%		
Not informed	1	0.6%		
Had contact				
No	126	80.3%		
Yes	30	19.1%		
Not informed	1	0.6%		
Fever + Respiratory symptom				
No	125	79.6%		
Yes	8	5.1%		
Not informed	24	15.3%		
Obesity				
No	117	74.5%		
Yes	24	15.3%		
Not informed	16	10.2%		
Numeric variables				
	Average	Median	Max - Min	
	(SD)			
Age (years)	25.6 (10.5)			
Pulse (bpm)	92.4 (15.9)	92	145-60	
Oxygen saturation (%)	97.4 (3.6)	98	99-94	
Temperature (degrees Celsius)	36.1 (0.4)	36	38.8-34.3	

Source: Data from the search itself.

Legend: n = absolute number. % = percentage.

The participants had an average age of 25.6 and higher prevalence of females. As for race, approximately 3/4 declared themselves white and most lived in urban areas. Regarding occupation, 80.2% reported being students, 15.3% teachers and 4.5% university agents. Of the participants interviewed, 19.1% reported having had close contact with someone diagnosed with COVID-19. In the sample, 5.1% reported having fever accompanied by at least one respiratory symptom in the maximum period of 60 days prior to the study. Regarding the vital signs of the participants at the time of collection, the average was in accordance with the parameters of normality. The prevalence of antibodies is shown in Table 2.

Table 2 – Presence of antibodies against SARS-CoV-2 in academics and servants of a public university in southern Brazil. Southern Brazil, 2020.

Total antibody	n	%	CI 95%
Reagent (IgM and/or IgG)	11/157	7%	3.5% a 12.5%

Source: Data from the search itself.

Legend: n = absolute number. % = percentage.

The prevalence of antibodies against SARS-CoV-2 in the population studied was 7% (Table 2). The participants who presented results of the rapid test reagents for the detection of antibodies, were referred to the reference service of the municipality, thus ensuring the continuity of health care. Table 3 shows the variables associated with the presence of antibodies.

Table 3 – Bivariate analysis of factors associated with the presence of antibodies.

Independent variable	Presence of Antibodies		RP (CI 95%)
	No	Yes	
Sex			
Female	129	8	1
Male	17	3	2.85 (0.69; 11.77)
Occupation			
Academic	120	6	1
Professor	20	4	4.00 (1.04; 15.44)*
University Agent	6	1	3.33 (0.34; 32.27)
Environment in which you live			
Urban	140	11	1
Rural	5	0	1.11 (0.58; 21.37)
Had contact			
No	120	6	1
Yes	25	5	4.00 (1.13; 14.14)*
Fever			
No	137	8	1
Yes	8	3	6.42 (1.42; 28.96)*
Muscle pain			
No	127	7	1
Yes	19	4	3.81 (1.02; 14.29)*
Cough			
No	118	6	1
Yes	28	5	3.51 (1.00; 12.33)*
Sore throat			
No	111	5	1
Yes	34	6	3.91 (1.12; 13.64)*
Loss of smell			
No	141	9	1
Yes	5	2	6.27 (1.06; 36.90)*
Loss of taste			
No	140	7	1
Yes	6	4	13.33 (3.05; 58.30)**

Source: Data from the research itself (2020).

Legend: * $p \leq 0.05$. ** $p < 0.01$.

DISCUSSION

The prevalence of antibodies against SARS-CoV-2 presented in this study was 7%, a variation among those presented in a similar study. In a study conducted in 14 municipalities in the pioneer north of the state of Paraná, from June to August 2020, involving 527 participants, it was identified that 8.5% had antibodies against SARS-CoV-2 ⁽¹¹⁾. In another study, this time conducted in Baixada Santista, 2442 serological tests were performed, of which 160 showed positive results, representing a prevalence rate of 6.6% ⁽¹²⁾.

In Portugal, the research entitled First National Serological Survey (ISNCOVID-19),

conducted in 101 cities in the country, between May and July 2020, aimed to estimate the seroprevalence of antibodies against SARS-CoV-2. In a sample of 2,301 participants, antibody prevalence of 2.9% (95% CI: 2.0%; 4.2%) was identified ⁽¹³⁾. Specifically in the university environment, a survey conducted between May and June 2020 with workers from the University of Porto in Portugal estimated seroprevalence at 2.5% (95% CI: 0.1; 5.3) ⁽¹⁴⁾.

The sociodemographic profile analyzed in the study included gender, occupation and place of residence. Of these variables, only occupation was associated with the history of infection, with a higher chance among teachers than students. Researchers in order to propose strategies for the return of classroom higher education classes located in Rio de Janeiro identified the prevalence of confirmed cases within the institution, where teachers demonstrated a prevalence rate of 11.90% and 3.46 times more chances of contracting the infection ⁽¹⁵⁾.

Among the epidemiological characteristics surveyed, it was found that people who had close contact with a case confirmed for COVID-19 were four times more likely to contract the infection. In Peru, a study in which it proposed to evaluate the association between some determinants in relation to serological cases positive for COVID-19, demonstrated that having a family member with previous infection for SARS-CoV-2 is more associated with infection ⁽¹⁶⁾. This finding reinforces the information brought by the WHO (2020) about the transmission of the virus, mainly by direct contact ⁽¹⁷⁾. Therefore, measures of physical distancing and isolation of suspicious people or with COVID-19 become assertive in coping with the pandemic.

With the clinical variables surveyed, such as fever, cough, myalgia, sore throat, loss of smell and loss of taste, it was found that all were associated with a history of Infection by SARS-CoV-2.

Research shows that fever and cough are present as the most common symptoms presented by people affected by the virus. Some authors have hierarchized on the characteristic symptoms of Severe Acute Respiratory Syndrome (SARS) in patients treated by the Brazilian health system and the elevated temperature stood out as one of the three most common symptoms ⁽¹⁸⁾. In China, the clinical characteristics in patients with COVID-19 infection reinforce the results observed in this study, showing the high relationship of fever and cough symptoms with the disease studied ^(19, 20). Muscle pain (myalgia) is strongly reported among the clinical symptoms of people who are seen in health services, with an average of 44.4% of reports ^(21, 22).

Pain is a symptom very present during the period of coronavirus infection, and throat pain is frequent during this period ^[23, 24].

Studies in order to evaluate the frequency and investigate the occurrence of loss of smell (anosmia) in people affected by COVID-19, demonstrated that olfactory dysfunction is closely related to cases of infection and presents as a specific symptom at the time of diagnosis, besides being more associated with non-severe cases of the disease ^(25, 26).

The loss of taste (ageusia) was the characteristic that most was related to SARS-CoV-2 infection, demonstrating that people with this symptom are almost 14 times more

likely to have the infection. Data collected in studies to investigate the occurrence of gustatory dysfunctions presented ageusia as a prevalent dysfunction in patients affected with infection (27, 28).

CONCLUSION

This study demonstrated that 7% of the studied sample had a history of infection against SARS-CoV-2. It also found that characteristics such as close contact with a person infected with the virus, fever, muscle pain, cough, sore throat, anosmia, ageusia and being a teacher, are more associated with the occurrence of positive serological tests.

This information contributes to the development of higher education institutions and discussions about the reopening of universities. In addition to presenting to public health services the factors with greater association linked to the presence of antibodies against COVID-19.

REFERENCES

1. Hu B, Guo H, Zhou P, Shi ZL. Characteristics of SARS-CoV-2 and COVID-19 [Internet]. Nature reviews. Microbiology. 2021;19(3):141–54.
2. Organização panamericana de saúde (OPAS). OMS afirma que COVID-19 é agora caracterizada como pandemia. [acesso em 14 out. 2021] Disponível em: <https://www.paho.org/pt/news/11-3-2020-who-characterizes-covid-19-pandemic>.
3. John Hopkins University - Coronavirus Resources Center [acesso em 14 out 2021]. Disponível em: <https://coronavirus.jhu.edu/map.html>.
4. MINISTÉRIO DA SAÚDE. Painel de casos COVID-19 [acesso em: 14 out 2021]. Disponível em: <https://covid.saude.gov.br/>.
5. Dias VMCH, Carneiro M, Michelin L, Vidal CFL, Costa LATJC, Ferreira CES, et al. Testes sorológicos para COVID-19: Interpretação e aplicações práticas. J. Infect. Control. 2020; 9(2).
6. MINISTÉRIO SA SAÚDE. Como se proteger? Confira medidas não farmacológicas de prevenção e controle da pandemia do novo coronavírus [acesso em 19 jul 2021]. Disponível em: <https://www.gov.br/saude/pt-br/coronavirus/como-se-proteger>.
7. CEPEDES/ENSP/FIOCRUZ. A gestão de riscos e governança na pandemia por COVID-19 no Brasil: análise dos decretos estaduais no primeiro mês, relatório técnico e sumário executivo. Rio de Janeiro: Fiocruz; 2020 [acesso em 14 out 2021]. Disponível em: https://www.arca.fiocruz.br/bitstream/icict/41452/2/relatorio_cepedes_gestao_riscos_covid19_final.pdf
8. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Departamento de Vigilância das Doenças Transmissíveis. Guia para Investigações de Surtos ou Epidemias / Ministério da Saúde, Secretaria de Vigilância em Saúde, Departamento de Vigilância das Doenças Transmissíveis – Brasília : Ministério da Saúde, 2018 [acesso em 14 out 2021]. Disponível em: <https://portalarquivos2.saude.gov.br/images/pdf/2018/novembro/21/guia-investigacao-surtos-epidemias-web.pdf>
9. Jung CF. Metodologia científica: ênfase em pesquisa tecnológica. 3ª edição. 2003 [acesso em 14 out 2021]. Disponível em: https://d1wqtxts1xzle7.cloudfront.net/38222499/metodologia_cientifica...-with-cover-

[page-v2.pdf?Expires=1634262206&Signature=MYU~1Zzkfji2IAuDWwAoJMVc9IYtvAOTrTk~D19VrRgpPeVtRO40mGFT-fARjbeKJY0TwNml-4Mo-YxUldTsSNmGho2cmOpO4Usr-ASoX-Dqs9BY1DO7WDLke0JfyFVloy-
pcph64ZGWpBIGZbU8tXH9xk~th4uNfO1uYb09Jp-EVZ7n9C3XzbvCCUzg88MCad5dDiaYYeFcfborD~kh5ps~5ymW3~0DjY370yToIXI4h
EpV0XZjc60YNR1cHO6RY2vsbr6w-ioWp07sA5b0IPn7IQh3bSaCB81vct7irlhZCLE-
3R4p6~ohJI0mTym~DDqtGqMjINQSB7eYFIQ &Key-Pair-
Id=APKAJLOHF5GGSLRBV4ZA.](#)

10. Moreira RC, Fernandes PHC. *Jornal Geografia/UENP*. Edição 37. 2020 [acesso em 14 out 2021]. Disponível em:

<https://sites.google.com/view/jornalgeografia/edi%C3%A7%C3%B5es?authuser=0>

11. Moreira RC, Lizzi EAS, Santos ES, Zanatta LF, Galdino MJQ, André GV, et al. Serological survey for research of COVID-19 infections in The adult population of north pioneer, paraná-brazil. *International Journal of Development Research*. 2021;11(04):46551-5.

12. Epicobs. Estudo inédito reúne dados sobre Sars-CoV-2 na Baixada Santista. UNIFESP. 2020 [acesso em 14 out 2021]. Disponível em:

<https://www.unifesp.br/reitoria/dci/releases/item/4570-estudo-inedito-reune-dados-sobre-sars-cov-2-na-baixada-santista>

13. Kislaya I, Gonçalves P, Barreto M, Sousa R, Garcia AC, Matos R, et al. Seroprevalence of SARS-CoV-2 Infection in Portugal in May-July 2020: Results of the First National Serological Survey (ISNCOVID-19). *Acta Med Port*. 2021 Feb 1;34(2):87-94.

14. Meireles P, Amaro J, Costa JP, Lopes MM, Varandas T, Norton P, et al. Prevalence of SARS-CoV-2 antibodies among workers of the public higher education institutions of Porto, Portugal: a cross-sectional study. *Occup Environ Med*. 2021 Set;78(9):648-653.

15. Rafael RMR, Correia LM, Mello AS, Prata JA, Gallasch CH, Pérez J, et al. Segurança e educação durante a COVID-19: prevalência, fatores associados e planos de reabertura da Faculdade de Enfermagem. *Esc. Anna Nery Rev. Enfem*. 2021;25.

16. Huamaní C, Velásquez L, Montes S, Mayanga-Herrera A, Bernabé-Ortiz A. SARS-CoV-2 seroprevalence in a high-altitude setting in Peru: adult population-based cross-sectional study. *PeerJ*. 2021.

17. World Health Organization. Report of the WHO-China joint mission on coronavirus disease 2019 (COVID-19). Geneva: World Health Organization; 2020 [acesso em 15 out 2021]. Disponível em: <https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf>

18. Santos JFS, Santos DD. Hierarchy of Covid-19-Related Flu Symptoms According to Sex and Color or Race in Reports of Patients with Severe Acute Respiratory Syndrome in Brazil. *Advances in Research*. 2020;21(11), 67-78.

19. Guan W, Ni Z, Hu Y, Liang W, Ou C, He J, et al. Clinical Characteristics of Coronavirus Disease 2019 in China. *N Engl J Med*. 2020;382:1708-1720.

20. Tian S, Hu N, Lou J, Chen K, Kang X, Xiang Z, et al. Characteristics of COVID-19 infection in Beijing. *J Infect*. 2020 Abr;80(4):401-406.

21. Accorsi TAD, Amicis K, Brígido ARD, Belfort DSP, Habrum FC, Scarpanti FG, et al. Avaliação de pacientes com sintomas respiratórios agudos durante a pandemia de COVID-19 via Telemedicina: características clínicas e impacto no encaminhamento. *Einstein*. 2020;18:1-8.

22. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet*. 2020;395:497-506.

23. Gasmi A, Peana M, Pivina L, Srinath S, Benahmed AG, Semenova Y, et al. Interrelations between COVID-19 and other disorders. *Clin Immunol*. 2021 mar;224.
24. Dreher M, Kersten A, Bickenbach J, Balfanz P, Hartmann B, Cornelissen C, et al. The Characteristics of 50 Hospitalized COVID-19 Patients With and Without ARDS. *Dtsch Arztebl Int*. 2020 Abr 17;117(16):271-278.
25. Pang KW, Chee J, Subramaniam S, Ng LC. Frequency and Clinical Utility of Olfactory Dysfunction in COVID-19: a Systematic Review and Meta-analysis. *Curr Allergy Asthma*. 2020;20(76).
26. Aziz M, Goyal H, Haghbin H, Lee-Smith WM, Gajendran M, Perisetti A. The Association of "Loss of Smell" to COVID-19: A Systematic Review and Meta-Analysis. *Am J Med Sci*. 2021 Feb;361(2):216-225.
27. Lechien JR, Chiesa-Estomba CM, De Siaty DR, Horoi M, Le Bon SD, Rodriguez A, et al. Olfactory and gustatory dysfunctions as a clinical presentation of mild-to-moderate forms of the coronavirus disease (COVID-19): a multicenter European study. *Eur Arch Otorhinolaryngol*. 2020 ago;277(8):2251-2261.
28. Lee Y, Min P, Lee S, Kim SW. Prevalence and Duration of Acute Loss of Smell or Taste in COVID-19 Patients. *J Korean Med Sci*. 2020 Mai 11;35(18):174.

ISSN 1695-6141

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