



## ESTIMATING EXPOSURE TO SARS-COV-2 AT THE ARAB INTERNATIONAL UNIVERSITY, SYRIA: A SNAPSHOT AFTER A YEAR OF PANDEMIC

Wafika Zarzour<sup>1</sup>, Wafa Habbal<sup>1,2\*</sup>, Alaa Oraige<sup>1</sup>, Ahmad Ganama<sup>1</sup> and Raghad Serri<sup>1</sup>

<sup>1</sup>Biochemistry and Microbiology Department, Faculty of Pharmacy, Arab International University, Daraa, Syria

<sup>2</sup>Clinical Laboratories Department, Al-Assad Hospital, Damascus University, PO Box 10769, Damascus, Syria

**Background:** After a year of pandemic in Syria, how prevalent the seropositivity is, and how far we are from herd immunity is a raised question. **Aim:** Our study aimed to estimate the overall exposure to SARS-COV-2 depending on the COVID-19-specific symptoms as well as the seroprevalence of anti-SARS-CoV-2 IgG antibodies among students and staff at the Arab International University (AIU) in Syria. **Methods:** All AIU students and staff were invited to voluntarily participate in the study by filling out and submitting an anonymous web-based survey. Responses were evaluated then asymptomatic and pauci-symptomatic respondents were notified of a phlebotomy appointment. Anti-SARS-CoV-2 IgG antibodies were analyzed by ELISA. **Results:** One third (122 of 381; 32%) of respondents were asymptomatic. The remaining respondents reported COVID-19-specific symptoms (177 of 381; 46.5%), mainly anosmia and/or ageusia (132 of 177; 74.5%), or nonspecific symptoms (82 of 381; 21.5%). Frequencies of symptoms onset showed a strong, positive correlation with the incidence of confirmed SARS-CoV-2 RNA-positive cases reported by the Ministry of Health in Syria. Anti-SARS-CoV-2 IgG antibodies were similarly detected in both symptomatic (21 of 33; 63.6%) and asymptomatic (39 of 61; 63.9%) individuals ( $P=.97$ ). **Conclusions:** After a year of pandemic, a 69% exposure to SARS-CoV-2 is roughly estimated amongst asymptomatic and pauci-symptomatic individuals. Further post-vaccination assessment of seroprevalence against SARS-CoV-2 in future large-scale studies might provide a more complete picture of the SARS-CoV-2 epidemic in Syria.

**Keywords:** COVID-19, anti-SARS-CoV-2 IgG, asymptomatic, seroprevalence, exposure, Syria

### INTRODUCTION

Since its discovery in Wuhan, China in December 2019,<sup>1</sup> coronavirus disease 2019 (COVID-19) has never been reported in Syria until March 22, 2020. Subsequently, COVID-19 spread in the Syrian community and peak incidence was reached in August 2020, December 2020, March/April 2021, September/October 2021, and February 2022; the curve has got flattened ever since.<sup>2</sup> COVID-19 reporting system in Syria relies on confirmed SARS-CoV-2 RNA-positive cases and RT-qPCR is generally performed to test

nasopharyngeal swabs collected from hospitalized patients, healthcare workers and travelers. Thus, the predominant portion of COVID-19 cases including asymptomatic and pauci-symptomatic non-hospitalized individuals might remain untested and unidentified; hence, actual incidence is perhaps undervalued.<sup>3-5</sup>

On the contrary of nucleic acid amplification test, IgG antibody testing is utilized to diagnose past rather than current infection.<sup>6</sup> More reliable results are obtained when blood is drawn at least twenty days after the onset of symptoms, if any.<sup>7</sup> Estimating the

seroprevalence of anti-SARS-CoV-2 IgG antibodies has then proved to better reflect the burden of infection.<sup>8&9</sup> Serologic assays usually detect anti-nucleocapsid protein antibodies and/or anti-spike neutralizing antibodies.<sup>10</sup> It has already been demonstrated that anti-nucleocapsid protein antibodies might appear earlier than anti-spike antibodies.<sup>1,10</sup> Therefore, testing both kinds of antibodies in a single assay might increase the diagnostic sensitivity.

Prior to our study, seroprevalence studies have been conducted in several populations showing various rates of seropositivity among healthy individuals ranging between 1.2% and 24.4%.<sup>4&5</sup> After a year of pandemic in Syria, how prevalent the seropositivity is, and how far we are from herd immunity is a raised question. Our study aimed to estimate the overall exposure to SARS-COV-2 depending on the COVID-19-specific symptoms as well as the seroprevalence of anti-SARS-CoV-2 IgG antibodies amongst asymptomatic and pauci-symptomatic individuals. Study population encompassed students as well as academic and administrative staff at the Arab International University located in Ghabagheb, Daraa Governorate and mostly representing the young adults from various Syrian governorates.

## METHODS

### *Web-based survey*

This prospective cross-sectional study was conducted during February and March 2021 where a web-based survey had been developed, validated and announced on the official website of the Arab International University (AIU), Syria. All AIU students and staff were invited to voluntarily participate in the study by filling out and submitting the self-administered anonymous survey including the informed consent. The survey comprised open- and closed-ended questions on demographic information; diagnosis, treatment and course of COVID-19 infection; vaccination against SARS-CoV-2; and potential contact with suspected/confirmed COVID-19 patients. Responses were carefully evaluated and checked for data validity and potential duplication. Concerning disease severity, respondents were grouped into 'severe cases' when oxygen therapy was required, 'moderate

cases' when pulmonary infiltrates were reported but oxygen therapy was not required, 'mild cases' when presenting symptoms but neither oxygen therapy was required nor pulmonary infiltrates were reported, and 'asymptomatic cases' when no symptoms were reported. Respondents, who reported contact with suspected/confirmed COVID-19 patients, were assessed for the risk of acquiring SARS-CoV-2 infection and were assigned exposure risk scores according to number of encounters (once, 1; several, 3; daily, 4), social distancing (more than one meter, 1; less than one meter, 3), and wearing the mask (surely, 1; not necessarily, 2; never, 3) by the participant and the patient each; the higher the sum score the higher the risk. Whereas, respondents who reported no contact with suspected/confirmed COVID-19 patients were assigned a 0 score.

### *Inclusion and exclusion criteria*

Respondents who reported COVID-19-specific symptoms including anosmia, ageusia, dyspnea, and/or thoracalgia; pulmonary infiltrates; oxygen therapy; and/or positive SARS-CoV-2-specific antibodies and/or RT-qPCR tests as well as those who were already vaccinated against SARS-CoV-2 were excluded from antibody testing. Eligible respondents who provided their contact information along with their approval for participation were notified of a phlebotomy appointment. Electronic informed consent was obtained from all participants and the study was approved by the Research Ethics Committee of the Arab International University (REF; Project No. 3-9-31-1-2021). Time elapsed since the onset of symptoms until the time of phlebotomy was calculated for the participants who reported mild nonspecific symptoms.

### *ELISA*

Blood samples were drawn in plain tubes and collected sera were stored at  $-30^{\circ}\text{C}$  until the time of analyses. Anti-SARS-CoV-2 IgG antibodies were analyzed using the COVID-19 ELISA IgG kit (Vircell, S.L., Granada, Spain) according to the manufacturer's instructions.

### *Statistical analysis*

Data analysis was performed using IBM® SPSS® Statistics, version 25 (IBM corp., New

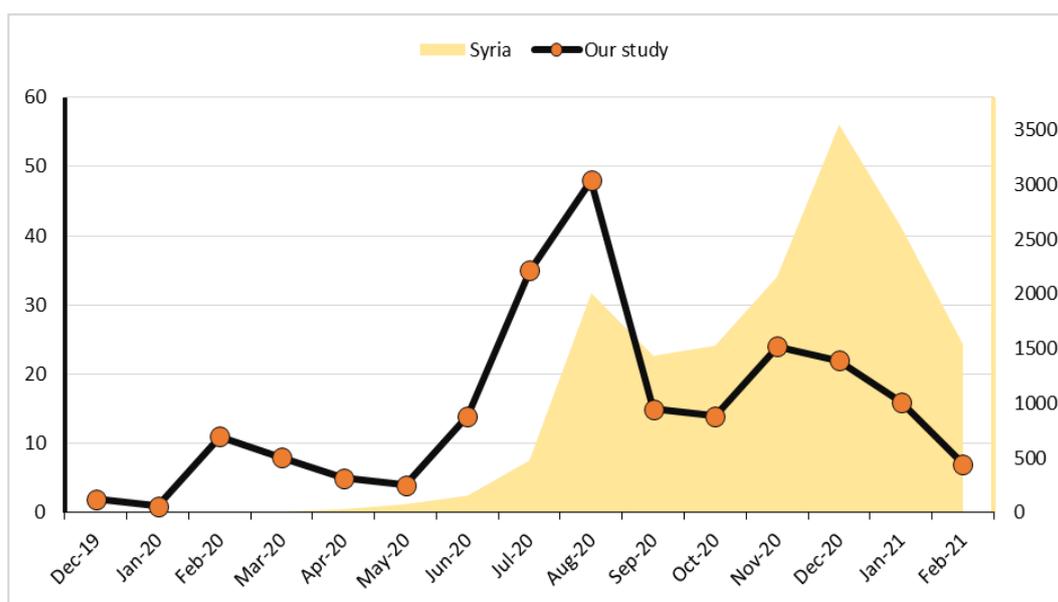
York, USA). Chi-square test of independence and Kendall's tau correlation coefficient were utilized. Differences between independent groups were compared using Kruskal-Wallis and Mann-Whitney U tests. P-value <0.05 was considered statistically significant.

## RESULTS AND DISCUSSION

### Results

A total of 381 responses, including 273 (72%) AIU students and 108 (28%) AIU academic and administrative staff, were received between Feb 17<sup>th</sup> and Mar 19<sup>th</sup>, 2021. The median age of respondents was 23 years ranging between 18 and 74 years and 70% were female. Two thirds (259 of 381; 68%) of respondents were symptomatic while the remaining 122 of 381 (32%) respondents were asymptomatic. Symptomatic respondents included 177 of 259 (68%) reporting COVID-19-specific symptoms such as anosmia (126 of 177; 71%), ageusia (100 of 177; 56.5%), dyspnea (82 of 177; 46.3%), and/or thoracalgia (60 of 177; 33.9%) and 82 of 259 (32%) reporting nonspecific symptoms such as fever, chill, fatigue, myalgia, sore throat, cough, diarrhea, and/or insomnia. The majority of

symptomatic respondents (243 of 259; 94%) were considered 'mild cases', while 11 of 259 (4%) and 5 of 259 (2%) were deemed 'moderate cases' and 'severe cases', respectively. The median duration of symptoms was 7 days ranging from 1 to 75 days. Indeed, presenting symptoms, disease severity, and infection duration were independent of age and gender ( $P>0.05$ ). The peak frequencies of symptoms onset were demonstrated during the months of August 2020 and November 2020 showing a strong, positive correlation ( $\tau_b=0.53$ ,  $P<0.01$ ) with the incidence of confirmed SARS-CoV-2 RNA-positive cases reported by the Ministry of Health in Syria (**Fig. 1**). Around two thirds (230 of 381; 60.4%) of respondents were contacts of suspected/confirmed COVID-19 patients and the median exposure risk score was 9 ranging between 4 and 13. Apparently, exposure risk scores showed no significant differences neither between cases who reported COVID-19-specific symptoms, nonspecific symptoms, and no symptoms [ $H(2)=1.41$ ,  $P=.49$ ] nor between severe/moderate, mild and asymptomatic cases [ $H(2)=1.52$ ,  $P=.46$ ].



**Fig. 1:** Incidence of confirmed SARS-CoV-2 RNA-positive cases reported by the Ministry of Health in Syria (grey area, right scale) and onset of symptoms reported by participants in our study (n=381, black line, left scale). The peak frequencies of symptoms onset were demonstrated during the months of August 2020 and November 2020 showing a strong, positive correlation ( $\tau_b=0.53$ ,  $P<0.01$ ) with the incidence of confirmed SARS-CoV-2 RNA-positive cases reported by the Ministry of Health in Syria, where peak incidence was reached during the months of August 2020 and December 2020.

**Table 1:** Characteristics of participants in anti-SARS-CoV-2 IgG antibodies testing by ELISA (n=94).

		Anti-SARS-CoV-2 IgG antibodies		
		IgG-Negative (n=34)	IgG-Positive (n=60)	
Age (years)	Median	28	23	P=.056 <sup>a</sup>
	Range	21-74	19-74	
Gender	Female	22 (64.7%)	43 (71.7%)	P=.48 <sup>b</sup>
	Male	12 (35.3%)	17 (28.3%)	
Symptoms	Asymptomatic	22 (64.7%)	39 (65%)	P=.97 <sup>b</sup>
	Symptomatic	12 (35.3%)	21 (35%)	
Infection duration (days)	Median	4.5	3	P=.69 <sup>a</sup>
	Range	2-12	1-15	
Contact with suspected/confirmed COVID-19 patients	No	13 (38.2%)	16 (26.7%)	P=.24 <sup>b</sup>
	Yes	21 (61.8%)	44 (73.3%)	
Exposure risk score	Median	6	6	P=.47 <sup>a</sup>
	Range	0-12	0-13	
Time elapsed since the onset of symptoms (days)	Median	211.1	201.5	P=.76 <sup>a</sup>
	Range	32-395	65-305	

<sup>a</sup> P-value was obtained using Mann-Whitney U test.

<sup>b</sup> P-value was obtained using Chi-square test.

Anti-SARS-CoV-2 IgG antibodies were analyzed by ELISA in a total of 94 serum samples, and 60 of 94 (64%) participants were IgG-positive and 34 of 94 (36%) participants were IgG-negative (**Table 1**). Median antibody S/CO index for IgG-positive samples was 27.32 ranging between 7 and 93. Anti-SARS-CoV-2 IgG antibodies were similarly detected in both symptomatic (21 of 33; 63.6%) and asymptomatic (39 of 61; 63.9%) individuals [ $\chi^2(1, N=94) = .001, P=.97$ ] and hence no significant difference in antibody S/CO indices was established (Mann-Whitney U=955, P=.68). Likewise, seropositivity and antibody indices were independent of age, gender, and contact with suspected/confirmed COVID-19 patients ( $P > 0.05$ ). The median time elapsed since the onset of mild nonspecific symptoms until the time of phlebotomy was 201 days, ranging between 32 and 395 days, and showing no significant difference between IgG-positive and IgG-negative cases ( $P > 0.05$ ). Moreover, antibody S/CO index did not show significant correlation with exposure risk score, duration of symptoms, or time elapsed since the onset of symptoms ( $P > 0.05$ ).

## Discussion

Apparently, about half (46.5%) of the population at the Arab International University in Syria were exposed to SARS-CoV-2 and suffered COVID-19-specific symptoms such as anosmia, ageusia, thoracalgia, and/or dyspnea. Specifically, anosmia and ageusia were the most noticeable of all (74.5%) as previously reported.<sup>11</sup> Most importantly, they were all convinced they were infected. Despite lack of lab testing in the majority of cases, this is evidenced by the strong positive correlation between the frequencies of symptoms onset and the incidence of confirmed SARS-CoV-2 RNA-positive cases reported by the Ministry of Health in Syria. The other half (53.5%) of the university population were either asymptomatic or pauci-symptomatic and were mostly unaware of their exposure to SARS-CoV-2. Strikingly, two thirds (64%) of whom were SARS-CoV-2 seropositive, a proportion far higher than ever reported in other populations.<sup>4,5,7&11-14</sup> This is evidently attributed to the poor adherence to social distancing, which is against the recommendations of the national regulatory authorities.

It seems that the community popular perception is primarily linked to social distancing from suspected/confirmed symptomatic COVID-19 patients, which showed no correlation with seropositivity, antibody index, presenting symptoms, or even disease severity according to our exposure risk scoring system. This is ascribed to unaccounted potential contact with subclinical cases, who are responsible for the transmission of infection,<sup>5&13-15</sup> while social distancing might be probably unattained. Albeit detectable up to ten months post-infection, seropositivity and antibody index were not correlated with time elapsed since the onset of symptoms. Waning over time,<sup>4,8,16&17</sup> antibody production might be boosted, however, due to subclinical re-infection upon unconscious contact with asymptomatic cases. This postulation can be further confirmed/nullified in future longitudinal studies.

Overall, depending on both COVID-19-specific symptoms i.e., anosmia and ageusia, as well as SARS-CoV-2 seropositivity, a 69% exposure to SARS-CoV-2 among students and staff of the university is roughly estimated. In addition to the limitation of our sample-size, however, reaching out to herd immunity is still questioned as new variants are evolving and the seropositivity of anti-SARS-CoV-2 antibodies is evidence of exposure rather than effective immunity.<sup>4&18</sup> Levels of anti-SARS-CoV-2 IgG antibodies were mainly low to moderate among asymptomatic/pauci-symptomatic participants. Furthermore, since our ELISA test assayed both anti-spike glycoprotein and anti-nucleocapsid protein antibodies, such antibody levels never accounted solely for the neutralizing antibodies responsible for immunity.<sup>19</sup> Moreover, suspected re-infection was reported afterward by two participants in spite of seropositivity. This accorded well with previous studies that reported lower antibody levels among asymptomatic/pauci-symptomatic individuals than in severe COVID-19 patients,<sup>1,4,8,9,13,17,20&21</sup> probably owing to exposure to a number of viral particles below the infectious dose.<sup>9</sup> However, inducing anti-SARS-CoV-2 neutralizing antibody production upon re-infection in one asymptomatic patient has already been reported.<sup>22</sup> This suggests that lower IgG titers do not necessarily indicate inefficient immunity against SARS-CoV-2 as

memory lymphocytes should commit humoral immunological response upon subsequent exposure.

As previously observed,<sup>[4]</sup> the majority of symptomatic participants enrolled in our study were mild cases, thus hindering exploring severity-related associations. Age and gender were independent of presenting symptoms, disease severity, infection duration, seropositivity, and antibody index. Undoubtedly, our study group were mostly young adults and age-related associations might not be obvious due to our bias toward youth age group. Nevertheless, age-related COVID-19 morbidity and mortality are still debated.<sup>13</sup> In addition, blood samples were drawn at least one month after the onset of symptoms; hence no false negative results are anticipated due to inappropriate sampling interval.<sup>1,7</sup> Still, false negative results due to post-infection decline of antibody levels cannot be excluded; an unexplained reported phenomenon.<sup>8</sup>

## Conclusions

Our study roughly estimated a 69% exposure to SARS-CoV-2 after a year of pandemic in Syria depending on the COVID-19-specific symptoms as well as the seroprevalence of anti-SARS-CoV-2 IgG antibodies amongst asymptomatic and pauci-symptomatic individuals. This estimate has been made prior to the national immunization campaign in Syria as the only two excluded respondents due to vaccination against SARS-CoV-2 were vaccinated abroad. Attentively, further post-vaccination assessment of seroprevalence against SARS-CoV-2 in future large-scale studies might provide a more complete picture of the SARS-CoV-2 epidemic in Syria.

## REFERENCES

1. M. E. Moeller, J. Fock, P. Pah, *et al.*, "Evaluation of commercially available immuno-magnetic agglutination in comparison to enzyme-linked immunosorbent assays for rapid point-of-care diagnostics of COVID-19", *J Med Virol*, 93(5), 3084-3091 (2021).
2. E. Dong, H. Du, and L. Gardner, "An interactive web-based dashboard to track

- COVID-19 in real time", *Lancet Infect Dis*, 20(5), 533-534 (2020).
3. R. L. Stout, and S. J. Rigatti, "Seroprevalence of SARS-CoV-2 Antibodies in the US Adult Asymptomatic Population as of September 30, 2020", *JAMA Netw Open*, 4(3), e211552 (2021).
  4. Y. Yang, X. Wang, R. H. Du, *et al.*, "Serological investigation of asymptomatic cases of SARS-CoV-2 infection reveals weak and declining antibody responses", *Emerg Microbes Infect*, 10(1), 905-912 (2021).
  5. H. T. Al-Jighefee, H. M. Yassine, and G. K. Nasrallah, "Evaluation of Antibody Response in Symptomatic and Asymptomatic COVID-19 Patients and Diagnostic Assessment of New IgM/IgG ELISA Kits", *Pathogens*, 10(2), 161 (2021).
  6. V. Higgins, A. Fabros, and V. Kulasingam, "Quantitative Measurement of Anti-SARS-CoV-2 Antibodies: Analytical and Clinical Evaluation", *J Clin Microbiol*, 59(4), e03149-20 (2021).
  7. Y. Cosgun, A. B. Altas, E. A. Kuzucu, *et al.*, "Role of rapid antibody and ELISA tests in the evaluation of serological response in patients with SARS-CoV-2 PCR positivity", *Folia Microbiol (Praha)*, 66(4), 579-586 (2021).
  8. S. Weis, A. Scherag, M. Baier, *et al.*, "Antibody response using six different serological assays in a completely PCR-tested community after a coronavirus disease 2019 outbreak-the CoNAN study", *Clin Microbiol Infect*, 27(3), 470.e1-470.e9 (2021).
  9. N. Wellinghausen, D. Plonné, M. Voss, *et al.*, "SARS-CoV-2-IgG response is different in COVID-19 outpatients and asymptomatic contact persons", *J Clin Virol*, 130, 104542 (2020).
  10. L. Grzelak, S. Temmam, C. Planchais, *et al.*, "A comparison of four serological assays for detecting anti-SARS-CoV-2 antibodies in human serum samples from different populations", *Sci Transl Med*, 12(559), eabc3103 (2020).
  11. P. M. Wells, K. J. Doores, S. Couvreur, *et al.*, "Estimates of the rate of infection and asymptomatic COVID-19 disease in a population sample from SE England", *J Infect*, 81(6), 931-936 (2020).
  12. V. Caturano, B. Manti, F. Carbone, *et al.*, "Estimating asymptomatic SARS-CoV-2 infections in a geographic area of low disease incidence", *BMC Infect Dis*, 21(1), 350 (2021).
  13. W. H. Mahallawi, and A. H. Al-Zalabani, "The seroprevalence of SARS-CoV-2 IgG antibodies among asymptomatic blood donors in Saudi Arabia", *Saudi J Biol Sci*, 28(3), 1697-1701 (2021).
  14. Q. X. Long, X. J. Tang, Q. L. Shi, *et al.*, "Clinical and immunological assessment of asymptomatic SARS-CoV-2 infections", *Nat Med*, 26(8), 1200-1204 (2020).
  15. L. P. Borges, A. F. Martins, M. S. de Melo, *et al.*, "Seroprevalence of SARS-CoV-2 IgM and IgG antibodies in an asymptomatic population in Sergipe, Brazil", *Rev Panam Salud Publica*, 44, e108 (2020).
  16. P. G. Choe, K. H. Kim, C. K. Kang, *et al.*, "Antibody Responses 8 Months after Asymptomatic or Mild SARS-CoV-2 Infection", *Emerg Infect Dis*, 27(3), 928-931 (2021).
  17. J. Watson, A. Richter, and J. Deeks, "Testing for SARS-CoV-2 antibodies", *BMJ*, 370, m3325 (2020).
  18. G. Antonelli, E. Anastasi, F. Ciprani, *et al.*, "Asymptomatic individuals positive for anti-SARS-CoV-2 antibodies negative on molecular swab", *Lancet Microbe*, 2(5), e178 (2021).
  19. S. Dispinseri, M. Secchi, M. F. Pirillo, *et al.*, "Neutralizing antibody responses to SARS-CoV-2 in symptomatic COVID-19 is persistent and critical for survival", *Nat Commun*, 12(1), 2670 (2021).
  20. N. Kaku, F. Nishimura, Y. Shigeishi, *et al.*, "Evaluation of anti-SARS-CoV-2 antibody testing in asymptomatic or mild COVID-19 patients in outbreak on a cruise ship", *MedRxiv*, 21253064 (2021).
  21. E. Brochot, B. Demey, and A. Touzé, *et al.*, "Anti-spike, Anti-nucleocapsid and Neutralizing Antibodies in SARS-CoV-2 Inpatients and Asymptomatic Individuals", *Front Microbiol*, 11, 584251 (2020).

22. M. Inada, M. Ishikane, M. Terada, *et al.*, "Asymptomatic COVID-19 re-infection in a Japanese male by elevated half-maximal inhibitory concentration (IC50) of neutralizing antibodies", *J Infect Chemother*, 27(7), 1063-1067 (2021).
23. W. Zarzour, W. Habbal, A. Oraige, *et al.*, "Seropositivity of anti-SARS-CoV-2 IgG antibodies among asymptomatic and pauci-symptomatic students and staff at the Arab International University, Syria: a snapshot after a year of pandemic", PREPRINT (Version 1) available at *Research Square* [<https://doi.org/10.21203/rs.3.rs-885678/v1>] (2021).



## نشرة العلوم الصيدلانية جامعة أسيوط



### تقدير التعرّض لفيروس SARS-CoV-2 في الجامعة العربية الدولية، سورية: لقطة بعد عام من الجائحة

وفيفة زرزور<sup>١</sup> - وفاء الحبال<sup>١\*</sup> - علاء عريج<sup>١</sup> - أحمد كنامة<sup>١</sup> - رغد سرّي<sup>١</sup>

<sup>١</sup> قسم الكيمياء الحيوية والأحياء الدقيقة، كلية الصيدلة، الجامعة العربية الدولية، درعا، سورية

<sup>٢</sup> قسم المخبر، مستشفى الأسد الجامعي، جامعة دمشق، ص.ب. ١٠٧٦٩، دمشق، سورية

**الخلفية:** بعد مُضيّ عام من الجائحة في سورية، يتساءل المرء عن مدى انتشار الإيجابية المصلية، وإلى أي مدى نبعد عن مناعة القطيع.

**الهدف:** هدفت دراستنا إلى تقدير التعرض لفيروس SARS-CoV-2 اعتماداً على الأعراض النوعية لمرض COVID-19 إضافة إلى الانتشار المصلي لأضداد SARS-CoV-2 IgG ضمن الطلاب والموظفين في الجامعة العربية الدولية (AIU) في سورية.

**الطرق:** تمّت دعوة جميع الطلاب والموظفين في الجامعة للمشاركة الطوعية في الدراسة عن طريق ملء استبيان إلكتروني مغفل الاسم عبر الويب. إثر تقييم الردود، تم إخطار أصحابها الذين لم يبدوا أية أعراض أو أبدو أعراضاً طفيفة بموعد سحب الدم ليتمّ تحليل أضداد IgG المضادة لفيروس SARS-CoV-2 بواسطة ELISA.

**النتائج:** لم تظهر أية أعراض لدى ثلث المشاركين (١٢٢ من ٣٨١؛ ٣٢%) بينما ذكر الباقون أعراضاً نوعية لمرض COVID-19 (١٧٧ من ٣٨١؛ ٤٦,٥%)، كان أهمها فقدان الشم و/أو الذوق (١٣٢ من ١٧٧؛ ٧٤,٥%)، أو أعراضاً غير نوعية (٨٢ من ٣٨١؛ ٢١,٥%). أبدى تواتر ظهور الأعراض في مجموعة دراستنا ارتباطاً إيجابياً قوياً مع معدّل الإصابات بفيروس SARS-CoV-2 المؤكدة باختبار RT-PCR التي أبلغت عنها وزارة الصحة في سورية. تم كشف أضداد IgG المضادة لفيروس SARS-CoV-2 بالمثل في كل من الأفراد العرضيين (٢١ من ٣٣؛ ٦٣,٦%) واللاعرضيين (٣٩ من ٦١؛ ٦٣,٩%) (P=0.97).

**الاستنتاجات:** بعد عام من الجائحة، تم تقدير التعرض لفيروس SARS-CoV-2 بحوالي ٦٩% ضمن الأفراد اللاعرضيين وأولئك الذين عانوا أعراضاً طفيفة. إنّ إعادة تقييم الانتشار المصلي بعد حملة اللقاح ضد SARS-CoV-2 في دراساتٍ مستقبليةٍ واسعة النطاق سيعطي صورةً أكثر اكتمالاً لجائحة SARS-CoV-2 في سورية.