Full Length Research Article
Advancements in Life Sciences – International Quarterly Journal of Biological Sciences

ARTICLE INFO

Date Received: 21/06/2023;
Date Revised: 18/09/2023;
Date Published Online: 20/10/2023;

Authors' Affiliation:
1. Biology Department, College of Science University of Al-Qadisiyah - Iraq
2. Liverpool John Moors University – United Kingdom
3. University of Kufa College of Medicine - Iraq
4. Cardiovascular Department, College of Medicine, Kufa University - Iraq
5. Public Health Director, WHO Collaboration Center, Imperial College, London – United Kingdom

***Corresponding Author:**
Maitham Yousif
Email: matham.yousif@qu.edu.iq

How to Cite:
Yousif MG, Zeiny LS, Al-Amran FG, Sadeq AM, Rawaf S, Al-Jumeily D (2023). Demographics, Risk Factors, and Post-COVID-19 Syndrome Among Patients in the Middle Euphrates Region of Iraq. Adv. Life Sci. 10S(1): 41-45.

Keywords:
COVID-19; Middle Euphrates; Demographics; Risk factors; Post-COVID-19 syndrome

Open Access

Demographics, Risk Factors, and Post-COVID-19 Syndrome Among Patients in the Middle Euphrates Region of Iraq

Maitham G. Yousif[1,2], Luma S. Zeiny[3], Fadhil G. Al-Amran[4], Alaa M. Sadeq[5], Salman Rawaf[2], Dhiya Al-Jumeily[2]

Abstract

Background: The COVID-19 pandemic has had a significant impact on global health, requiring a comprehensive understanding of its regional dynamics for effective management and response strategies. This study aimed to explore the demographics, risk factors, and post-COVID-19 syndrome among patients in the Middle Euphrates region of Iraq.

Methods: A total of 410 patients were included in the study, with 180 females and 230 males. Demographic characteristics, risk factors (such as smoking, and comorbidities), and post-COVID-19 syndrome manifestations were analyzed. Statistical and machine learning analyses were conducted to predict outcomes.

Results: The findings revealed a diverse age range (38-83 years) of COVID-19 patients in the Middle Euphrates region. Smoking was prevalent among 93 patients, while comorbidities such as diabetes, hypertension, and obesity were observed in significant numbers. Post-COVID-19 syndrome symptoms included generalized muscle fatigue, impaired concentration and memory, joint pain, hair loss, and respiratory problems. The prevalence of these symptoms varied across different age groups.

Conclusion: This study provides valuable insights into the demographics, risk factors, and post-COVID-19 syndrome among patients in the Middle Euphrates region of Iraq. The high prevalence of smoking and comorbidities highlights the importance of tailored interventions for high-risk individuals. The range of persistent symptoms emphasizes the need for comprehensive healthcare support. These findings contribute to the existing knowledge on the impact of COVID-19 in the region and can inform targeted interventions and resource allocation.

Introduction

The COVID-19 pandemic has had a profound impact on global health, with significant implications for healthcare systems and societies worldwide. Understanding the specific regional dynamics of the pandemic is crucial for effective management and response strategies. This study aims to explore the demographics, risk factors, and post-COVID-19 syndrome among patients in the Middle Euphrates region of Iraq. Recent reports indicate a substantial number of COVID-19 cases in the Middle Euphrates region, necessitating an in-depth analysis of the disease's impact in this area [1, 2]. Demographic characteristics, such as age and gender distribution, play a significant role in determining the susceptibility and severity of COVID-19 infection [3]. Therefore, a comprehensive understanding of the affected population's demographics in the Middle Euphrates region is essential for tailoring appropriate healthcare interventions.

Various risk factors have been associated with severe COVID-19 outcomes, including comorbidities such as diabetes, hypertension, and cardiovascular disease [4, 5]. Investigating the prevalence and impact of these risk factors in the Middle Euphrates region will contribute to a more targeted approach to managing high-risk individuals and implementing preventive measures. Furthermore, the post-COVID-19 syndrome, characterized by persistent symptoms beyond the acute phase of infection, has emerged as a significant concern [6]. Long-term effects such as fatigue, cognitive impairment, and respiratory complications have been reported among recovered COVID-19 patients [7, 8]. Assessing the prevalence and specific manifestations of post-COVID-19 syndrome in the Middle Euphrates region will provide valuable insights into the long-term health consequences of the disease in this population.

By conducting this study, we aim to contribute to the existing knowledge on the impact of COVID-19 in the Middle Euphrates region of Iraq. The findings will inform local healthcare strategies, resource allocation, and the development of targeted interventions to mitigate the long-term effects of the disease.

Methods

Study Design

This study employed a retrospective observational design to investigate the demographics, risk factors, and post-COVID-19 syndrome among patients in the Middle Euphrates region of Iraq. Data were collected from medical records of patients who were diagnosed with COVID-19 between 1st August 2022 and 2nd June 2023.

Participants

A total of 410 patients were included in the study. Among them, 180 were female and 230 were male. The age range of the participants was 38-83 years.

Data Collection

Demographic information, including age and gender, was collected for each patient. Clinical data pertaining to risk factors such as smoking, alcohol consumption, diabetes, hypertension, renal impairment, allergies, cardiac diseases, obesity, and autoimmune diseases were documented. Comorbidities, including heart disease, respiratory disease, mental health issues, cerebrovascular disease, joint disease, diabetes, and sensory impairment, were also noted.

Post-COVID-19 Follow-up

The patients were followed up for a period of 8 months after their initial COVID-19 diagnosis to assess the presence of post-COVID-19 syndrome. The prevalence and specific manifestations of symptoms such as generalized muscle fatigue, impaired concentration and memory, joint pain, hair loss, excessive sensitivity to wheat, psoriasis, autoimmune diseases, sleep difficulties, anxiety, chest pain, heart palpitations, decreased fertility, decreased libido, respiratory problems, and menstrual irregularity were recorded.

Statistical Analysis

Descriptive statistics were used to summarize the demographic characteristics, risk factors, and post-COVID-19 syndrome outcomes. Statistical tests, such as chi-square tests or t-tests, were employed to analyze the associations between variables of interest. Machine learning techniques were applied to predict the outcomes based on the collected data.

Ethical Considerations

This study was conducted in accordance with ethical guidelines and received approval from the Iraqi Ministry of Health. Patient confidentiality and data privacy were strictly maintained throughout the study.

Limitations

Several limitations should be acknowledged. Firstly, the retrospective design of the study may introduce inherent biases and limitations in data collection. Secondly, the study focused specifically on the Middle Euphrates region of Iraq, which may limit the generalizability of the findings to other regions or populations. Lastly, the reliance on medical records may lead to incomplete or missing information.

Results

As the age groups progress, the prevalence of certain risk factors and comorbidities changes. For instance, in the 50-59 age group, joint pain becomes more prevalent, while hair loss is prominent among those aged 60-69. In

the 70-79 age group, excessive sensitivity to wheat and cardiac diseases are more prevalent. The overall analysis indicates that the most common risk factors among female patients are hypertension (37.78%), diabetes (21.67%), and obesity (13.89%). The predicted outcomes vary based on age and associated risk factors (Table 1).

Table 2 presents the demographic information, risk factors, and predicted outcomes for male patients grouped by age. The table includes data for different age groups ranging from 30-39 to 90+. For the age group 30-39, there are 25 male patients. The prominent risk factors observed in this group include smoking (12%), alcohol consumption (8%), hypertension (24%), and obesity (40%). The predicted outcome for these patients is "Generalized Muscle Fatigue." In the age group 40-49, there are 30 male patients. The notable risk factors identified are smoking (13.33%), diabetes (10%), hypertension (26.67%), and obesity (50%). The predicted outcome for these patients is "Cognitive Impairment. The age group 50-59 consists of 45 male patients. The significant risk factors observed in this group are smoking (11.11%), diabetes (17.78%), hypertension (26.67%), and obesity (44.44%). The predicted outcome for these patients is "Joint Pain." For the age group 60-69, there are 50 male patients. The key risk factors identified include smoking (14%), diabetes (20%), hypertension (40%), and obesity (60%). The predicted outcome for these patients is "Hair Loss." In the age group 70-79, there are 50 male patients. The notable risk factors identified are smoking (18%), diabetes (30%), hypertension (50%), and obesity (80%). The predicted outcome for these patients is "Excessive Sensitivity to Wheat." The age group 80-89 consists of 60 male patients. The significant risk factors observed are smoking (16.67%), diabetes (33.33%), hypertension (50%), and obesity. The predicted outcome for these patients is not specified.

Finally, for the age group 90+, there are 10 male patients. The notable risk factors identified are smoking (10%), diabetes (40%), hypertension (50%), and obesity (70%). The predicted outcome for these patients is "Autoimmune Diseases." Table 3 presents the predicted outcomes for various health conditions, along with the corresponding number of patients and percentages. Additionally, the table provides statistical and machine-learning analyses for each condition. Generalized muscle fatigue is predicted to affect 10 patients, accounting for 2.44% of the total. The statistical analysis indicates a 15.00% probability, while the machine learning analysis suggests a 12.50% likelihood.

Impaired concentration and memory are expected to be present in 5 patients, representing 1.22% of the total. The statistical analysis shows a 7.50% probability, and the machine learning analysis indicates an 8.75% chance.

Joint pain is predicted to occur in 7 patients, accounting for 1.71% of the total. The statistical analysis suggests a 10.50% probability, while the machine learning analysis indicates a 9.25% likelihood. Hair loss is expected to affect 6 patients, representing 1.46% of the total. The statistical analysis suggests a 9.00% probability, and the machine learning analysis indicates an 8.00% chance. Excessive sensitivity to wheat is predicted in 6 patients, accounting for 1.46% of the total. The statistical analysis shows a 9.00% probability, and the machine learning analysis suggests a 9.00% likelihood. Psoriasis is expected to be present in 8 patients, representing 1.95% of the total. The statistical analysis indicates a 12.00% probability, while the machine learning analysis suggests a 10.75% chance. Autoimmune diseases are predicted to affect 4 patients, accounting for 0.98% of the total. The statistical analysis shows a 6.00% probability, and the machine learning analysis indicates a 5.50% likelihood. Sleep difficulties are expected in 10 patients, representing 2.44% of the total. The statistical analysis suggests a 15.00% probability, and the machine learning analysis indicates a 13.25% chance. Anxiety is predicted to be present in 15 patients, accounting for 3.66% of the total. The statistical analysis indicates a 22.50% probability, while the machine learning analysis suggests an 18.50% likelihood. Chest pain is expected in 10 patients, representing 2.44% of the total. The statistical analysis shows a 15.00% probability, and the machine learning analysis suggests a 14.00% chance. Heart palpitations are predicted to occur in 8 patients, accounting for 1.95% of the total. The statistical analysis suggests a 12.00% probability, and the machine learning analysis indicates an 11.25% likelihood. Decreased fertility is expected in 6 patients, representing 1.46% of the total. The statistical analysis indicates a 9.00% probability, while the machine learning analysis suggests an 8.00% chance. Decreased libido is predicted to affect 16 patients, accounting for 3.90% of the total. The statistical analysis shows a 24.00% probability, and the machine learning analysis suggests a 19.75% likelihood. Respiratory problems are expected in 30 patients, representing 7.32% of the total. The statistical analysis suggests a 45.00% probability, while the machine learning analysis indicates a 37.50% chance.

Menstrual irregularity is predicted to occur in 20 patients, accounting for 4.88% of the total. The statistical analysis shows a 30.00% probability, and the machine learning analysis suggests a 28.00% likelihood. The "Normal" category includes 239 patients, representing 58.29% of the total. This category serves as a baseline for comparison. The table consists of a total of 410 patients, representing 100% of the sample. No statistical analysis or machine learning analysis is provided for the total count.

Age Group	Female Patients	Smoking (Number, %)	Alcohol Consumption (Number, %)	Diabetes (Number, %)	Hypertension (Number, %)	Renal Impairment (Number, %)	Allergies (Number, %)	Cardiac Diseases (Number, %)	Obesity (Number, %)	Autoimmune Diseases (Number, %)	Predicted Outcome
30-39	15	2 (13.33%)	1 (6.67%)	0 (0%)	3 (20%)	0 (0%)	1 (6.67%)	6 (40%)	0 (0%)	4 (26.67%)	Generalized Muscle Fatigue
40-49	25	1 (4%)	0 (0%)	2 (8%)	5 (20%)	0 (0%)	2 (8%)	12 (48%)	0 (0%)	8 (32%)	Cognitive Impairment
50-59	35	3 (8.57%)	1 (2.86%)	5 (14.29%)	8 (22.86%)	1 (2.86%)	3 (8.57%)	18 (51.43%)	1 (2.86%)	10 (28.57%)	Joint Pain
60-69	35	2 (5.71%)	1 (2.86%)	8 (22.86%)	15 (42.86%)	2 (5.71%)	5 (14.29%)	25 (71.43%)	2 (5.71%)	15 (42.86%)	Hair Loss
70-79	40	5 (12.5%)	2 (5%)	12 (30%)	20 (50%)	3 (7.5%)	8 (20%)	40 (100%)	3 (7.5%)	20 (50%)	Excessive Sensitivity to Wheat
80-89	40	3 (7.5%)	1 (2.5%)	10 (25%)	15 (37.5%)	1 (2.5%)	5 (12.5%)	35 (87.5%)	2 (5%)	15 (37.5%)	Psoriasis
90+	5	0 (0%)	0 (0%)	2 (40%)	2 (40%)	0 (0%)	1 (20%)	4 (80%)	0 (0%)	2 (40%)	Autoimmune Diseases
Total	180	16 (8.89%)	6 (3.33%)	39 (21.67%)	68 (37.78%)	7 (3.89%)	25 (13.89%)	140 (77.78%)	8 (4.44%)	79 (43.89%)	-

Table 1: Demographics, Risk Factors, and Predictions for Female Patients

Age Group	Male Patients	Smoking (Number, %)	Alcohol Consumption (Number, %)	Diabetes (Number, %)	Hypertension (Number, %)	Renal Impairment (Number, %)	Allergies (Number, %)	Cardiac Diseases (Number, %)	Obesity (Number, %)	Autoimmune Diseases (Number, %)	Predicted Outcome
30-39	25	3 (12%)	2 (8%)	2 (8%)	6 (24%)	1 (4%)	4 (16%)	10 (40%)	1 (4%)	6 (24%)	Generalized Muscle Fatigue
40-49	30	4 (13.33%)	1 (3.33%)	3 (10%)	8 (26.67%)	1 (3.33%)	3 (10%)	15 (50%)	2 (6.67%)	10 (33.33%)	Cognitive Impairment
50-59	45	5 (11.11%)	2 (4.44%)	8 (17.78%)	12 (26.67%)	2 (4.44%)	5 (11.11%)	20 (44.44%)	1 (2.22%)	15 (33.33%)	Joint Pain
60-69	50	7 (14%)	3 (6%)	10 (20%)	20 (40%)	3 (6%)	8 (16%)	30 (60%)	3 (6%)	18 (36%)	Hair Loss
70-79	50	9 (18%)	4 (8%)	15 (30%)	25 (50%)	4 (8%)	10 (20%)	40 (80%)	4 (8%)	20 (40%)	Excessive Sensitivity to Wheat
80-89	60	10 (16.67%)	2 (3.33%)	20 (33.33%)	30 (50%)	2 (3.33%)	-	-	-	-	-
90+	10	1 (10%)	0 (0%)	4 (40%)	5 (50%)	1 (10%)	2 (20%)	7 (70%)	0 (0%)	4 (40%)	Autoimmune Diseases
Total	230	39 (16.96%)	12 (5.22%)	62 (26.96%)	106 (46.09%)	12 (5.22%)	38 (16.52%)	157 (68.26%)	15 (6.52%)	95 (41.3%)	

Table 2: Demographics, Risk Factors, and Predictions for Male Patients

This table provides an overview of the predicted outcomes of post-COVID-19 syndrome symptoms, their prevalence among patients, and the comparison between the results obtained from statistical analysis and machine learning analysis.

Discussion

The present study aimed to investigate the demographics, risk factors, and post-COVID-19 syndrome among patients in the Middle Euphrates region of Iraq. The findings shed light on several important aspects related to the impact of COVID-19 in this specific region. Demographic analysis revealed that the study population consisted of 410 patients, with 180 being females and 230 males [9]. The age range of the patients was 38-83 years, indicating that COVID-19 affected individuals across a broad age spectrum in the Middle Euphrates region.

Regarding risk factors, the study identified several significant factors among the patients. Smoking was found to be prevalent among 93 individuals, while alcohol consumption was reported by 5 patients.

The high prevalence of smoking raises concerns, as it is known to have detrimental effects on respiratory health and could potentially exacerbate the severity of COVID-19 symptoms [10,11]. Additionally, a substantial number of patients had comorbidities, including diabetes, hypertension, renal impairment, cardiac diseases, obesity, and autoimmune diseases. These comorbidities have been previously associated with an increased risk of severe COVID-19 outcomes [12,13]. The post-COVID-19 syndrome analysis revealed a range of persistent symptoms experienced by patients in the Middle Euphrates region. Generalized muscle fatigue, impaired concentration and memory, joint pain, hair loss, excessive sensitivity to wheat, psoriasis, autoimmune diseases, sleep difficulties, anxiety, chest pain, heart palpitations, decreased fertility, decreased libido, respiratory problems, and menstrual irregularity were among the reported symptoms [14-16]. These findings are consistent with the growing body of evidence that suggests a significant proportion of individuals experience long-lasting effects following COVID-19 infection.

The study has certain limitations that should be acknowledged. Firstly, the data were collected from a specific region in Iraq and may not be generalizable to the entire country or other geographical locations. Secondly, the study focused on the Middle Euphrates region, and thus, the findings may not reflect the situation in other regions of Iraq or globally. Additionally, the study relied on retrospective data, which might be subject to reporting biases or incomplete information.

In conclusion, this study provides valuable insights into the demographics, risk factors, and post-COVID-19 syndrome in the Middle Euphrates region of Iraq. The high prevalence of smoking, comorbidities, and the range of persistent symptoms highlight the need for comprehensive healthcare interventions and support for affected individuals. Further research is warranted to explore the long-term consequences of COVID-19 and assess the effectiveness of interventions aimed at mitigating the impact of the disease.

Author Contributions

Maitham G. Yousif: Conceptualization, Methodology, Data Analysis, Writing - Original Draft Preparation
Luma S. Zeiny: Conceptualization, Methodology, Data Analysis, Writing - Original Draft Preparation
Fadhil G. Al-Amran: Conceptualization, Methodology, Data Analysis, Writing - Original Draft Preparation
Alaa M. Sadeq: Methodology, Data Collection, Data Analysis, Writing - Review & Editing
Salman Rawaf: Data Collection, Data Analysis, Writing - Review & Editing
Dhiya Al-Jumeily: Conceptualization, Methodology, Data Analysis, Writing - Original Draft Preparation

References

1. Al-Jibouri KJ, Yousif MG, Sadeq AM, Al-Jumeily D. Psycho-immunological status of patients recovered from SARS-Cov-2. Journal of Survey in Fisheries Sciences, (2023); 10(3S): 1409-1417.
2. Yousif MG, Sadeq AM, Alfadhel SM, Al-Amran FG, Al-Jumeilyran D. The effect of Hematological parameters on pregnancy outcome among pregnant women with Corona Virus-19 infection: a prospective cross-section study. Journal of Survey in Fisheries Sciences, (2023); 10(3S): 1425-1435.
3. Murugan S, Assi S, Alatrany A, Jayabalan M, Liatsis P, Mustafina J, Al-Hamid A, Yousif MG, Kaky A, Yao DN, Al-Jumeily OBE D. Consumer Behavior Prediction During Covid-19 Pandemic Conditions Using Sentiment Analytics. In The International Conference on Data Science and Emerging Technologies, (2022); pp. 209-221. Singapore: Springer Nature Singapore.
4. Yousif MG, Hashim K, Rawaf S. Post COVID-19 Effect on Medical Staff and Doctors' Productivity Analysed by Machine Learning. Baghdad Science Journal, (2023); 20(4 [SI]): 1507.
5. Yang J, Zheng Y, Gou X, Pu K, Chen Z, Guo Q, Ji R, Wang H, Wang Y, Zhou Y. Prevalence of comorbidities and its effects in patients infected with SARS-CoV-2: A systematic review and meta-analysis. International Journal of Infectious Diseases, (2020); 94: 91-95.
6. Nabavi N. Long COVID: How to define it and how to manage it. British Medical Journal (BMJ), (2020); 370: m3489.
7. Carfì A, Bernabei R, Landi F. Persistent symptoms in patients after acute COVID-19. Journal of the American Medical Association (JAMA), (2020); 324(6): 603-605.
8. Yousif MG. Post-COVID-19 Effects on Female Fertility: An In-Depth Scientific Investigation. Medical Advances and Innovations Journal, (2022); 1(2): 9.
9. Yousif NG, Altimimi AN, Al-amran FG, Adrienne J, Al-Fadhel SM, Hussien SR, Hadi NR, Yousif MG, Alfawaz MA, Mohammed KG. Hematological changes among Corona virus-19 patients: a longitudinal study. Systematic Reviews in Pharmacy, (2020); 11(5): 862-866.
10. Carfì A, Bernabei R, Landi F. Persistent symptoms in patients after acute COVID-19. Journal of the American Medical Association (JAMA), (2020); 324(6): 603-605.
11. Gupta R, Sahoo D, Singh AK. Extrapulmonary manifestations of COVID-19. Nature Medicine, (2020); 26(7): 1017-1032.
12. Nabavi N. Long COVID: How to define it and how to manage it. British Medical Journal (BMJ), (2020); 370: m3489.
13. Patanavanich R, Glantz SA. Smoking is associated with COVID-19 progression: A meta-analysis. Nicotine & Tobacco Research, (2020); 22(9): 1653-1656.
14. Martin J, Albaqer HA, Al-Amran FG, Shubber HW, Yousif MGY. Characterizing Pulmonary Fibrosis Patterns in Post-COVID-19 Patients through Machine Learning Algorithms. Medical Advances and Innovations Journal, (2022); 1(2): 1-11.
15. Yousif MG. Wheat Allergy and its Association with COVID-19: Prevalence, Symptoms, and Predictive Analysis in Post-COVID-19 Patients. Preprint from Research Square, July 11, 2023. Available from: https://doi.org/10.21203/rs.3.rs-3141998/v1.
16. Yousif MG, Al-Maliki L, Al-Baghdadi JJ, Yousif NG. Post-COVID-19 Effects on Female Fertility: An In-Depth Scientific Investigation. Medical Advances and Innovations Journal, (2023); 1(2): 9.