Epidemiological interventions for university students affected by COVID-19 in Erbil, Kurdistan – Iraq

Zheen A. Abdullah[1], Aryan R. Ganjo[1,2], Suhayla H. Shareef [2,3] Rawand H. Jawad[1]

[1] Department of Clinical Analysis, College of Pharmacy, Hawler Medical University, Erbil, Iraq.

[2] Department of Medical Analysis, Faculty of Applied Science, Tishk International University, Erbil, Iraq.

[3] Department of Biology, College of Education, Salahaddin University-Erbil, Iraq.

https://doi.org/10.15218/crewh.2024.03

Abstract:

Background and Objectives: The outbreak of SARS-CoV-2 in Wuhan, China in late December 2019 became the harbinger of the COVID-19 pandemic. The main aims of this study is to determine the demographic and clinical characteristics of COVID-19 in the population of the universities in Erbil, Kurdistan-Iraq. As well as results of IgG/IgM in COVID-19 patients are also highlighted in this study.

Material and method: A total of 100 recorded data for the COVID -19 isolated from the patients were collected within (10) months (November 2020 until August 2021) from universities in Erbil city, Kurdistan – Iraq. Descriptive statistics was used for analysis.

Results: A total of 100 samples were taken from three universities (52 from Hawler Medical University, 35 from University of Kurdistan Hawler and 13 from Tishk International University), from these 32 were male and 68 were female with age arranged between 17-29 years old. Moreover 81 of patients their positive results were confirmed with IgG/IgM test while 19 of them were negative with this test. However, 94% of patients none suffer from other diseases (cardiovascular disease, asthma, diabetes, cancer, hypertension, bronchitis) while 2% suffer from diabetes and 4% from asthma. Indeed, the patients used different medications during treatment, 18% of them treated with Favipiravir, 66% of them used Azithromycin, 5 % consumed Enoxaparin, 8 % Dexamethasone and 3 % treated with ceftriaxone IV. On the other hand, 83 of patients were nonsmokers and 17 of them were smokers.

Keywords: SARS-CoV-2, Erbil city, COVID-19, Pandemic

INTRODUCTION:

Since the 19th Century, pathogenic viral outbreaks and their complicated interactions with animals and humans have resulted in transmission, posing a major threat to human health and safety [1]. With

human activities and fast globalization, pathogenic transmission has increased across continents and resulted in several pandemics, especially viral pandemics [2-3]. Along the last two decades, there has been an escalate in newly identified coronaviruses, like Middle East respiratory syndrome coronavirus (MERS-CoV) in Saudi Arabia [4]. New coronaviruses including severe acute respiratory syndrome coronavirus (SARS-CoV) , very pathogenic influenza (avian influenza A H7N9, pandemic H1N1) in China and hemorrhagic fever viruses (Lassa, Ebola) in West Africa [5]. These viral pandemics have caused in grand numbers of deaths. For example, SARS-CoV appeared in bats and passed to humans through the host (palm civets) in Guangdong Province, China; there were 8422 recorded cases including 916 deaths (mortality rate 11%) in 26 countries [6-7]. Similarly, 2494 cases of MERS-CoV which also originated in bats, via dromedary camels (intermediate host) were notified including 858 deaths (mortality rate 34%) in 27 countries [8]. Coronaviruses are enveloped, positive-sense, single-stranded RNA viruses, that belong to the family Coronavirdiae, (subfamily Coronavirinae, order Nidovirales) They are common human pathogens, and are known to cause acute respiratory, hepatic and neurological diseases with varying seriousness in humans and animals [9-10]. Coronaviruses are separated into four genera: alphacoronavirus (αCoV), betacoronavirus (βCoV), gammacoronavirus (γCoV) and deltacoronavirus (δCoV) [11]. Among them, SARS-CoV and MERS-CoV (i.e.βCoVs) have been recorded with elevated mortality rates, as mentioned above. In December 2019, an outbreak of pneumonia-like disease caused by a new coronavirus occurred in Wuhan, Hubei Province and from China to the rest of the world [12]. The World Health Organization (WHO) in February 2020 termed the disease 'coronavirus disease 2019' (COVID-19)[13]. and the virus named by the International Committee on Virus Taxonomy as 'severe acute respiratory syndrome coronavirus-2' (SARS-CoV-2) [14]. Coronaviruses are wrapped, positive-sense RNA viruses with a diameter of 60–140 nm. These viruses are recognized by club-like pin projections of protein on the surface, with a crown-like appearance under the electron microscope, the name coronavirus came from Latin word coronam for crown [15]. SARS-CoV-2 differentiates from other coronaviruses by it is strong affinity to bind with human cell receptors. Coronaviruses are renowned to cause a variety of diseases in birds and mammals, including fatal respiratory infections in humans, enteritis in pigs and cows and upper respiratory disease in chickens [16]. Transmission from animal to human was the first case of SARS-CoV-2 followed by many cases of local transmission, then seriously community transmission, have been reported, which lead to the pandemic status [17]. According to the cases of infected people detected

at Wuhan seafood market, where alive animals are sold routinely, it was proposed that the origin of SARS-CoV-2 could be zoonotic. Many efforts and retro studying have been undertaken to identify a reservoir host or intermediate host from where the infection might be transferred to human. Two types of snakes have been described as possible reservoirs of SARS-CoV-2; even so, till now date, there is no consistent directory for a coronavirus reservoir host other than birds and mammals [18-19]. According to the reports, transmission of SARS CoV-2 from one person to another may occur when a person shows symptoms or is in the incubation stage, while some persons are infectious and remain asymptomatic [20]. Transition happens through inhalation of respiratory droplets (>10 μm) of exhaled virus from an infected human (within 1 m). The virus stays airborne for a prolonged time. Transition also happens by contact with infected surfaces, like skin-to-skin, or via touching an infected inanimate things then spreading it by touching the mouth, nose or eyes [21]. SARS-CoV-2 is recorded to remain for many hours on contaminated metal surfaces and sterile sponges, latex surgical gloves, if not altered after dealing with an infected patient, increasing the opportunity for transmission through touch. ARS-CoV-2 is recorded to remain for many hours [22]. In order to control the transmission and infection of SARSCoV-2 there is need to evaluate the role of big respiratory droplets, smaller airborne aerosols (<5μm) and direct surface contacts to the transmissibility of SARSCoV-2 [23]. The main aims of this study to determine the demographic and clinical characteristics of COVID-19 in the population of the universities in Erbil, Kurdistan-Iraq. As well as the medications used to treat the disease and the methods for detecting COVID -19. The results of IgG/IgM in COVID-19 patients are also highlighted in this study.

METHODS:

A total of 100 recorded data for the COVID -19 isolated from the patients were collected within (10) months (November 2020 until August 2021) from universities in Erbil city, Kurdistan – Iraq. Descriptive statistics was used for analysis.

RESULTS:

A total of 100 samples were taken from three universities (52 from HMU, 35 from UKH and 13 from TIU), from these 32 were male and 68 were female with age arranged between17-29 years old.

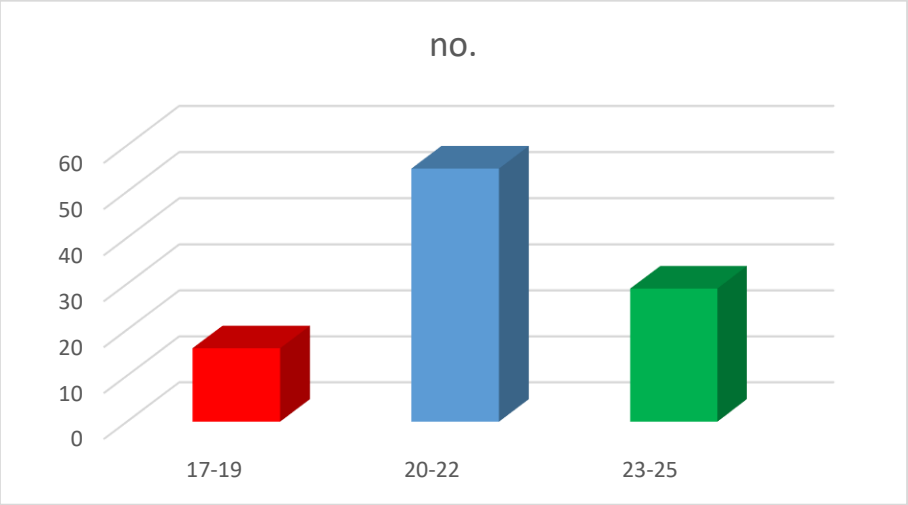

Figure 1: Age distribution of among students of COVID-19

On the other hand, 71 of patients their positive results of Covid19 confirmed by PCR test while 29 were none confirmed by PCR test. Moreover 81 of patients their positive results were confirmed with IgG/IgM test while 19 of them were negative with this test.

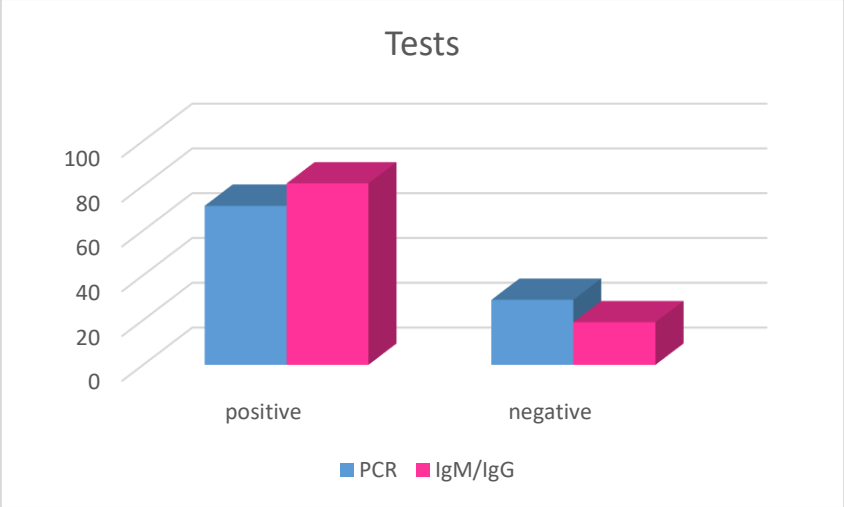

Figure 2: IgG/IgM test results among patients

DISCUSSION:

In November 2019, a new outbreak starts of pandemic proportions, which has dispersal throughout the world causing a big number of deaths and morbidities [24]. The pandemic has resulted in significant loss of life and severe illness, particularly among vulnerable populations such as the

elderly and those with underlying health conditions[25]. At the same rapidity as the virus propagation, researches were carried out for diagnosis and treatment of the disease [26]. This study was carried out during the peak of the COVID-19 disease outbreak in Erbil. A high seroprevalence of IgM/IgG (81%) were recorded among 100 outpatients. The results reported in this study were similar to those found in Iran by Shakiba *et al*. 2020 who found that 22-33% of the studied population were seropositive [27]. However, much lower ratios (2.49-4.16%) were reported in California, USA, in Sweden (1.7% and 6.8%), and in Italy (11.6%) [28-29]. The high prevalence of seropositivity in the Erbil city could be due to its geographical location, in addition to low cost of serological test comparing with other tests, social activities and a low level of awareness among people can increase the spread of the infection, many of whom had false negative RT-PCR test results and were asymptomatic individuals, and who spread the disease rapidly in the population. Moreover, Polymerase Chain Reaction (PCR) is a DNA amplification technique that was invented and this technology is commonly used for pathogen identification, forensic analysis gene identification, and genetic engineering [30]. Diagnosis of SARS-CoV-2 infection is recently based on real-time polymerase chain reaction (RT-PCR) achieved on either nasopharyngeal swabs or oropharyngeal swabs [31]. In addition to that this study showed that 71% of patients were positive result with PCR.

Conclusions: The COVID-19 pandemic has had a profound impact on various aspects of society, affecting individuals, communities, and economies worldwide. Students experienced learning loss due to disruptions in traditional teaching methods and difficulties in adapting to remote learning environments, every country needs to scale up emergency response mechanisms, educate and actively communicate with the public, condense infected case finding, contact tracing, monitoring, quarantine of contacts, and isolation of cases. Responding to an emergency requires efficient collaboration and a multi-skilled approach (medical, information, statistical, political, social, and other expertise), which makes it hard to define one interface for all.

Funding

Not applicable

Competing interests

The authors declare that they have no competing interests.

References:

1. Mackenzie, J. S.; Jeggo, M.; Daszak, P.; Richt, J. A.,(2013). *One Health: The human-animal-environment interfaces in emerging infectious diseases*. Springer:; Vol. 366.
2. Liu, J.; Dai, S.; Wang, M.; Hu, Z.; Wang, H.; Deng, F., (2016**).** Virus like particle-based vaccines against emerging infectious disease viruses. *Virologica Sinica**,** 31*, 279-287.
3. Qu, G.; Li, X.; Hu, L.; Jiang, G.,(2020). An imperative need for research on the role of environmental factors in transmission of novel coronavirus (COVID-19). ACS Publications:.
4. Weber, D. J.; Rutala, W. A.; Fischer, W. A.; Kanamori, H.;(2016**).** Sickbert-Bennett, E. E., Emerging infectious diseases: Focus on infection control issues for novel coronaviruses (Severe Acute Respiratory Syndrome-CoV and Middle East Respiratory Syndrome-CoV), hemorrhagic fever viruses (Lassa and Ebola), and highly pathogenic avian influenza viruses, A (H5N1) and A (H7N9). *American journal of infection control**,** 44* (5), e91-e100.
5. Sharma, A.; Tiwari, S.; Deb, M. K.; Marty, J. L.,(2020**).** Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2): a global pandemic and treatment strategies. *International journal of antimicrobial agents**,** 56* (2), 106054.
6. Organization, W. H., Statistics on Middle East respiratory syndrome. Geneva: WHO. (2019). Published on Nov.
7. Wang, X.; Ren, Z.; Wang, L.; Chen, J.; Zhang, P.; Chen, J.-P.; Chen, X.; Li, L.; Lin, X.; Qi, N., (2022**).** Identification of coronaviruses in farmed wild animals reveals their evolutionary origins in Guangdong, southern China. *Virus Evolution**,** 8* (1), veac049.
8. Arslan, O. E., Middle East Respiratory Syndrome (MERS).(2024)**.** *Rising Contagious Diseases: Basics, Management, and Treatments*, 164-180.
9. Zumla, A.; Chan, J. F.; Azhar, E. I.; Hui, D. S.; Yuen, K.-Y., (2016**).** Coronaviruses—drug discovery and therapeutic options. *Nature reviews Drug discovery**,** 15* (5), 327-347.
10. Denis, M.; Vandeweerd, V.; Verbeeke, R.; Laudisoit, A.; Reid, T.; Hobbs, E.; Wynants, L.; Van der Vliet, D., Covipendium:(2020**).** Information available to support the development of medical countermeasures and interventions against COVID-19. *Transdisciplinary Insights**,** 4* (1), 1-296.
11. Chan, J. F.-W.; Kok, K.-H.; Zhu, Z.; Chu, H.; To, K. K.-W.; Yuan, S.; Yuen, K.-Y.,(2020**).** Genomic characterization of the 2019 novel human-pathogenic coronavirus isolated from a patient with atypical pneumonia after visiting Wuhan. *Emerging microbes & infections**,** 9* (1), 221-236.
12. Wang, C.; Horby, P. W.; Hayden, F. G.; Gao, G. F., (2020**).** A novel coronavirus outbreak of global health concern. *The lancet**,** 395* (10223), 470-473.
13. Baloch, S.; Baloch, M. A.; Zheng, T.; Pei, X., (2020**).** The coronavirus disease 2019 (COVID-19) pandemic. *The Tohoku journal of experimental medicine**,** 250* (4), 271-278.
14. Lai, C.-C.; Shih, T.-P.; Ko, W.-C.; Tang, H.-J.; Hsueh, P.-R.,(2020**).** Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and coronavirus disease-2019 (COVID-19): The epidemic and the challenges. *International journal of antimicrobial agents**,** 55* (3), 105924.
15. Schoeman, D.; Gordon, B.; Fielding, B. C., Coronaviruses.(2022**).** *Encyclopedia of Infection and Immunity*, 241.
16. Decaro, N.; Lorusso, A., Novel human coronavirus (SARS-CoV-2): A lesson from animal coronaviruses.(2020**).** *Veterinary microbiology**,** 244*, 108693.
17. Yen, H.-L.; Sit, T. H.; Brackman, C. J.; Chuk, S. S.; Gu, H.; Tam, K. W.; Law, P. Y.; Leung, G. M.; Peiris, M.; Poon, L. L., (2022**).** Transmission of SARS-CoV-2 delta variant (AY. 127) from pet hamsters to humans, leading to onward human-to-human transmission: a case study. *The Lancet**,** 399* (10329), 1070-1078.
18. Rothan, H. A.; Byrareddy, S. N., (2020**).** The epidemiology and pathogenesis of coronavirus disease (COVID-19) outbreak. *Journal of autoimmunity**,** 109*, 102433.

19. Bassetti, M.; Vena, A.; Giacobbe, D. R., (2020). The novel Chinese coronavirus (2019-nCoV) infections: Challenges for fighting the storm. Wiley Online Library:; Vol. 50, p e13209.
20. Johansson, M. A.; Quandelacy, T. M.; Kada, S.; Prasad, P. V.; Steele, M.; Brooks, J. T.; Slayton, R. B.; Biggerstaff, M.; Butler, J. C.,(2021**).** SARS-CoV-2 transmission from people without COVID-19 symptoms. *JAMA network open***,** *4* (1), e2035057-e2035057.
21. Castaño, N.; Cordts, S. C.; Kurosu Jalil, M.; Zhang, K. S.; Koppaka, S.; Bick, A. D.; Paul, R.; Tang, S. K.,(2021**).** Fomite transmission, physicochemical origin of virus–surface interactions, and disinfection strategies for enveloped viruses with applications to SARS-CoV-2. *ACS omega***,** *6* (10), 6509-6527.
22. Riddell, S.; Goldie, S.; Hill, A.; Eagles, D.; Drew, T. W., (2020**).** The effect of temperature on persistence of SARS-CoV-2 on common surfaces. *Virology journal***,** *17*, 1-7.
23. Heneghan, C. J.; Spencer, E. A.; Brassey, J.; Plüddemann, A.; Onakpoya, I. J.; Oke, J. L.; Evans, D. H.; Conly, J. M.; Jefferson, T., (2022**).** SARS-CoV-2 and the role of airborne transmission: a systematic review. *F1000Research***,** *10* (232), 232.
24. Mayer, J. D.; Lewis, N. D., (2020**).** An inevitable pandemic: geographic insights into the COVID-19 global health emergency. *Eurasian Geography and Economics***,** *61* (4-5), 404-422.
25. Mccain, S.; Ward, D.; McGoohan, K.; Richards, H.; Fiore, B.; Hakeem, A.; Farid, S.; Pollard, S.; Lodge, P.; Toogood, G., (2022**).** The Covid-19 Pandemic Has Had a Significant Impact on the Quantity and Quality of Liver Cancer Surgery-Reality or Myth? *HPB: The Official Journal of the International Hepato Pancreato Biliary Association***,** *24*, S211.
26. Falzone, L.; Gattuso, G.; Tsatsakis, A.; Spandidos, D. A.; Libra, M., (2021**).** Current and innovative methods for the diagnosis of COVID-19 infection. *International journal of molecular medicine***,** *47* (6), 100.
27. Shakiba, M.; Nazari, S. S. H.; Mehrabian, F.; Rezvani, S. M.; Ghasempour, Z.; Heidarzadeh, A.,(2020**).** Seroprevalence of COVID-19 virus infection in Guilan province, Iran. *MedRxiv*.
28. Bendavid, E.; Mulaney, B.; Sood, N.; Shah, S.; Bromley-Dulfano, R.; Lai, C.; Weissberg, Z.; Saavedra-Walker, R.; Tedrow, J.; Bogan, A.,(2021**).** Covid-19 antibody seroprevalence in santa clara county, california. *International journal of epidemiology***,** *50* (2), 410-419.
29. Apolone, G.; Montomoli, E.; Manenti, A.; Boeri, M.; Sabia, F.; Hyseni, I.; Mazzini, L.; Martinuzzi, D.; Cantone, L.; Milanese, G., (2021**).** Unexpected detection of SARS-CoV-2 antibodies in the prepandemic period in Italy. *Tumori Journal***,** *107* (5), 446-451.
30. Kadri, K., (2019**).** Polymerase chain reaction (PCR): Principle and applications. *Synthetic Biology-New Interdisciplinary Science*, 1-17.
31. Moreira, V. M.; Mascarenhas, P.; Machado, V.; Botelho, J.; Mendes, J. J.; Taveira, N.; Almeida, M. G., (2021**).** Diagnosis of SARS-Cov-2 infection by RT-PCR using specimens other than naso-and oropharyngeal swabs: a systematic review and meta-analysis. *Diagnostics***,** *11* (2), 363.