

RESEARCH ARTICLE

Hypertension the major predictor of mortality in COVID-19: A retrospective study

Rizka Febtrina, Andre Syahputra, Eka Malfasari, Dendy Kharisna

Abstract

Objective: To determine the role of comorbid diseases in patients with coronavirus disease-2019.

Method: The quantitative, retrospective study was conducted in July 2022 at Arifin Achmad Hospital, Riau, Indonesia, and comprised patients who died due to coronavirus disease-2019 between January and March 2021. Data was retrieved from the institutional medical records using a checklist that contained items related to demographic and comorbid data. Data was analysed using SPSS 27.

Results: Of the 48 patients, 27(56.3%) were males, 21(43.7%) were females, and 20(41.7%) were aged 45-60 years. There were 16(33.3%) patients having hypertension, 11(22.9%) had diabetes mellitus, 5(10.4%) had both hypertension and diabetes mellitus, 5(10.4%) had asthma, and there was no co-morbidity in 11(22.9%) patients.

Conclusion: Hypertension was the most common comorbid disease among coronavirus disease-2019 who died.

Keywords: Hypertension, Diabetes Mellitus, Morbidity, Asthma, Demography. (JPMA 74: S-67 [Suppl. 5]; 2024)

DOI: <https://doi.org/10.47391/JPMA.Ind-RINC-18>

Introduction

Coronavirus disease-2019 (COVID-19) is a viral infection involving the respiratory tract and can cause diverse symptoms, such as fever, cough, discomfort in the throat, nausea, vomiting, dizziness, and loss of taste and smell. COVID-19 can also be transmitted with or without symptoms. The COVID-19 infection was detected for the first time in late 2019¹ and was subsequently declared a global pandemic affecting millions of people.²

COVID-19 cases in Indonesia were first reported on March 2, 2020, after which there was a serious spike in both the number of cases and deaths.³ COVID-19 cases in the Riau province of Indonesia was first reported in mid-March 2020 in Pekanbaru city.⁴

Comorbid conditions, like diabetes mellitus (DM), hypertension (HTN) and cardiovascular diseases (CVDs) were additional risk factors for COVID-19 patients. COVID-19 patients with comorbidities had a higher mortality rate compared to patients without comorbid diseases.¹ The risk of mortality for COVID-19 patients with HTN increased by 1.95 times, and the risks increased twice for patients with DM, and obesity.^{5,6}

The current study was planned to determine the role of comorbid diseases in patients with COVID-19.

Materials and Methods

The quantitative, retrospective study was conducted in July

School of Nursing Payung Negeri, Pekanbaru, Riau, Indonesia.

Correspondence: Sri Wahyuni. e-mail: wahyuni@unissula.ac.id

2022 at Arifin Achmad Hospital, Riau, Indonesia, and comprised patients who died due to COVID-19 between January and March 2021. After approval from the institutional ethics review committee, data was retrieved from the medical records using a checklist that contained items related to demographic and comorbid data. Data was analysed using SPSS 27.

Results

Of the 48 patients, 27(56.3%) were males, 21(43.7%) were females and 20(41.7%) were aged 45-60 years (Table 1). Blood pressure (BP) (Table 2) and oxygen saturation (SpO₂)

Table-1: Sample characteristics (n=48).

Variable	n (%)
Gender	
Female	21 (43.8)
Male	27 (56.3)
Age (years)	
Adolescents	2 (4.2)
Young age (25-44)	11 (22.9)
Middle age (45-60)	20 (41.7)
Elderly age (61-75)	10 (20.8)
Senile age (76-90)	5 (10.4)
Total	48 (100)

Table-2: Mean and median vital signs.

Vital Signs	Mean (SD)	Median	IQR	Min-Max
Blood pressure				
Systolic	125.02±29.1	128.5	40.5	50 – 178
Diastolic	73.46 ±18.1	80	23.25	15 – 107
Temperature	36.86 ±0.7	36.8	0.725	35.5 – 39
Respiration rate	28.81±7.9	28	5.75	14 – 46
Pulse	99.40 ±26.4	100	28.75	16 – 144

SD: Standard deviation, IQR: Interquartile range.

Table-3: Oxygen saturation (SpO₂) values.

Vital Signs	Mean (SD)	Median	IQR	Min-Max
SpO ₂	74.25 (3.8)	82.5	39.5	6 – 100

SD: Standard deviation, IQT: Interquartile range.

Table-4: Sample characteristics (n=48).

Variable	n (%)
Yes	
Hypertension	16 (33.3)
Asthma	5 (10.4)
Diabetes mellitus	11 (22.9)
Diabetes mellitus and hypertension	5 (10.4)
No	
	11 (22.9)
Total	48 (100)

(Table 3) values were noted for all the subjects.

There were 16(33.3%) patients having hypertension, 11(22.9%) had diabetes mellitus, 5(10.4%) had both hypertension and diabetes mellitus, 5(10.4%) had asthma, and there was no co-morbidity in 11(22.9%) patients (Table 4).

Discussion

In the current study, 29.2% patients were aged 45-60 years, while only 4.2% were aged 17-25 years. A meta-analysis results showed similar age distribution among COVID-19 patients. At age 50 years, a person experiences a decrease in the production of various hormones that support the regeneration process and organ health. With a decrease in the productivity of such hormones, when infected, there is a higher risk of experiencing fatal damage.⁷

The current results showed that 56.3% patients were males. The male gender tended to have a higher risk of getting a COVID-19 infection.⁸ Smoking habits in men can significantly predict increased oxygenation needs. Men who are positive for COVID-19 with a history of smoking needed more oxygen, and the risk of intubation among them was high.⁹ Men were at a higher risk of developing COVID-19 infection compared to women due to chromosomal and hormonal factors.¹⁰ In women, there are sex hormones that play an important role in innate and adaptive immunity. Men typically spend more time at work than women, making them more prone to diseases.¹¹

The risk factors for men can be attributed to a variety of factors compared to women.¹²

The factors in question include differences in lifestyle, including smoking, as well as immunological variations between men and women.¹³

In the current study, HTN was the most common comorbid, followed by DM and asthma. An earlier study reported

deaths in COVID-19 patients with HTN (76%), hyperlipidaemia (46.2%), and DM (39.5%).² Comorbidities are additional physical and psychological diseases apart from the patient's main condition, which worsens the patient's condition.^{14,15} Risk factors for patients with comorbid chronic diseases are likely to increase the risk of death in patients infected with COVID-19.⁹ Among them are cardiovascular or cerebrovascular diseases as well as DM.¹⁶ A study in New York showed that 39% of COVID-19 patients died in hospitals due to critical illnesses they were already suffering from. In addition, the greater severity of the disease at admission was strongly associated with an increased risk of death; specifically, patients with critical illnesses who needed help in the ICU had an 8 times higher risk than those who did not.¹⁷

A study in Iran reported that of the 239 deaths, 10.89% patients had comorbidities, such as DM, chronic respiratory diseases, HTN, CVD, chronic kidney disease (CKD) and cancer.² People with COVID-19 having DM are more likely to develop a more serious or critical disease, and had high mortality risk.^{18,19}

HTN and heart failure were the most prevalent comorbidities in non-survivors in the current study, demonstrating a relationship of high mortality with coronary artery disease (CAD) and heart failure. Another study,¹⁹ however, found that cerebrovascular disease and DM were the most common comorbidities among non-survivors.

Comorbidities result in acute inflammation and decreased cardiovascular function in patients at the beginning of the treatment, which leads to a higher risk of mortality from infection from COVID-19.²⁰

The current study has limitations as it was a retrospective study done with a small sample size. Larger studies with longer duration and assessment of the correlation of comorbidities with the progression of COVID-19 disease are recommended.

Conclusion

HTN was the most common comorbid condition among COVID-19 patients who died.

Disclaimer: None.

Conflict of Interest: None.

Source of Funding: None.

References

- Alkautsar A. The Relationship between Comorbid Diseases and the Severity Level of Covid-19 Patients. *J Med Hutama* 2021;03:1488–94.
- Monshi MMA, Poon J, Chung V, Monshi FM. CovidXrayNet:

- Optimizing data augmentation and CNN hyperparameters for improved COVID-19 detection from CXR. *Comput Biol Med* 2021;133:104375. doi: 10.1016/j.compbio.2021.104375.
3. Indonesian Lung Doctors Association (PDPI), Association of Indonesian Cardiovascular Specialist Doctors (PERKI), Association of Indonesian Internal Medicine Specialists (PAPDI), Indonesian Association of Anesthesiology and Intensive Therapy Doctors (PERDATIN), Indonesian Pediatrician Association (IDAI). Covid-19 Management Guidelines, 4th ed. Jakarta, Indonesia: PDPI, PERKI, PAPDI, PERDATIN, and IDAI; 2022.
 4. Riau Provincial Government. Riau Province Covid-19 Confirmation Data and Statistics. [Online] 2022 [Cited 2022 February 12]. Available from URL: <https://corona.riau.go.id/data-statistik/>
 5. Covid-19 Handling Task Force. National Covid-19 Situation. [Online] 2021 [Cited 2022 January 28]. Available from URL: <https://covid19.go.id/id/situasi>
 6. Rahayu LAD, Admiyanti JC, Khalda YI, Ahda FR, Agistany NFF, Setiawati S, et al. Hypertension, diabetes mellitus, and obesity as the main comorbidity factors of mortality in COVID-19 patients: a literature review. *J Ilm Mhs Kedokt Indonesia* 2021;9:90–7. DOI: 10.53366/jimki.v9i1.342
 7. Fadlillah S, Sucipto A, Amestiasih T. Age, Gender, Smoking Behavior, And Bmi Are Related To The Risk Of Cardiovascular Disease. *J keperawatan* 2019;11:261–8. DOI: 10.32583/keperawatan.v11i4.558
 8. Hadian HS, Masria S. Description of the Characteristics of Covid-19 Patients at Hospital. *J Riset Kedokt* 2022;2:51-6. DOI: 10.29313/jrk.vi.878
 9. Honardoost M, Janani L, Aghili R, Emami Z, Khamseh ME. The Association between Presence of Comorbidities and COVID-19 Severity: A Systematic Review and Meta-Analysis. *Cerebrovasc Dis* 2021;50:132–40. doi: 10.1159/000513288.
 10. Shuja SH, Asad D, Latif Motan MA. Interplay between body mass index and COVID-19, a harbinger of danger for Pakistan. *J Pak Med Assoc* 2021;71:2853. doi: 10.47391/JPMA.4326.
 11. Zhou F, Yu T, Du R, Fan G, Liu Y, Liu Z, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. *Lancet* 2020;395:1054–62. doi: 10.1016/S0140-6736(20)30566-3.
 12. Maryati W, Widyastuti A, Rizky APK, Listyorini PI, Aryanti FD. Analysis of Characteristics of Inpatients with Covid-19 Cases. *Infokes: Scientific Journal of Medical Records and Health Information* 2022;12:20–5. DOI: 10.47701/infokes.v12i1.1354
 13. Hafeez T, Ahmed Y, Ahmad M. Awareness about sexually transmitted diseases in women related to their age, education and income. *J Pak Med Assoc* 2021;71:2842–6. doi: 10.47391/JPMA.2036.
 14. Kalra S, Mittal S. COVID-19 and diabetes: Covidiabatology. *J Pak Med Assoc* 2020;70:954–5.
 15. Ejaz H, Alsrhani A, Zafar A, Javed H, Junaid K, Abdalla AE, et al. COVID-19 and comorbidities: Deleterious impact on infected patients. *J Infect Public Health* 2020;13:1833–9. doi: 10.1016/j.jiph.2020.07.014.
 16. Lee SC, Son KJ, Han CH, Jung JY, Park SC. Impact of comorbid asthma on severity of coronavirus disease (COVID-19). *Sci Rep* 2020;10:21805. doi: 10.1038/s41598-020-77791-8.
 17. Esfandiari F, Nurdiana DR, Triwahyuni T, Prasetya T. Comparison Of Health Rate Between Covid-19 Patients With Diabetes Mellitus And Without Diabetes Mellitus In Natar Medika Hospital, 2021. *Medula* 2022;12:342–6. DOI: 10.53089/medula.v12i2.367.
 18. Liu H, Chen S, Liu M, Nie H, Lu H. Comorbid Chronic Diseases are Strongly Correlated with Disease Severity among COVID-19 Patients: A Systematic Review and Meta-Analysis. *Aging Dis* 2020;11:668–78. doi: 10.14336/AD.2020.0502.
 19. Choirunnisaa, Heldab. Association of Hypertension with Mortality among Covid-19 Patients in South Tangerang. *J Epidemiol Kesehatan Indonesia* 2021;5:67–74.
 20. Sanyaolu A, Okorie C, Marinkovic A, Patidar R, Younis K, Desai P, et al. Comorbidity and its Impact on Patients with COVID-19. *SN Compr Clin Med* 2020;2:1069–76. doi: 10.1007/s42399-020-00363-4.

DISCLAIMER

Articles published in JPMA and Supplements of JPMA do not represent the views of the editor or editorial Board. Authors are solely responsible for the opinions expressed and the accuracy of the data.

The contribution of each author towards the published research included in this supplement is the responsibility of the authors and their institutions. It is expected to be in accordance and compliance with the ICMJE Guidelines.

Any questions/queries raised by readers should be directed to the corresponding author.