Med. J. Cairo Univ., Vol. 93, No. 1, Accepted 22/2/2024
DOI: 10.22608/MJCU. 145-152, March 2025
www.medicaljournalofcairouniversity.net

Association between Body Mass Index and the Severity of COVID-19 Among Patients in Riyadh, Saudi Arabia

NORA ALAFIF, Ph.D.*; WAAD ALFAWAZ, Ph.D.*; NOUF ALGHAMDI, Ph.D.*; TOURKIAH ALESSA, Ph.D.**; SHADEN ALMUTAIRI, M.Sc.*; BADRYH ALANAZI, M.Sc.* and MAHA ALQAHTANI, M.Sc.*

The Departments of Community Health Sciences and Biomedical Technology**, College of Applied Medical Sciences, King Saud University, Riyadh, Saudi Arabia*

Abstract

Background: The Coronavirus (COVID-19), a highly contagious disease, has been officially classified as a global pandemic by the World Health Organization. Notably, obesity has been identified as a significant risk factor for severe illness in COVID-19 patients.

Aim of Study: This cross-sectional study determines the association between BMI classification and the severity of COVID-19 symptoms.

Material and Methods: The study included 366 adults recruited from King Saud University Medical City (KSUMC). The data were collected from the informational systems of patients on the hospital premises.

Results: Sixty-nine percent of the participants had elevated BMI, followed by normal BMI (29%) and low BMI (2%). The chi-square test showed a statistically significant relation (p=0.04) between BMI categories and the intensive care unit (ICU) admissions. These findings suggest that people with a higher BMI are more likely to have severe COVID-19 outcomes than people with a low or normal BMI.

Conclusion: The findings of this study emphasize the importance of recognizing obesity as a significant health threat and a risk factor for communicable diseases to the public. Thus, practitioners should closely monitor obese patients to prevent severe and potentially lifethreatening outcomes.

Key Words: *COVID-19 – Obesity – BMI – ICU.*

Introduction

THE Coronavirus 2019 (COVID-19) pandemic was one of the most severe health crises of the 21st century. The first case reported was in Wuhan, and within 90 days, it spread worldwide **[1,2]**. The World Health Organization (WHO) declared the COVID-19 outbreak a pandemic in the first quarter of 2020 **[3]**. Symptoms of this virus vary from person to person, ranging from asymptomatic, a mild infection, or potentially fatal. Comorbidities such as hypertension, diabetes, coronary artery disease, liver disease, and chronic obstructive pulmonary disease (COPD) worsen the severity of COVID-19 symptoms in patients who have been diagnosed **[4]**. In response to this significant health threat, the international community advocated for modified personal behaviour, including greater adherence to personal hygiene practices, mask-wearing, maintaining physical distance, and avoiding large gatherings. Measures such as lockdowns and stay-at-home orders were also implemented to reduce the curve's steepness and effectively manage the spread of the disease **[5]**.

Obesity typically occurs when there is an energy imbalance, where the amount of energy taken in from food sources is higher than the amount of energy burnt off through physical activity. Body mass index (BMI) is commonly used as a quantitative marker to determine obesity. However, it is essential to note that BMI does not differentiate between fat and muscle mass and can be misleading **[6,7]**. Obesity has been recognized as a significant risk factor for critical illness in COVID-19 patients. Recent studies suggest that the prevalence of severe diseases linked to obesity is higher in younger age groups compared to older adults **[8]**. According to a report by the CDC, individuals with preexisting conditions such as heart disease and diabetes face an elevated risk of experiencing COVID-19 complications, suggesting that obesity may exacerbate the impact of the virus **[9]**.

As the BMI scale is used to classify being overweight or obese, several BMI criteria have been

Correspondence to: Dr. Nora Alafif,
E-Mail: nalafif@ksu.edu.sa

applied based on age and gender. A BMI equal to or greater than 25kg/m^2 is considered overweight, and a BMI greater than 30kg/m^2 is considered obese [10]. Obesity has more than doubled globally since 1980. More than 1.9 billion adults were overweight in 2014, with over 600 million obese. Obesity is a major national health concern due to the morbidity and mortality it causes [11]. According to the WHO, the Kingdom of Saudi Arabia (KSA) has an extremely high prevalence of overweight or obesity in both adults and infants/children. The prevalence of overweight and obesity in the KSA is 68.2% and 33.7%, respectively. The population enjoys a rich diet of fat and sugars and has low physical activity (PA) [12]. Evidence suggests that obesity may be a risk factor for coronavirus disease complications, explaining how obesity is related to the severity of COVID-19 [13].

Several studies have examined the link between the severity of COVID-19 and obesity. Steinberg et al., reported that obesity is considered an independent risk factor for poor prognosis in COVID- 19 patients [14]. Similarly, Al-Sabah et al. (2020) found that patients with class one obesity were 3.5 times more likely to be admitted to the ICU compared to patients with a normal BMI, while patients with morbid obesity were 5.2 times more likely to be admitted to the ICU [15]. These findings demonstrate the dangerous impact of obesity on COVID-19 related ICU admissions.

There are not many studies on the association between obesity and the severity of COVID-19 among patients residing in Saudi Arabia. Based on this gap, this study aimed to investigate the association between BMI classification and COVID-19 seriousness among patients in Saudi Arabia. By analyzing the data on ICU admissions and BMI classification, we aimed to understand better the risks faced by individuals with varying obesity grades when it comes to severe COVID-19. Ultimately, the findings from this study could help support public health policies, protect atrisk populations, and prevent the severity of future pandemics within Saudi Arabia.

Material and Methods

Ethical approval:

The study was approved by King Saud University, College of Medicine's Ethics Committee (No. E-22-6721). Study summary and informed consent were provided to those who met the eligibility criteria before participation through phone calls. Furthermore, participants were informed that they could withdraw from the study any time.

Study design:

This cross-sectional study investigated 366 positive COVID-19-infected patients recruited during their hospitalization at King Saud University Medical City (KSUMC) in Riyadh, KSA. Patients who tested positive for COVID-19 and were admitted into the KSUMC were included in the study; those who tested negative were excluded. The diagnosis of COVID-19 patients was confirmed in the hospital premises of KSUMC.

BMI calculation:

BMI is calculated as weight in kilograms divided by the square of height in meters (kg/m^2). The BMI was categorized into (i) underweight (<18.5 kg/m^2), (ii) normal weight 18.5-24.9 kg/m^2), (iii) overweight (25.0-29.9 kg/m^2), (iv) Class-I obesity (30.0-34.9 kg/m^2), (v) Class-II obesity (35.0-39.9 kg/m^2) and (vi) Class-III obesity (≥40.0 kg/m^2) [16].

Data collection:

Data for COVID-19-infected patients were gathered from the patient database stored on hospital premises. The collected data included anthropometric measures, demographic information, admission date, medical history, and severity of COVID-19 based on the Ministry of Health protocol (MOH, 2022) in Saudi Arabia as mild to moderate symptoms: Fever, cough, headache, sore throat, dyspnea, trembling or pain in the body, nausea, diarrhoea, and loss of sense of smell or taste; and severe symptoms: Clinical signs of pneumonia (fever, cough, and dyspnea) and one of the following: Respiratory rate >30min (adults), blood oxygen saturation <90% on room air.

Data analysis:

A descriptive analysis was conducted to interpret the characteristics of the study participants, their BMI, and the severity of COVID-19. The Chi-square test compared mild/moderate and severe symptoms among COVID-19 patients with and without BMI. The data was reviewed, cleaned, and analyzed using SPSS software (28.0.1.1). A *p*-value ≤0.05 determines statistical significance, and a 95% confidence interval (CL) shows the estimate's accuracy.

Results

Sociodemographic characteristics of study participants:

Table (1) displays the sociodemographic characteristics of study participants. Male subjects accounted for 58.5% of the participants, while the remaining 41.5% were female. The participants were classified into three age groups: 31.7% were between 18 and 39, 35.2% were between 40 and 59, and 33.1% were over 60. 56% were Saudi nationals, while the other 44% were non-citizens. Of the participants, 2.2% had a low BMI level, 27.3% had normal BMI levels, and 70.5% had increased BMI levels.

Table (1): Sociodemographic characteristics of study participants (n=366).

Categories	n (%)
Gender:	
Female	152 (41.5%)
Male	214 (58.5%)
Nationality:	
Saudi	205 (56%)
Non-Saudi	161 (44%)
Age:	
18-39	116 (31.7%)
40-59	129 (35.2%)
60 and above	121 (33.1%)
BMI levels:	
Low BMI (<18.5 kg/m^2)	8 (2.2%)
Normal BMI (19.0-24.9 kg/m^2)	100 (27.3%)
High BMI (≥25 kg/m^2)	258 (70.5%)

BMI = Body Mass Index.
Kg = Kilograms.
m^2 = Metre squared.

Prevalence of diseases with mild, moderate, and severe symptoms in COVID-19 patients:

The Ministry of Health's protocol served as the basis for determining the severity of the COVID-19 cases. Table (2) shows many patients diagnosed with COVID-19 had preexisting conditions, among which 23.8% were diabetic, 3.3% had cardiovascular disease (CVD), 13.4% had hypertension (HTN), 3% had chronic kidney disease (CKD), and 0.8% had cancer. Upon hospital admission, patients exhibited typically mild and moderate symptoms of COVID-19 infection, including flu (35.2%), shortness of breath (SOB) (22.1%), pain (14.2%), vomiting (2.5%), and diarrhoea (1.1%). Additionally, the severe symptoms reported by COVID-19 patients include pneumonia (19.4%), acute respiratory distress syndrome (ARDS) (7.1%), ICU admission (21.3%), ICU stay (11.7%), mortality (9.6%), sepsis (6.3%), and shock (3.3%).

Correlation between the body mass index and severity of symptoms in COVID-19 patients:

BMI levels were classified into three categories: low, normal, and high BMI (Table 3, Fig. 1). Out of the eight subjects with low BMI, six suffered from flu (75%), two experienced pain (25%), one experienced ARDS (12.5%), one required ICU admission (12.5%), two stayed in the ICU (25%), and two died (25%). None suffered from shortness of breath, vomiting, diarrhea, or pneumonia. A total of 104 subjects with normal BMI were examined. Among them, 37 individuals (35.6%) experienced flu symptoms, 21 (20.2%) experienced shortness of breath, 18 (1.3%) reported pain, three (2.9%) experienced vomiting and diarrhoea, one individual (0.96%) had pneumonia, 15 individuals (14.4%) were diagnosed with ARDS, two required admission into the ICU (1.9%), 20 (19.2%) remained in the ICU, and 14 individuals (13.5%) died. The rest of the participants (n=254) were classified as having a high BMI. Among this group, 89 individuals (35%) suffered from flu, 60 from shortness of breath (23.6%), 32 (12.6%) experienced pain, 6 (2.4%) suffered from vomiting and diarrhoea, three individuals (1.2%) were diagnosed with pneumonia, 57 (22.4%) with ARDS, 23 (9.1%) required admission to the ICU, 56 (22%) stayed in the ICU, and 27 died (10.6%). The chi-square test revealed a statistically significant correlation between BMI levels and severe symptoms with a *p*-value of 0.04.

Table (2): Prevalence of diseases with mild, moderate, and severe symptoms in COVID-19 patients.

Diseases and types of symptoms	Diseases/Symptoms	Total (n=366)
Diseases	Diabetes mellitus	87 (23.8%)
	Cardiovascular disease	12 (3.3%)
	Hypertension	49 (13.4%)
	Cancer	03 (0.8%)
	Chronic kidney disease	11 (3%)
	LCD	23 (6.3%)
Mild-Moderate symptoms	Flu	129 (35.2%)
	SOB	81 (22.1%)
	Pain	52 (14.2%)
	Vomiting	09 (2.5%)
	Diarrhea	04 (1.1%)
Severe symptoms	Pneumonia	71 (19.4%)
	ARDS	26 (7.1%)
	ICU admit	78 (21.3%)
	ICU stay	43 (11.7%)
	Mortality (Death)	35 (9.6%)
	Sepsis	23 (6.3%)
	Shock	12 (3.3%)

SOB = Shortness of breath.
ICU = Intensive Care Unit.

Table (3): Categorization of BMI with categorical and numerical variables.

BMI levels	Range of specific BMIs	Obtained values	Total Number (%)
Low BMI	<18.5 kg/m^2	14.0-18.5 kg/m^2	08 (2.2%)
Normal BMI	18.5-24.9 kg/m^2	19.0-24.9 kg/m^2	100 (27.3%)
High BMI	≥25.0 kg/m^2	25.0-50.0 kg/m^2	258 (70.50%)

BMI = Body Mass Index.
Kg = Kilograms.
m^2 = Metre squared.

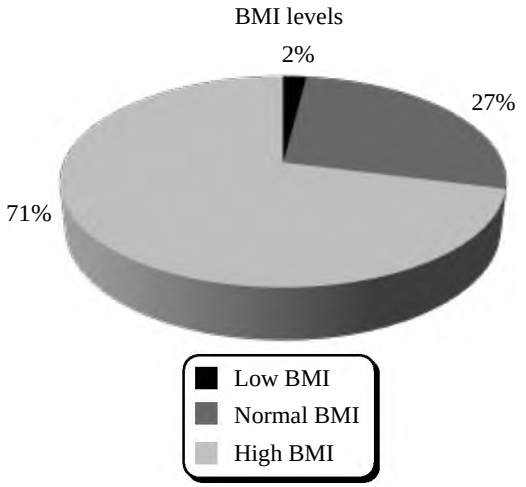


Fig. (1): Classification of BMI in the COVID-19 patients.

Association between age and comorbidities in COVID-19 patients:

As illustrated in Fig. (2), among 366 subjects between 18 and 39 years of age, 18 patients (4.9%) had diabetes, four patients (1.1%) had CVD, 20 individuals (5.5%) had HTN, and three patients (0.8%) were diagnosed with cancer. The morbidity of LCD was 9 (2.5%), which is high in this age group. Of subjects between 40–59 years of age, 29 (7.9%) patients had diabetes, CVD, 5 (1.4%), HTN was 17 (4.6%), cancer only in this age group was 3 (0.8%) patients, and CKD was 2 (0.6%). The morbidity of LCD was 7 (1.9%) of the patients who were already diagnosed. Subjects over the age of 60 had diabetes 40 (10.9%), CVD 3 (0.8%), HTN 12 (3.3%), and CKD was prevalent in patients over the age of 60, with 6 (1.6%). The LCD morbidity was 7 (1.9%) of the patients were already diagnosed, which was the same present with age 40–59 years of age. The chi-square test revealed a significant correlation between age and comorbidities, including HTN, CVD, DM, and LCD, with a p-value ≤ 0.05.

Association between gender and severity of symptoms in COVID-19 patients:

Fig. (3) shows that 95% of males and only 5% of females experienced shortness of breath. An association between gender and the ICU stay was also seen.

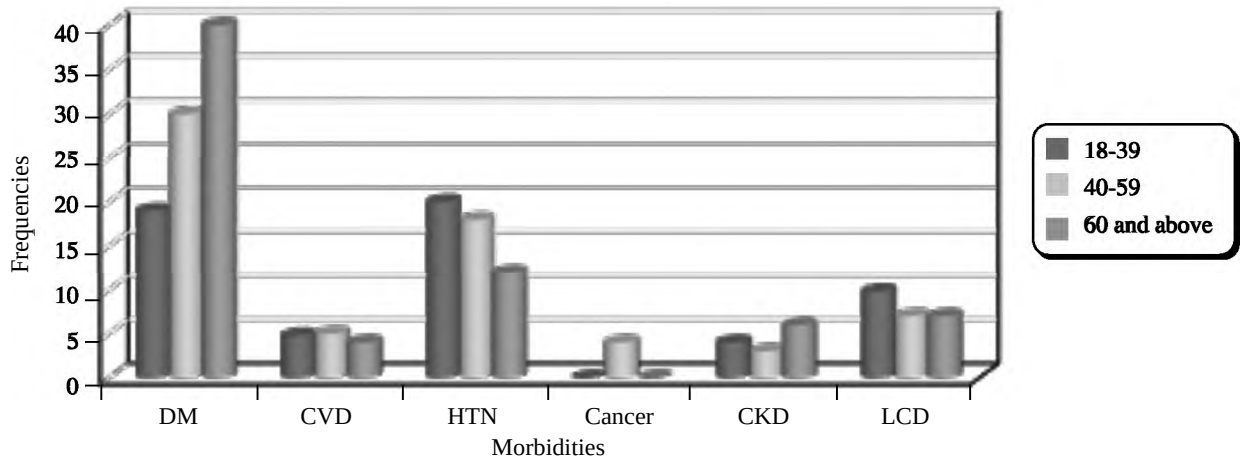
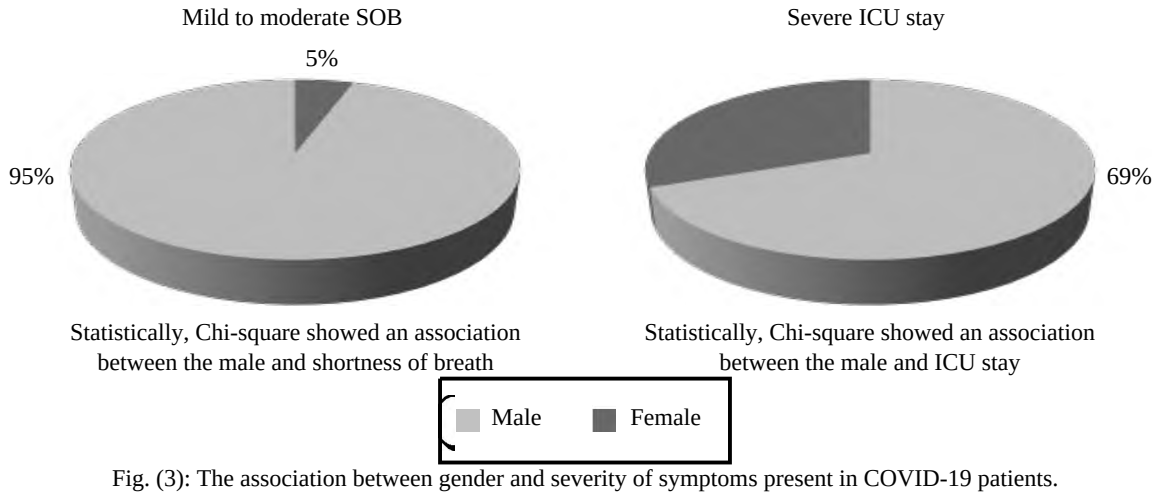


Fig. (2): The association between age and comorbidities in COVID-19 patients.



Statistically, Chi-square showed an association between the male and shortness of breath

Statistically, Chi-square showed an association between the male and ICU stay

Fig. (3): The association between gender and severity of symptoms present in COVID-19 patients.

The correlation between mild and moderate symptoms in COVID-19 patients:

The flu, vomiting, and diarrhoea were the most prevalent among the mild and moderate symptoms in all three age groups. Of the total participants, 129 (35.2%) developed the flu, 81 (22.1%) had SOB, 52 (14.2%) experienced pain, 9 (2.5%) had vomiting, and 4 (1.1%) experienced diarrhoea.

Fig. (4) demonstrates the classification of these mild and moderate symptoms. Among the group of COVID-19 patients that developed the flu, 44 (12%) were between 18 and 39 years, 45 (12.3%) were aged 40-59 years, and 40 (10.9%) were >-60 years. The development of SOB was low across different age groups, where 19 cases (5.2%) were 18-39 years of age, 30 (8.2%) were 40-59 years of age, and 32 (8.7%) were >-60 years of age. Among patients aged 18-39, 16 (4.4%) reported pain, and in both the 40-59 age group and the >-60 years, eight individuals (4.9%) reported pain. Only one person (0.3%) experienced vomiting among the 18-39 year-olds, three (0.8%) at 40-59 years of age, and five (1.4%) at >-60 years of age. Finally, only one person (0.3%) in the 18–39 age group, none among those 40–59 years old, and three (0.8%) people >-60 years reported having diarrhoea. The chi-square test revealed a significant correlation between mild shortness of breath and people in age groups older than 60 years, with a *p*-value of <_0.001.

Association with severe symptoms in COVID-19 patients:

As shown in Fig. (5), many COVID-19 patients had severe symptoms, among which 71(19.4%) developed pneumonia, 26 (7.1%) had ARDS, 78 (21.3%) were admitted to the ICU, 43 (11.7%) stayed in the ICU, 35 (9.6%) died, 23 (6.6%) had sepsis, and 12 (3.3%) experienced shock. About 23 (6.3%) patients presented with pneumonia were 18–39 years and 40–59 years of age with severe symptoms of COVID-19 patients, and 25 (6.8%) were present 60 years and above ages. Moreover, 10 (2.7%) had ARDS at 18–39 years of age, 9 (2.5%) at 40–59 years of age, and 7 (1.9%) at 60 years and above age. Also, 24 (6.6%) of 18-39-year-old patients were admitted to the ICU, 32 (6.7%) were 40-59 years of age, and 22 (6%) were >-60 years of age. Around 3.8% (n=14) of COVID-19 patients between 18 and 39 years of age stayed in the ICU, 17 (4.6%) were 40–59 years, and 12 (3.3%) were >-60 years of age. The mortality rate was highest among the 40–59 years of age, where 14 (3.8%) patients died, and 13 patients (3.6%) died among the 18–39 years. There were 8 (2.2%) deaths in the >-60 years category. The chi-square test revealed a significant correlation between severe ICU stays, severe sepsis shock, and people in age groups between 40 and 59 years old, with a *p*-value <_0.001.

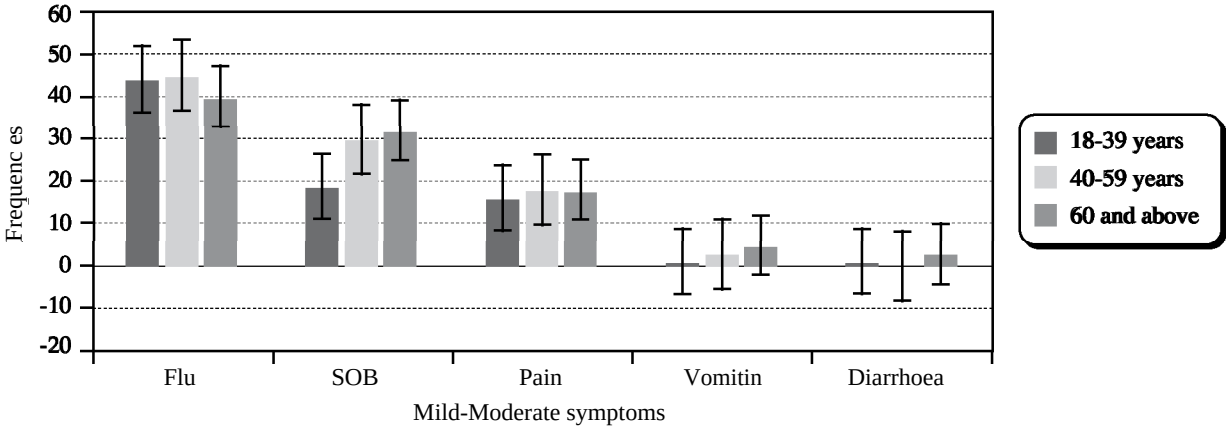


Fig. (4): Mild and moderate symptoms present in COVID-19 patients.

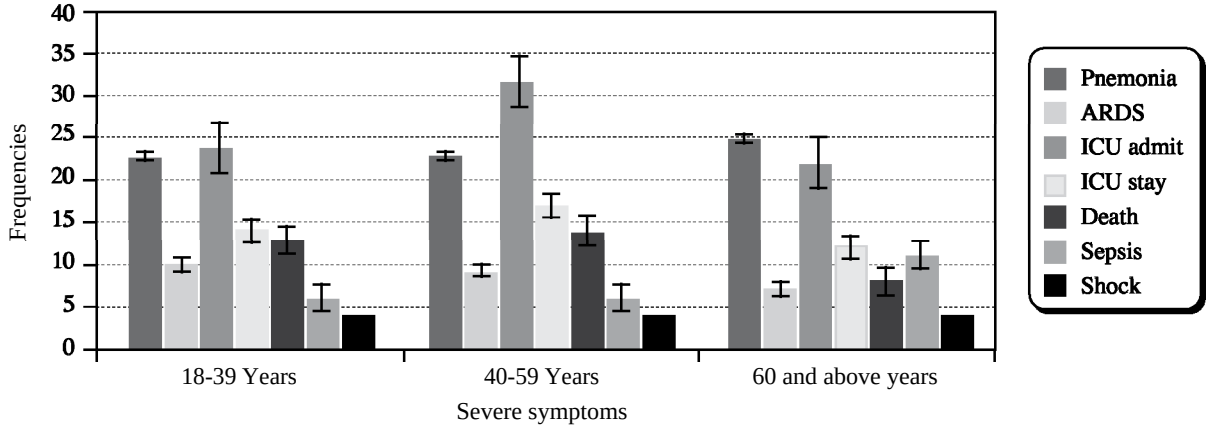


Fig. (5): Severe symptoms present in COVID-19 patients.

Discussion

In this study, we examined the association between BMI classification and the severity of COVID-19 among patients in Saudi Arabia this cross-sectional analysis aimed to determine a potential relationship between the two variables. A significant association was seen (p=0.04) between BMI categories and admission to the intensive care unit (ICU), indicating that those with higher BMI are more likely to experience severe COVID-19 outcomes than those with low and normal BMI.

This study divided BMI into three categories: (i) low BMI, (ii) normal BMI, and (iii) high BMI; however, prior studies classified them into three groups: normal, overweight, and obese (class IIII). Based on the results of their study, patients with BMI above the average BMI (29kg/m^2) were at a higher risk of hospitalization compared to other patients below the average BMI [17]. Second, 88% of ICU patients reported worse COVID-19 symptoms if their BMI was higher than 25kg/m^2. The majority of patients hospitalized to the intensive care unit were overweight or obese, which is seen as a serious COVID-19 consequence.

Third, participant characteristics showed that the majority of severe ICU patients (69%) were males and had mild to moderate dyspnea, with 58.5% of patients being COVID-19, ARDS, death, sepsis, shock, and ICU outcomes. In this study, almost one-third of patients belonged to all three groups, but the majority were from 40-59 years of age, with 35.1% of the prevalence. Many countries have reported that a BMI of 30kg/m^2 predisposes patients to severe COVID-19 outcomes. Patients with a BMI of 30 to 34.9kg/m^2 had a much higher risk of respiratory failure and ICU admission. In contrast, patients with a BMI of 35kg/m^2 had a much higher risk of death [17].

A study confirmed that combating COVID-19 by addressing obesity requires a multisystem approach, including RAAS suppression, weight loss, vitamin D supplementation, management of OSA, and avoidance of sarcopenia/frailty [18]. Other global studies have confirmed the relationship between BMI/obesity, COVID-19 and hospitalization with mild-severe symptoms [19-24]. Meta-analysis studies have also confirmed that obese patients with COVID-19 have a higher chance of being hospitalized, admitted to the ICU, needing intravenous nutritional support, and mortality. Moreover, severe COVID-19 results appear to be correlated to high visceral obesity [25].

In consistency with previous reports, [26,27] our study showed a significant association between higher BMI, longer hospitalization time, more severe cases of COVID-19, and worse outcomes (primarily the greater likelihood for ICU admission). A strong association between gender and severity of COVID-19 was also seen, with the majority of severe patients being males (69%). The study conducted by Tartof et al. [28] demonstrated that men and younger patients with a high BMI appeared to be most at risk. Male COVID-19 patients are at a higher risk of developing significant adverse outcomes from the SARS-CoV-2 infection than female patients [29]. It has been hypothesized that the way fat is distributed in women explains why obesity may not be considered a risk factor in female patients [28].

Moreover, our findings suggest a significant association between high BMI and the severity of COVID-19. However, Mayer et al. [30] found no association between obesity and COVID-19. This finding may be explained due to the small proportion (21.7%) of obese persons in their sample. Although our study has a few limitations, it is the first to assess the relationship between obesity and the severity of COVID-19 symptoms in Saudi Arabia. Among the limitations, the first is that the proportion of women in the sample (41%) was higher than that of men (59%). Secondly, the sample was limited to only one hospital, so the results can not be generalized to the Riyadh region. Thirdly, specific confounders such as smoking, exercise, and nutritional supplements and their impact on health-related outcomes were missing. Additionally, vital data such as respiratory rate and blood oxygen saturation were missing. Lastly, the study utilizes a cross-sectional design, which precludes causal inferences.

Conclusions:

COVID-19 has presented a unique challenge to medical professionals, exacerbating the world's medical resource shortage. COVID-19 and obesity were linked to severe outcomes for ICU patients. According to our findings, both high BMI and the number of ICU admissions are associated with a high prevalence of COVID-19 cases. A high BMI also increases the likelihood of death in patients. Furthermore, COVID-19 had a more significant impact on men. COVID-19, ARDS, mortality, sepsis, shock, and ICU hospitalization were also linked to age groups above 40 years. For better health outcomes, clinicians must pay close attention to obese patients. Educational courses and programs should be developed to raise awareness and explain the adverse effects of obesity particularly related to COVID-19.

Conflict of Interest: The authors declare no conflict of interest.

References

1- YANG L., et al.: COVID-19: Immunopathogenesis and immunotherapeutics. Signal transduction and targeted therapy, 5 (1): p. 128, 2020.

2- CIOTTI M., et al.: The COVID-19 pandemic. Critical reviews in clinical laboratory sciences, 57 (6): p. 365-388, 2020.

3- SOHRABI C., et al.: World Health Organization declares global emergency: A review of the 2019 novel coronavirus (COVID-19). International journal of surgery, 76: p. 71-76, 2020.

4- MEHTA P., et al.: COVID-19: Consider cytokine storm syndromes and immunosuppression. The lancet, 395 (10229): p. 1033-1034, 2020.

5- POKHREL S. and CHHETRI R.: A literature review on the impact of the COVID-19 pandemic on teaching and learning. Higher education for the future, 8 (1): p. 133-141, 2021.

6- ALHARBI K.K., et al.: Screening for obesity in the offspring of first-cousin consanguineous couples: A Phase-I study in Saudi Arabia. Saudi Journal of Biological Sciences, 27 (1): p. 242-246, 2020.

7- ALHARBI K.K., et al.: Relationship between serum amyloid A1 (SAA1) gene polymorphisms studies with obesity in the Saudi population. Diabetes, Metabolic Syndrome, and Obesity: Targets and Therapy, p. 895-900, 2021.

8- FOULKES A.S., et al.: Understanding the link between obesity and severe COVID-19 outcomes: Causal mediation by systemic inflammatory response. The Journal of Clinical Endocrinology & Metabolism, 107 (2): p. e698-e707, 2022.

9- MICHALAKIS K. and ILIAS I.: SARS-CoV-2 infection and obesity: Common inflammatory and metabolic aspects. Diabetes & Metabolic Syndrome: Clinical Research & Reviews, 14 (4): p. 469-471, 2020.

10- ALAFIF N. and ALRUWAILI N.W.: Sleep Duration, Body Mass Index, and Dietary Behaviour among KSU Students. Nutrients, 15 (3): p. 510, 2023.

11- MOHAMMED M.S., et al.: Systems and WBANs for controlling obesity. Journal of healthcare engineering, 2018.

12- KHABAZ M.N., et al.: Dietary habits, lifestyle patterns, and obesity among young Saudi University Students. JPMA. The Journal of the Pakistan Medical Association, 67 (10): p. 1541-1546, 2017.

13- NAKESHBANDI M., et al.: The impact of obesity on COVID-19 complications: A retrospective cohort study. International journal of obesity, 44 (9): p. 1832-1837, 2020.

14- STEINBERG E., WRIGHT E. and KUSHNER B.: In young adults with COVID-19, obesity is associated with adverse outcomes. Western Journal of Emergency Medicine, 21 (4), 2020.

15- AL-SABAH S., AL-HADDAD M., AL-YOUHA S., JAMAL M. and ALMAZEEDI S.: COVID-19: Impact of obesity and diabetes on disease severity. Clinical Obesity, 10 (6), 2020. https://doi.org/10.1111/cob.12414.

16- AL-NBAHEEN M.S.: Impact of weight loss predictors in severe-morbid obesity patients in the Saudi population. Saudi Journal of Biological Sciences, 27 (10): p. 2509-2513, 2020.

17- AL HEIALY S., et al.: Combination of obesity and comorbidities leads to unfavorable outcomes in COVID-19 patients. Saudi journal of biological sciences, 28 (2): p. 1445-1450, 2021.

18- EKIZ T. and PAZARLı A.C.: Relationship between COVID-19 and obesity. Diabetes & Metabolic Syndrome: Clinical Research & Reviews, 14 (5): p. 761-763, 2020.

19- CAI Q., et al.: Obesity and COVID-19 severity in a designated hospital in Shenzhen, China Diabetes Care, 43 (7): p. 1392-1398, 2020.

20- GAO M., et al.: Associations between body-mass index and COVID-19 severity in 6· 9 million people in England: A prospective, community-based, cohort study. The Lancet Diabetes & Endocrinology, 9 (6): p. 350-359, 2021.

21- HENDREN N.S., et al.: Association of body mass index and age with morbidity and mortality in patients hospitalized with COVID-19: Results from the American Heart Association COVID-19 Cardiovascular Disease Registry. Circulation, 143 (2): p. 135-144, 2021.

22- KIM T.S., et al.: BMI as a risk factor for clinical outcomes in patients hospitalized with COVID-19 in New York. Obesity, 29 (2): p. 279-284, 2021.

23- PETTIT N.N., et al.: Obesity is associated with increased risk for mortality among hospitalized patients with COVID-19. Obesity, 28 (10): p. 1806-1810, 2020.

24- PRICE-HAYWOOD E.G., et al.: Hospitalization and mortality among black patients and white patients with COVID-19. New England Journal of Medicine, 382 (26): p. 2534-2543, 2020.

25- HUANG Y., et al.: Obesity in patients with COVID-19: A systematic review and meta-analysis. Metabolism, 113: p. 154378, 2020.

26- ABUMAYYALEH M., et al.: Does there exist an obesity paradox in COVID-19? Insights of the international HOPE-COVID-19-registry. Obesity Research & Clinical Practice, 15 (3): p. 275-280, 2021.

27- AL-SABAH S., et al.: COVID-19: Impact of obesity and diabetes on disease severity. Clinical Obesity, 10 (6): p. e12414, 2020.

28- TARTOF S.Y., et al.: Obesity and mortality among patients diagnosed with COVID-19: Results from an integrated health care organization. Annals of Internal Medicine, 173 (10): p. 773-781, 2020.

29- JIN J.-M., et al.: Gender differences in patients with COVID-19: Focus on severity and mortality. Frontiers in Public Health, p. 152, 2020.

30- MAYER M.A., et al.: Clinical characterization of patients with COVID-19 in primary care in Catalonia: Retrospective observational study. JMIR public health and surveillance, 7 (2): p. e25452, 2021.

العلاقة بين مؤشر كتلة الجسم وشدة كوفيد - ١٩ بين المرضى فى الرياض، المملكة العربية السعودية

خلفية البحث: تم تصنيف فيروس كورونا (كوفيد-١٩)، وهو مرض شديد العدوى، رسميًا على أنه جائحة عالمية من قبل منظمة الصحة العالمية. والجدير بالذكر أن السمنة تم تحديدها كعامل خطر كبير للإصابة بمرض. شديد لدى مرضى كوفيد-١٩.

الهدف من الدراسة: تحدد هذه الدراسة المقطعية العلاقة بين تصنيف مؤشر كتلة الجسم وشدة أعراض كوفيد-١٩.

المواد والأساليب: شملت الدراسة ٣٦٦ بالغًا تم تجنيدهم من المدينة الطبية بجامعة الملك سعود. تم جمع البيانات من أنظمة المعلومات للمرضى فى مبانى المستشفى.

النتائج: كان لدى ٦٩٪ من المشاركين مؤشر كتلة جسم مرتفع، يليه مؤشر كتلة جسم طبيعى (٢٩٪) ومؤشر كتلة جسم منخفض (٢٪). أظهر اختبار مربع كأى علاقة ذات دلالة إحصائية (p=0,04) بين فئات مؤشر كتلة الجسم ودخول وحدة العناية المركزة (ICU) تشير هذه النتائج إلى أن الأشخاص الذين لديهم مؤشر كتلة جسم أعلى هم أكثر عرضة للإصابة بنتائج شديدة لمرض كوفيد-١٩ مقارنة بالأشخاص الذين لديهم مؤشر كتلة جسم منخفض أو طبيعى.

الخلاصة: تؤكد نتائج هذه الدراسة على أهمية الاعتراف بالسمنة كتهديد صحى كبير وعامل خطر للإصابة بالأمراض المعدية للجمهور. وبالتالى، يجب على الممارسين مراقبة المرضى المصابين بالسمنة عن كثب لمنع النتائج الشديدة والمهددة للحياة.