EPIDEMIOLOGICAL CHARACTERISTICS OF DEATH CASES BY COVID-19 AT DUC GIANG GENERAL HOSPITAL FROM JANUARY TO FEBRUARY, 2022

Nguyen Van Thuong*, Dang Van Xuyen*, Nguyen Huy Nga, Tran Tuan Anh*****

ABSTRACT

The study was conducted to describe the epidemiological characteristics of the patients who died of COVID-19 at Duc Giang General Hospital from January to February, 2022. This is a cross-sectional study using quantitative methods. Research result shows that: Mortality accounted for 27% of hospitalizations; Rate of deaths in the first 24 hours and 1-7 days were 6% and 49,1%, respectively; The majority of death cases were over 70 years old (90,7%); 74,7% mortal patients had comorbidities: hypertension (47,6%), cardiovascular disease (22,3%), cerebral stroke (17,5%); 31,6% mortal patients had vaccination of Covid 19, of which, 17,8% got full vaccination. Clinical classification upon admission: 46,4% critical, 40,8% severe, 9% medium 3,8% mild; Common causes of death included: respiratory failure (84,4%), Sepsis (37,2%), heart failure (32,3%).

Keywords: *COVID-19, mortality, epidemiological characteristics*

I. INTRODUCTION

Coronaviruses (CoV) is a large family of RNA viruses that can cause illness in both animals and human. In human, coronaviruses can cause a range of illnesses, from the common cold to severe medical conditions such as severe acute respiratory syndrome (SARS-CoV) in 2002 and Middle East Respiratory Syndrome (MERS-CoV) in 2012. Since December 2019, a new strain of coronavirus (SARS-CoV-2) has been identified as the cause of acute respiratory infection (COVID-19) in Wuhan city (Hubei province, China), then spread worldwide, caused a global pandemic. Since then, the virus has also mutated producing various variants [6]. SARS-CoV-2 is transmitted directly from person to person through the respiratory (primarily through droplets) and through contact with contaminated items. SARS-CoV-2 is also capable of aerosol transmission in enclosed, crowded, and poorly ventilated spaces or where there is aerosolization as treatment facilities [6].

The spectrum of COVID-19 ranges from asymptomatic, mildly symptomatic infected people to severe medical manifestations such as severe pneumonia, acute respiratory distress syndrome (ARDS) with multi-organ failure, and death. Elderly people, people with chronic or immunocompromised diseases, or with co-infection or superinfection with other etiologies such as bacteria and fungi are at greater risk of severe disease. Complications of COVID-19 include complications of lung damage, heart failure, thrombosis, acute renal failure, liver failure, gastrointestinal disorders [6], [7]. Up to March 23th, 2022, there were 474,803,177 SARS-CoV-2 infections worldwide and 6,123,368 deaths. In Vietnam, the number of infections were 8,479,751 cases, of which deaths were 42,075 cases, recovery were 4,661,270 cases. Up to March 19th, 2022,

** Duc Giang General Hospital. Hanoi*
***Faculty of Medicine, Quang Trung University*
****Centers for Health Environment Research and Development - CHERAD*
Responsible person: Nguyen Huy Nga
Email: nhnga@qtu.edu.vn
Date of receipt: 01/2/2023
Date of scientific judgment: 13/3/2023
Reviewed date: 24/3/2023

Hanoi has had 1,217,600 infections with 1,194 deaths [7].

Around the world there have been many studies on death in COVID-19 patients. Among them, some showed the impact of age, complications, immunity, comorbidities on mortality in COVID-19 patients.

Duc Giang General Hospital is a Grade I hospital in Hanoi, with 400 beds for severe and critical COVID-19 patients. During the period of January to February 2022 was the peak of the COVID-19 epidemic in Hanoi with many severe cases and deaths.

II. RESEARCH METHODS

2.1. Subjects of study: Patients who died of COVID-19 or related to COVID-19 treatment in the hospital. Patients who died at the hospital from January 1, 2022 to February 28, 2022 were selected with criteria:

- Being positive for COVID-19 by RT-PCR test or rapid test.
- Died of COVID-19 complications, or sequelae or complications related to covid-19 treatment in the hospital (such as medication complications, dialysis complications,...).
- The patients were determined the cause of death at the hospital with sufficient medical records.

2.2. Time and place of study

- Time: From 01/2022 to 09/2022.
- Location: Treatment ward for COVID-19 patients at Duc Giang General Hospital.

2.3. Research design: a cross-sectional description using quantitative research method .

2.4. Sample size and sampling method: Selection of all death cases by COVID-19 at Duc Giang General Hospital from 01/01/2022 to 28/02/2022. The total number of patients in the study were 269 patients who died at Duc Giang General Hospital.

2.5. Collecting and analyzing data: Data was collected by conducting retrospect on medical records and analyzed with SPSS 20.0.

III. RESEARCH RESULTS

3.1. Mortality by general characteristics

Table 1. COVID-19 mortality by time

Time	Hospitalization number	Mortality	
		n	%
January	374	156	41,7
February	624	113	18,1
Sum	**998**	**269**	**27,0**

The rate of mortality by COVID-19 were 27%, of which, January and February accounted for 41,7% and 18,1%, respectively.

Table 2. Mortality rate by time of hospitalization

Time of death	n	%
First 24 hours	16	6,0
1-7 days	132	49.1
8-14 days	87	32,3
>15 days	34	12,6
Sum	**269**	**100**

The mortality rate in 24 hours of hospitalization accounted for 5,95%, deaths 1-7 days accounted for almost half of the patients.

Table 3. Mortality rate by age, gender

Characteristics		n	%
Age	≤60	25	9,3
	61-70	42	15,6
	71-80	77	28,6
	81-90	96	35,7
	>90 years old	29	10,8
Gender	South	140	52,0
	Female	129	48,0
Sum		**269**	**100,0**

The age of death case was mostly scattered in over-60 age group, with the highest is in the 81-90 years old age group.

3.2. Mortality by medical history

Table 4. Medical history/comorbidities of deathcases by COVID-19

Medical history/comorbidities		n	%
Medical history	Diabetes	19	7,1
	Cancer	8	3,0
	Chronic kidney disease	21	7,8
	Organ transplantation, stem cells	2	0,7
	Cardiovascular diseases	60	22,3
	Cerebral stroke	47	17,5
	HIV/AIDS	1	0,4
	Neuropathy	24	8,9
	Venous thromboembolism	2	0,7
	Hypertension	128	47,6
	Chronic liver disorder	5	1,9
	Autoimmune Disease	5	1,9
Covid- 19 vaccination	0 dose	190	70,7
	1 dose	31	11,5
	≥2 dose	48	17,8

There were 201 patients with comorbidities, accounting for 3/4 of the patients (74,7%). Especially, some chronic diseases accounted for a high incidence such as: hypertension (47,6%), cardiovascular disease (22,3%), cerebral stroke (17,5%).

The percentage of patients who had received full vaccination were 17,8%.

3.3. Clinical status upon admission, treatment interventions and causes of death in COVID-19 patients

Table 7. Clinical classification and treatment therapies

Characteristics		n	%
Clinical classification	Mild	10	3,8
	Medium	24	9
	Severe	110	40,8
	Critical	125	46,4
Oxygen therapies	Simple oxygen/mask	81	30,1
	HFNC/NIVH Breathing Oral. Breathing Mask	63	23,4
	Mechanical Ventilation (Invasive/Non-Invasive)	68	25,3
	Sum		78,81

Characteristics		n	%
Dialysis interventions, ECMO	HA330 Adsorbent hemodialysis	11	4,1
	OXYRIS adsorption hemodialysis	10	3,7
	M100 hemodialysis	3	1,1
	ECMO	1	0,4
	Sum	22	8,1

Upon admission, critical symptoms accounted for nearly half of patients, while severe situation accounted for 40,8%.

The rate of using simple oxygen/mask cases was 30.1%, HFNC/NIV was 23.4%, mechanical ventilation was 25,3%. In mortal patients due to COVID-19, HA330 Adsorbent hemodialysis accounted for 4,1%, OXYRIS adsorption hemodialysis accounted for 3,7%, M100 hemodialysis 1.1%, ECMO had 1 case accounting for 0.4%.

Table 9. Cause of death in Covid 19 patients

Fatal complications	n	%
Heart failure	115	42,7
Arrhythmias	41	15,2
Acute kidney failure	43	16,0
Acute liver failure	16	5,9
Thrombosis in arteries and veins	26	9,7
Sepsis	100	37,2
Septic shock	75	27,9
Respiratory failure	227	84,4
Others	6	2,2

The most common cause of death in COVID-19 patients was respiratory failure with 84,4%, followed by heart failure with 42,3%, sepsis with 37,2%.

IV. DISCUSSION

The mortality rate of COVID-19 at Duc Giang General Hospital was 27,0%, of which the highest mortality rate was in January with 41,7%, while in February, the mortality rate was 18,1%. This difference is due to the fact that January 1 was the peak month of the epidemic in Hanoi, although fewer patients were hospitalized, but deaths rate was higher due to late addmision . Our study differed from the results of Danaché et al. (2022) with the majority age in over 75 group (46,4%) [2].

24-hour mortality accounted for 6%, 1 - 7day mortality accounted for 49,1%, over 7-day mortality accounted for 44,9%. This result explains the fact that many patients arrived at the hospital in critical condition, the criticality in patients is partly due to late detection and delayed emergency management when the patient declines in vital signs.

The age of death cases was mostly over 60 years old (91,7%), of which the age of 61-70 accounted for 15,6%, the age of 71-80 accounted for 28,6%, the age of 81-90 accounted for 35,7%. At older ages, patients have multiple comorbidities, so they are more likely to die of complications. This is similar to the meta-analysis of Israfil et al, showing that mortality among COVID-19

patients was higher in the over - 47 age group [5].

The proportion of female and male patients are equal. The results of the study are different from the results of the study of Danaché et al. (2022) in which hospitalized patients had a male gender accounting for 55,9% [2].

The study found that 201 out of 269 patients with comorbidities accounted for 3/4 of the patients (74,7%); In details: Hypertension (47,6%), cardiovascular disease (22,3%), cerebral stroke (17,5%), neuropathy (8,9%), chronic kidney disease (7,8%), diabetes (7,1%), cancer (3%), chronic liver disorder (1,9%).

The study results showed that the proportion of patients with COVID-19 vaccination was 31,6%, unvaccinated accounted for 68,4%. The total number of patients who received enough injections (2 doses) was 17,8%. Thus, the majority of unvaccinated and not - fully - vaccinated patients accounted for 82,2%.

Oxygen interventional therapy: There were 212 out of 269 patients with oxygen therapy intervention accounting for 78,8%, of which the number of simple oxygen / mask ventilation were 30,1% of cases, HFNC / NIVH respiration 23,4%, mechanical ventilation 25,3%. In general, the majority of COVID-19 deaths were severe, critical, presenting with respiratory failure, so most of them requires intensive therapies. This results in this research is much lower when comparing with the previous SARS-CoV pandemic, SARS in 2003 recorded a mortality rate of 45-48% of invasive ventilators [3] and the dead who needed ventilator Middle East respiratory distress syndrome (MERS) accounted for 60-70% [8], [9].

The number of patients using hemodialysis accounted for 8,1% of cases, HA330 adsorption hemodialysis accounted for 4,1%, OXYRIS adsorption hemodialysis accounted for 3.7%, ECMO had 1 case accounting for 0.4 %. During the peak of the epidemic, hemodialysis machines were not sufficient, so the rate is low, in fact many patients had hemodialysis needs, but the hospital could not afford.

Some common causes of death by organ and functional failure were recorded, such as heart failure (42,7%), arrhythmia (15,2%), acute kidney failure (16%), acute liver failure (4,8%), thromboembolism causing arterial occlusion (9,7%), sepsis (37,2%), septic shock (27,9%), respiratory failure (84,4%).

V. CONCLUSION

- 27% case rate of COVID-19; Death rate in the first 24 hours of hospitalization is 6%, 1-7 days is 49,1%; The majority died at the age of >70 with 90,7% of cases;

- 74,7% having comorbidities including: hypertension 47,6%, cardiovascular disease 22,3%, cerebral stroke 17,5%. 31,6% got Covid 19 Vaccination, of which 17,8% were fully vaccinated.

- Treatment: Oxygen therapy: simple glass oxygen/mask 30,1% of cases, HFNC breathing 23.4%, mechanical ventilation 25,3%. The number of cases using hemodialysis accounted for 8,1% of cases.

- Common causes of death by organ and function failure includes: respiratory failure with 84,4%, followed by heart failure with 42,3%, sepsis with 37,2%.

REFFERNCES

1. **Al-Dorzi H.M., Aldawood A.S., Khan R., et al.** The critical care response to a hospital outbreak of Middle East respiratory syndrome

coronavirus (MERS-CoV) infection: an observational study. *Ann Intensive Care*. 2016 **6**(**1**), 101.

2. **Dananché C., Elias C., Hénaff L., et al**. Baseline clinical features of COVID-19 patients, delay of hospital admission and clinical outcome: A complex relationship. *PLOS ONE*. 2022. **17**(**1**), e0261428.
3. **Fowler R.A., Lapinsky S.E., Hallett D., et al.** Critically ill patients with severe acute respiratory syndrome. *JAMA*. 2003. **290**(**3**), 367-373.
4. **Gomersall C.D., Joynt G.M., Lam P., et al.** Short-term outcome of critically ill patients with severe acute respiratory syndrome. *Intensive Care Med*. 2004. **30**(**3**), 381-387.
5. **Israfil I., Wiliyanarti P.F., and Selasa P.** Literature Review: Risk of Death in Covid-19. 2021.
6. **Ministry of Health .** Guidelines for diagnosis and treatment of COVID-19, issued together with Decision No. 250/QD-BYT. 2022.
7. **Ministry of Health - Ministry of Health's portal on the COVID-19 pandemic.** https://covid19.gov.vn , accessed: 03/23/2022.
8. **Lim Z.J., Subramaniam A., Ponnapa Reddy M., et al. (2021).** Case Fatality Rates for Patients with COVID-19 Requiring Invasive Mechanical Ventilation. A Meta-analysis. *Am J Respir Crit Care Med*, **203**(**1**), 54-66.
9. **Al-Dorzi H.M., Aldawood A.S., Khan R., et al. (2016).** The critical care response to a hospital outbreak of Middle East respiratory syndrome coronavirus (MERS-CoV) infection: an observational study. *Ann Intensive Care*, **6**(**1**), 101.