www.biogenericpublishers.com

Article Type: Research Article

Received: 08/02/2022

Published: 12/04/2022

Open Access Journal of Biogeneric Science and Research
ISSN 2692-1081

DOI: *10.46718/JBGSR.2022.11.000267*

Seroprevalence of COVID-19 Antibodies among the Workers at the University College of Science and Technology, Palestine

Khaled A Abu-Ali* and Akram MHAltaher

Department of Medical Sciences, University College of Science and Technology, Gaza Strip, Palestine

*Corresponding author: Khaled A Abu-Ali, Department of Medical Sciences, University College of Science and Technology, Gaza Strip, Palestine

Abstract

Background: COVID-19 is an infectious disease caused by the last strain of coronavirus which was detected in Wuhan city in December 2019. COVID-19 has now become a pandemic disease affecting all countries in the world. This study aimed to identify the seroprevalence of COVID-19 virus infection among the workers at the University College of Science and Technology (UCST).

Methods: A descriptive cross-sectional study conducted between April and September 2021, sample size composed of 171 UCST employees. A predesigned questionnaire was completed and VivaDiag COVID19 IgM/IgG rapid test was utilized for the COVID19 specific antibodies screening.

Results: Most of the participants (n=87; 50.88%) were between the ages of 30 and 50 years. Results showed that the seroprevalence of COVID-19 antibodies was 23.39% IgM positive and IgG 25.73% positive. 84% (n=144) of employees know about symptoms of COVID-19, 42.6% (n=73) complained from at least one symptom of COVID-19. Moreover, 54.3% of them have commited with Palestinian Ministry of Health instructions (MoH) for the prevention to combat COVID-19, 70.2% (n=120) dislke to be vaccinated against COVID-19 vaccine. Furthermore, the majority of subjects 92.0% were washing their hands with alcohol sanitizer, whereas 89.0% wear gloves and protective masks, and 80.0% follow social distancing.

Conclusion: Despite the vast majority of the UCST employees having moderate to high commitment with MoH instructions for the prevention of COVID-19, large part of them require awareness program about the advantages of COVID-19 vaccination.

Keywords: COVID-19, Seroprevalence, Awareness, Palestine.

Introduction

Infectious diseases pose a significant hazard to human health [1]. CORONA VIRUS DISEASE 2019 (COVID-19) is a member of Coronaviridae, a family of respiratory viruses that can cause diseases in animals and humans [2]. COVID-19 is also named as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Since the first case was discovered in Wuhan city, China at the end of 2019, the virus has quickly expanded around the world [3,4]. The virus is named the coronavirus because of possesses spikes on its surface that look like a crown (4). COVID-19 has now emerged as a life-threatening pandemic infection from December 2019 to the time this article is written [5,6]. The World Health Organization (WHO) declared that the COVID-19 disease is an international health emergency on 30 January 2020 and on 11 March 2020, the WHO proclaimed of COVID-19 pandemic, citing over 118,000 cases in 114 regions worldwide [7]. The total mortality rate of the COVID-19 worldwide ranges from 1.4 to 7.2% [5]. This highly infectious disease causes a severe acute respiratory syndrome, with symptoms such as fever, fatigue, cough, shortness of breath, the pain of muscles, sputum production, sore throat, diarrhea, abdominal pain, and loss of smell [8,9]. COVID-19 may be more severe among older persons, those with chronic conditions such as high blood pressure, and healthcare workers [9,10]. COVID-19 may be transmitted through respiratory droplets and close contact with infected individuals and asymptomatic individuals [11].

The average duration of its symptoms is 5 days; however, it can range from 2 to 14 days from exposure to commencement [12]. COVID-19 is diagnosed using a nasopharyngeal swab and polymerase chain reaction (PCR) assay, as well as chest X-rays that look for pneumonia-like characteristics [13]. Coronavirus spike (S) glycoproteins aid in cell entrance. Antibodies are mostly directed against the s-spike , and they bind with high affinity to the angiotensin-converting enzyme 2 (ACE2) receptor in humans, similar to severe acute respiratory syndrome coronavirus (SARS) [14]. COVID-19's reproductive number (R0) is nearly between 2 and 3, implying a greater pandemic potential than SARS [15]. Asymptomatic (subclinical) infections are among COVID-19's biggest problems, raising threats to public health because they can transmit the virus and remained undetected in the communities [16]. A large-scale study conducted on a total of 3711 individuals on board the Diamond Princess (2666 passengers and 1045 crew members) reported that 51% of all confirmed cases including 10 crew and 308 passengers were asymptomatic [17]. Although the prevalence of asymptomatic infection in the community is unknown, it is critical to identify the undiscovered infection mortality rate because it is an essential public health metric of COVID-19, could be accurately assessed if the percentage of all people infected with new coronavirus was sufficiently known [18]. Calculations of current fatality rates are dependent on confirmed cases multiplied by a factor that accounts for asymptomatic cases [19]. Furthermore, the least threshold of population immunity to halt the transmission of infection in the community would be 1-(1/R0) for obtaining so-called temporary herd immunity. In an ongoing epidemic, R0 is the number of secondary cases created by an infected individual, which is estimated to be 1.54 in Palestine [20].

As a result, knowing the percentage of past infected and thus immune persons can aid in identifying herd immunity, projecting epidemics, and determining public policy recommendations. Based on the World Health Organization (WHO) instructions, the surveillance of antibody seropositivity against COVID-19 in a community, including immunoglobulin G (IgG) and immunoglobulin M (IgM), can offer conclusions about the extent and cumulative infection rates [21]. Khan Yunis and Rafah Governorates are a large governorate located in the south of Gaza Strip, Palestine, and had several earliest numbers of COVID-19 soon after epidemic initiation in Palestine. Students and workers of the University College of Science and Technology (UCST) are from these two Governorates. However, the UCST is an appropriate population-level location to test for the presence of active and past infections through seroprevalence survey. The study aimed to identify the seroprevalence of Covid-19 virus infection among the workers of the University College of Science and Technology based on WHO protocol.

Materials and Methods

The study design was a descriptive cross-sectional conducted between April and September 2021. The study population included 260 workers (administrative and academic employees) of UCST. All employees were asked to sign a consent form before they participated in the study to make the research goal and importance obvious, so the response rate among employees was 65.7%, as the study sample size consisted of 171 employees, ranging in age between 25 and 60 years old, belonging to the south of Gaza Strip, Palestine, came from varying socioeconomic backgrounds. These employees were chosen using the quota sampling method. The researchers created an interview questionnaire that included 16 questions concerning personal information as well as COVID-19 knowledge, awareness, and healthy habit levels. Four infectious disease experts reviewed the questionnaire's content and layout. The questionnaire's validity and reliability were also investigated, and the reliability was found to be satisfactory (0.82). The questionnaire consisted of three parts which are: (1) Part A was socio-demographic details of participants (like; age, gender, marital status, etc.), (2) Part B consisted of 9 questions describing knowledge concerning COVID-19 (like; sources of information on the COVID-19, common symptoms of COVID-19, etc.), [3] Part C consisted of 1 question describing healthy practices against COVID-19 (like; protective mask-wearing, hands of cleaning with soap and water or alcohol, etc.). A 50 µL of venous blood was withdrawn into an EDTA-coated micro trainer by the research team who wearing personal protective equipment. Tubes were labeled with the identities of the participants. For the COVID19 specific serological screening, VivaDiag COVID19 IgM/IgG rapid test was utilized [22]. Around 10µL of whole blood or serum sample was put to the sample port, then 2 to 3 drops (75-100µL) of dilution buffer, as directed by the manufacturer. The test cast was read after around 10 to 15 minutes. As per the manufacturer, the sensitivity of the assay is nearly 97.0 % in between 11-to 14 days after infection and nearly 81.0 % in between 4 to10 days after infection [22]. SPSS software version 22 was used for statistical analysis of gathered data. Descriptive statistical analysis and Chi-Square test were performed at 95% confidence interval. The hypothesis test was judged statistically significant when the P-value was less than 0.05 [23].

Results

Socio-demographic characteristics of the study participants

A total of 171 respondents from the Gaza Strip's five Governorates (20.47 % female vs. 79.35 % male) participated in the study. The distribution of study participants by socio-

Table 1: *Distribution of the subjects by socio-demographic characteristics.*

Item	Frequency	%
Age group (years)		
< 30	28	16.37%
30- <40	45	26.32%
40- <50	42	24.56%
50 and more	32	18.71%
I don't like to mention	24	14.04%
Gender		
Male	136	79.35%
Female	35	20.47%
		Education level
Up to intermediate	35	20.50%
Graduate / Postgraduate	136	79.50%
Governorate		
North Gaza	7	4.90%
Gaza	15	8.77%
Middle zone	11	6.43%
Khan Younis	117	68.42%
Rafah	21	12.28%
Marital status		
Married	148	86.55%
Single	21	12.28%
Widowed	2	1.17%
Type of work		
Academic	71	41.52%
Administrative or service	100	58.48%
Total	171	100.00%

demographic variables is shown in Table 1. According to the present study findings, the overwhelming of the participants (n=87; 50.88%) were between the ages of 30 and 50 years. Moreover, the bulk of them, 136 (79.5%) have completed the graduate level at least. Concerning the inhabited governorate, this survey registered that 68.42% (n=117) of respondents inhabit Khan Yunis governorate vs. 12.28% (n=21) inhabit Rafah governorate (Table1). The findings reported that the majority of the participants (n=100; 58.48%) were working as an academic vs. 41.52% (n=71) we're working as administrative employees or services (Table 1).

The knowledge, awareness, and prevention practices regarding COVID-19 infection

Regarding employee's awareness, and prevention practices levels to COVID-19 infection, the present study reported that about 58.0% (n=99) heard about COVID-19 via social media, 22.0% (n=38) through audio-visual (AV) media, and 12.0% (n=20) through health experts, with the remaining 8.0% (n=14) having no notion (Figure 1). Around 84% (n=144) of employees know of COVID-19's most common symptoms, while 42.6% (n=73) of employees had at least one symptom of COVID-19 (cough, fever, headache, etc.) since January to date, whereas only 5.2% (n=9) of employees got the seasonal influenza vaccine last winter, whilst 43.2% (n=74) of workers had contact with someone infected with COVID-19, and 22.2% (n=38) of them were quarantined because of their previous contact with a COVID-19 patient (Figure 2). Most of the participants 54.3% (n=93) were adhered to the instructions for the prevention of COVID-19 issued by the Palestinian Ministry of Health, while those who didn't follow the instructions were only

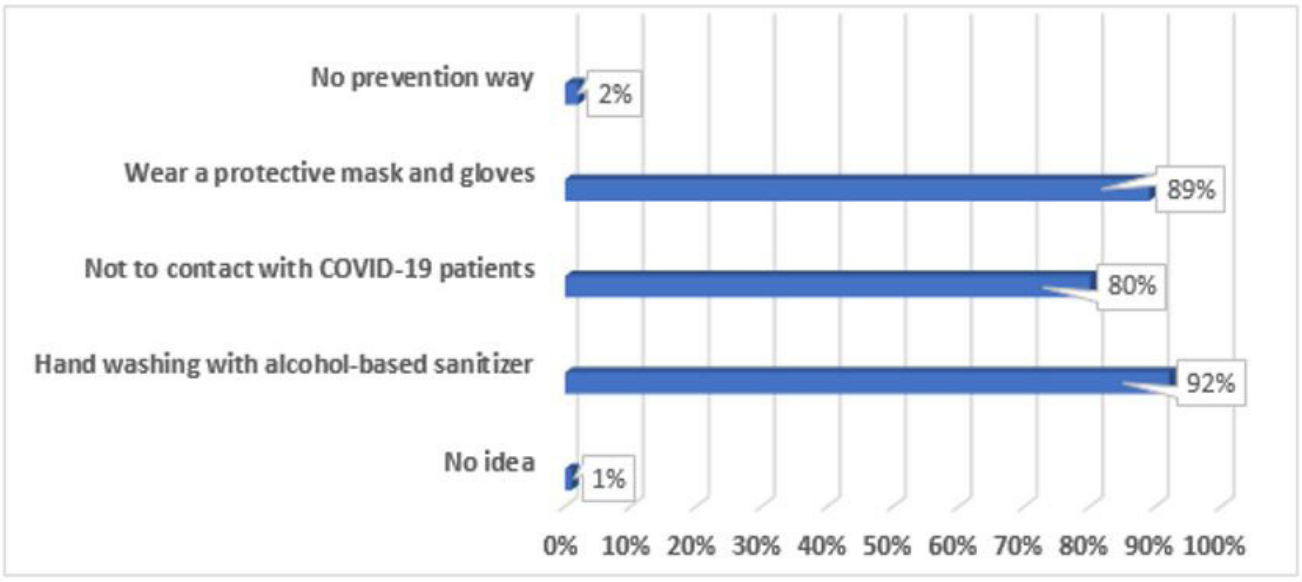

Figure 1: *The preventive behaviors practiced to protect from COVID-19*

Table 2: *Distribution of the subjects by knowledge, awareness, and prevention practices regarding COVID-19 infection.*

Item	Frequency	%
Sources of information on the COVID-19		
Social media	99	58.00%
AV media	38	22.00%
Health professionals	20	12.00%
No idea about it	14	8.00%
Do you aware of COVID-19's most common symptoms		
Yes	144	84.21%
No	27	15.79%
Have you had any symptoms of COVID-19 (cough, fever, headache) since January to date		
Yes	73	42.69%
No	98	57.31%
Did you get the seasonal influenza vaccine last winter?		
Yes	9	5.26%
No	162	94.74%
Have you had contact with someone with COVID-19?		
Yes	74	43.27%
No	97	56.73
Have you been quarantined because of your previous contact with a COVID-19 patient?		
Yes	38	22.22%
No	133	77.78%
Have you traveled abroad since December 2019?		
Yes	8	4.68%
No	163	95.32%
To what extent do you adhere to the instructions for the prevention of COVID-19 issued by the Palestinian Ministry of Health?		
High commitment	93	54.38%
Moderate commitment	66	38.59%
I don't follow the instructions	12	7.01%
Would you like to receive the COVID-19 vaccination?		
Yes	51	29.80%
No	120	70.20%
Total	171	100.00%

Table 3: *The seroprevalence of COVID-19 immunoglobins among the respondents.*

Item	Frequency	%
IgM		
Positive	40	23.39%
Negative	131	76.61%
IgG		
Positive	44	25.73%
Negative	127	74.27%
Total	171	100.00%

7.0% (n=12). Moreover, most of the study participants 70.2% (n=120) would not want to receive the COVID-19 vaccine (Table 2). Concerning the preventive behaviors practiced to protect from COVID-19, the finding reported the majority of workers 92.0% were washing their hands with alcohol sanitizer, whereas 89.0% wear gloves and protective masks, and 80.0% follow social distancing with others (Figure 1). Table 2 showed that from 171 respondents, 40 and 44 subjects were positive for IgM and IgG antibodies. Hence, the seroprevalence of COVID-19 antibodies among the study subjects was 23.39% for IgM and 25.73% for IgG (Table 2).

Discussion

The COVID-19 pandemic has been declared a state of emergency in all countries around the world where many thousands of people die daily as a result of this life-threatening virus [24]. To our knowledge, this is one of the first studies to determine the seroprevalence of COVID-19 antibodies among official institution employees during the COVID-19 outbreak from the Gaza Strip, Palestine. According to the findings of the present research, the seroprevalence of COVID-19 antibodies was 23.39 % for IgM and 25.73 % for IgG among the study participants. Our findings were in line with the finding of a study conducted in 551 subjects from north of Iran, where rapid assay kits were used to determine antibodies (IgG and IgM) against COVID-19. The results of this study reported that the seroprevalence of COVID-19 antibodies was 19.0 % for IgM and 21.0 % for IgG among the study subjects [25]. In contrast, our findings were higher than the findings of the majority of studies conducted worldwide, where a seroprevalence survey was conducted in California, USA, and reported that the seroprevalence of IgM and IgG immunoglobulins were 2.49% and 4.16% respectively [26].

Moreover, another two studies were conducted in Germany and USA to find out the seroprevalence of both IgM and IgG among large numbers of adults where their findings were also lower than our findings with 14% and 13.9% respectively [27,28]. The researchers' interpretation in the current study of the relatively high seroprevalence rate of COVID-19 immunoglobins is that at this time of the year 2021 (between April and September) the Gaza Strip was exposed to a new wave of COVID-19, where the real infections were discovered late, and this led to a large number of infected persons, as it was the prevailing belief in at the time, the symptoms that appeared on people were seasonal flu symptoms, However, after the Palestinian Ministry of Health observed the increase in the number of people who complained about these symptoms, they increased the number of PCR tests for people who showed symptoms of influenza and corona, hence the PCR tests then showed that the Gaza Strip is exposed to a sudden wave of COVID-19 [20]. As same as this was confirmed in our survey study. Moreover, as it is known that the residents of the Gaza Strip, including the sample of this study (the employees of the University College of Science and Technology) are young people, and therefore their immune system is strong, and this contributed to the failure of a large number of them to enter hospitals.

The researchers concluded that the vast majority of the UCST employees have moderate to high commitment toward adhering to the instructions for the prevention of COVID-19 issued by the Palestinian Ministry of Health, but a large part of them requires awareness about the advantages of COVID-19 vaccination during the COVID-19 outbreak. Moreover, most of the participants in the present study are keen to follow preventive behaviors from the COVID-19 infection outbreak. Furthermore, the employees of the UCS have a high seroprevalence rate of COVID-19 antibodies.

Author statements

Ethical approval: All required ethical approval letters to conduct the study were taken from the relevant ethical institutional committee.

Funding

None

Competing interests

None

References:

1. Willman M, Kobasa D, Kindrachuk J (2019) A comparative analysis of factors influencing two outbreaks of middle eastern respiratory syndrome (MERS) in Saudi Arabia and South Korea. Viruses. 11(12).
2. Huang C, Wang Y, Li X, Ren L, Zhao J, et al. (2020) Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet 395(10223):497–506.
3. Fauci AS (2020) Covid-19-Navigating the uncharted, editorial published on February 28.
4. Wang L, Wang Y, Ye D, Liu Q. Erratum to (2020) ``A review of the 2019 Novel Coronavirus (COVID-19) based on current evidence'' [International Journal of Antimicrobial Agents 55/6 (2020) 105948] (International Journal of Antimicrobial Agents (2020) 55(6), (S0924857920300984), (10.1016/j.ijan. Int J Antimicrob Agents 56(3): 106137.
5. Altaher AM, Elottol AEY, Jebril MA, Aliwaini SH (2021) Assessment of awareness and hygiene practices regarding COVID-19 among adults in Gaza, Palestine. New Microbes New Infect 41: 100876.
6. Mitchell EP (2020) Vision: Continuing Declines in Cancer Incidence and Mortality Rates. J Natl Med Assoc 112(1): 1–2.
7. Sohrabi C, Alsafi Z, O'Neill N, Khan M, Kerwan A, Al-Jabir A, et al. (2020) World Health Organization declares global emergency: A review of the 2019 novel coronavirus (COVID-19). Int J Surg 76: 71–76.
8. Cao J, Tu WJ, Cheng W, Yu L, Liu Y-K, Hu X, et al. (2020) Clinical features and short-term outcomes of 102 patients with corona virus disease 2019 in Wuhan, China. Clin Infect Dis.
9. Das D, Kudpi RS, Mukherjee M, Unnikrishnan B, Rungta N (2020) Awareness among under graduate students of Mangalore city regarding novel coronavirus (COVID-19)-A questionnaire study. Disaster Med Public Health Prep p. 1–4.
10. Altaher AMR, Alewaity SS, Abu-Touima JA (2016) Lipid Profiles Levels of Type One Diabetics Compared to Controls in Gaza Strip. Am J Biomed Life Sci 4(4): 61–68.
11. Zhang Y, Dai C, Wang H, Gao Y, Li T, et al. (2020) Analysis and validation of a highly sensitive one-step nested quantitative real-time polymerase chain reaction assay for specific detection of severe acute respiratory syndrome coronavirus 2. Virol J 17(1): 1–13.
12. Chen N, Zhou M, Dong X, Qu J, Gong F, et al. (2020) Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. Lancet 395(10223): 507–513.
13. Chen APL, Chuang C, Huang YC, Wu PF, Huang SF, et al. (2019) The epidemiology and etiologies of respiratory tract infection in Northern Taiwan during the early phase of coronavirus disease 2019 (COVID-19) outbreak. J Microbiol Immunol Infect 54(5): 801–817.
14. Lu R, Zhao X, Li J, Niu P, Yang B, Wu H, et al. (2020) Genomic

characterization and epidemiology of 2019 novel coronavirus: implications for virus origins and receptor binding. Lancet 395(10224): 565–574.
15. Joel H, Sam A, Amy G, Nikos B. I, Jarvis Christopher I, Russell Timothy W, Munday James D, Kucharski Adam J, Edmunds W John, Sun Fiona. Feasibility Control COVID-19 outbreaks by Isol cases contacts Lancet Glob Heal 8: E488–E496.
16. Bai Y, Yao L, Wei T, Tian F, Jin DY, et al. (2020) Presumed asymptomatic carrier transmission of COVID-19. Jama 323(14): 1406–1417.
17. Japan National Institute of Infectious Diseases (2020) Field briefing: diamond princess COVID-19 cases [Internet]. National Institute of Infectious Diseases Tokyo, Japan.
18. Flahault A (2020) Has China faced only a herald wave of SARS-CoV-2? Lancet 395(10228): 947.
19. Onder G, Rezza G, Brusaferro S (2020) Case-fatality rate and characteristics of patients dying in relation to COVID-19 in Italy. Jama 323(18): 1775–1776.
20. Abdeljaoued-Tej I (2020) COVID-19 data analysis and modeling in Palestine. MedRxiv.
21. World Health Organization. Population-based age-stratified seroepidemiological investigation protocol for COVID-19 virus infection, 17 March 2020. World Health Organization; 2020.
22. Cassaniti I, Novazzi F, Giardina F, Salinaro F, Sachs M, Perlini S, et al. Performance of VivaDiag COVID-19 IgM/IgG Rapid Test is inadequate for diagnosis of COVID-19 in acute patients referring to emergency room department. J Med Virol. 2020;
23. Altaher AM, Mustafa YSA, El Ujeili AR, Almasry EA, Almasry EO (2018) Prevalence of Metabolic Syndrome & its Components Among University Young Students in South of Gaza, Palestine. IUG J Nat Stud 26(2).
24. Velavan TP, Meyer CG (2020) The COVID-19 epidemic. Trop Med Int Heal 25(3): 278–280.
25. Shakiba M, Nazari SSH, Mehrabian F, Rezvani SM, Ghasempour Z, et al. (2020) Seroprevalence of COVID-19 virus infection in Guilan province, Iran. Emerg Infect Dis.
26. Bendavid E, Mulaney B, Sood N, Shah S, Bromley-Dulfano R, et al. (2021) COVID-19 antibody seroprevalence in Santa Clara County, California. Int J Epidemiol 50(2):410–9.
27. Regalado A (2020) Blood tests show 14% of people are now immune to covid-19 in one town in Germany. Ref Source.
28. Higgins-Dunn H, Breuninger K, Kim J (2020) New York antibody study estimates 13.9% of residents have had the coronavirus, Gov. Cuomo says.