

PROFILE OF BRAIN INJURY PATIENTS WITH COVID-19 INFECTION AT DR. SOETOMO HOSPITAL SURABAYA FOR THE PERIOD 2020 TO 2022

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ABSTRACT

In 2019, a previously unidentified coronavirus was named COVID-19. This virus can infect everyone without exception, including brain injury patients. Because this virus is relatively new, there have not been many studies examining the interaction of COVID-19 with brain injury. The purpose of this study was to examine the profile of brain injury patients with COVID-19 at Dr. Soetomo Hospital. Method This study was conducted with a descriptive observational method with a retrospective approach. The data taken came from the medical records of Dr. Soetomo Hospital. The results of 56 brain injury patients with COVID-19, the majority of whom were male, most of whom were in the age range of 40 – 59 years, mild brain injury cases were the most dominant, the average length of patient stay was 16.4 days and patient mortality was 30.4%.

Keywords: *brain injury, covid-19, mortality*

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INTRODUCTION

In late December 2019, a previously unidentified strain of coronavirus appeared in Wuhan, China. (Wu, 2020) This virus then spread to various countries in the world. WHO officially named this disease as Coronavirus Disease-2019 (COVID-19) on February 11, 2020. (Wu, 2020) Exactly one month later, on March 11, 2020, COVID-19 was declared a global pandemic by WHO. (Cucinotta, 2020) Indonesia itself confirmed the first two cases of COVID-19 through an announcement by President Joko Widodo on March 2, 2020. (Gorbiano, 2020) Reporting from WHO data, Indonesia as of June 4, 2022 had a total of 6,056,017 cases and 156,604 of them resulted in death. (WHO, 2022) Therefore, COVID-19 is a big challenge for the medical world.

COVID-19 generally causes symptoms such as cough, fever, and shortness of breath, and there are even asymptomatic COVID-19 patients. Other symptoms also reported were fatigue, malaise, respiratory distress, muscle pain, sore throat, anosmia and ageusia. (Esakandari, 2020) Globally, the CFR (Case Fatality Rate) of COVID-19 is in the range of 2-3%. (Cao, 2020)

When the COVID-19 pandemic broke out in Indonesia, everyone could be infected, including brain injury patients. However, even though the pandemic has been running for about three years, there are still not many or almost no studies examining brain injury patients with COVID-19 infection. At Dr. Soetomo General Hospital itself, there has been no research on brain injury with COVID-19 infection. Therefore, researchers are interested in researching brain injury patients with COVID-19.

The purpose of this study is to examine the profile of brain injury patients with COVID-19 at Dr. Soetomo Hospital for the period 2020 to 2022, in addition to examining patient

profiles in the form of gender, age, brain injury category, length of hospitalization and patient outcomes

METHOD

This study is a type of descriptive observational study with a retrospective approach. This population is all brain injury patients with COVID-19 infection at Dr. Soetomo Hospital for the period 2020 to 2022. The sample size is all samples that meet the inclusion criteria and are not excluded. Sampling technique through data from medical records of Dr. Soetomo Hospital. The location of this study Medical record data collection was taken at Dr. Soetomo Hospital, Surabaya. The study was conducted from 2022 to 2023.

RESULTS AND DISCUSSION

Dr. Soetomo Hospital in the period 2020 to 2023 has 83 brain injury patients with COVID-19. Of the 83 patients, 27 patients were excluded because they had incomplete medical records. The remaining number of patients included in the study was 56.

Data Distribution Based on Patient Sex

Table 1. Gender Distribution of Patients

Gender	Sum
Man	39
Woman	17
Total	56

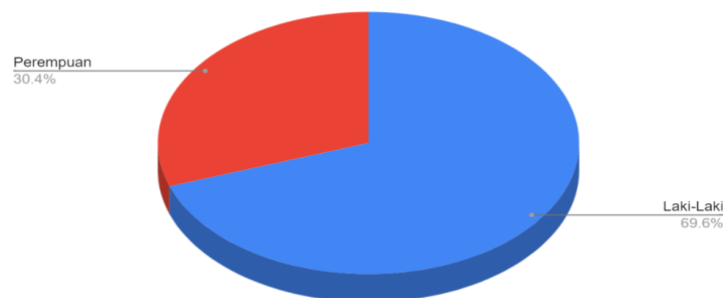


Figure 1 Pie Chart of Patient Sex Distribution

Data Distribution Based on Patient Age

Table 2. Gender Distribution of Patients

Age	Sum
0 - 9	2
10 - 19	5
20 - 29	7
30 - 39	8
40 - 49	12
50 - 59	12
60 - 69	7
70 - 79	3
Total	56

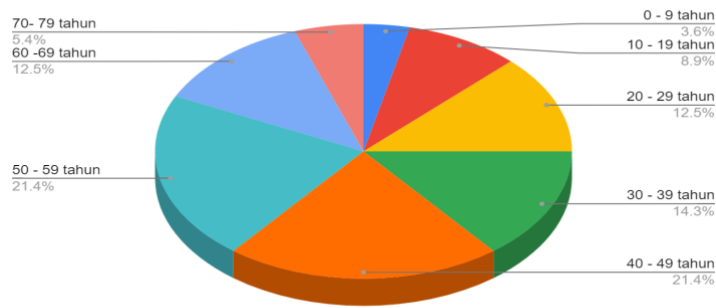


Figure 2 Pie Chart of Age Distribution of Patients

Distribution of data by category of brain injury patients

Table 3. Distribution of Brain Injury Categories of Patients

Categories Otak	Sum
Light	22
Keep	20
Heavy	14
Total	56

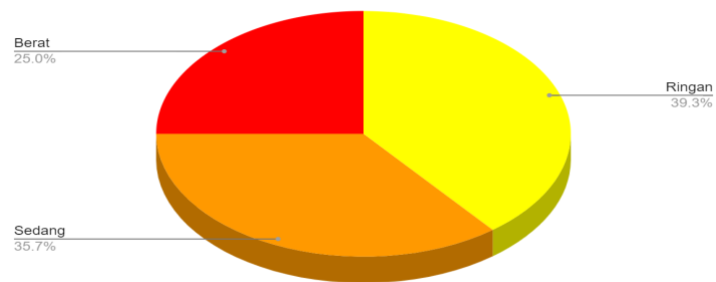


Figure 3 Pie Chart of Distribution of Patient Brain Injury Categories

Data Distribution Based on Length of Patient Hospitalization

Table 4. Distribution of Length of Hospitalization of Patients

Old Treat Stay	Sum
0 – 9 day	24
10 – 19 day	12
20 – 29 day	13
30 – 39 day	4
40 – 49 day	1
50 – 59 day	1
60 – 69 day	1
Total	56

Profile of Brain Injury Patients With Covid-19 Infection at Dr. Soetomo Hospital Surabaya For the Period 2020 to 2022

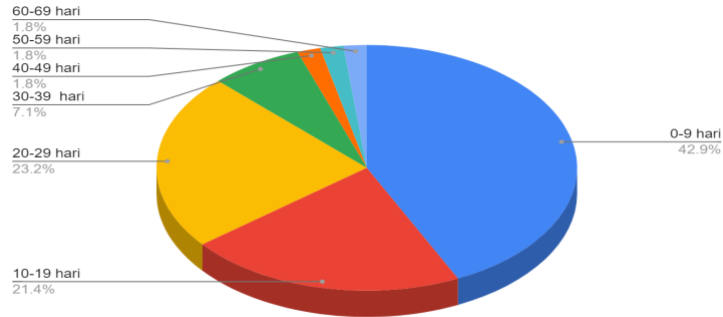


Figure 4 Pie Chart of Patient's Hospitalization

Data Distribution Based on Patient Outcomes

Table 5. Distribution of Patient Outcome Data

Result	Sum
Live	36
Die	17
Forced Return	3
Total	56

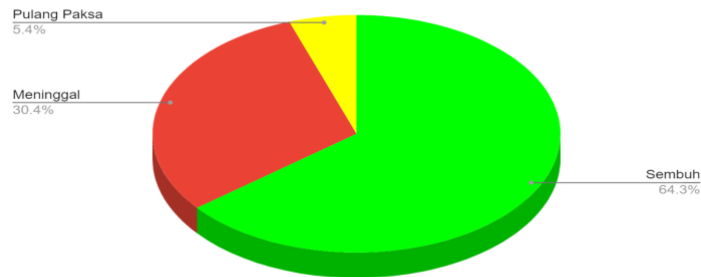


Figure 5 Patient Results Pie Chart

Distribution of patient outcome data by brain injury category

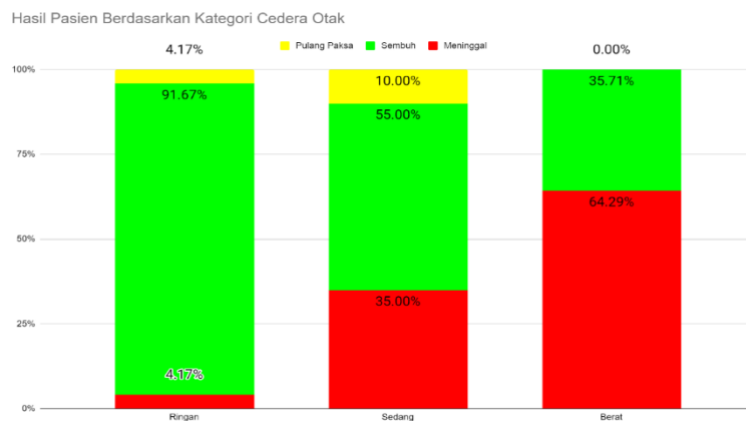


Figure 6 Patient outcome chart by brain injury category

Distribution of data on length of hospitalization of patients by brain injury category

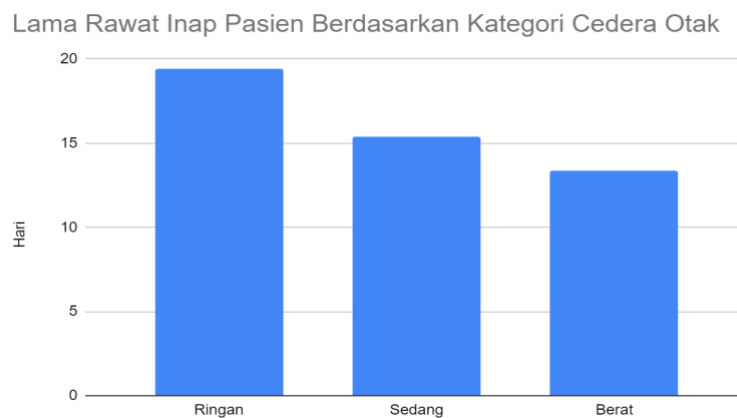


Figure 7 Chart of length of hospitalization of patients by brain injury category

DISCUSSION

Discussion of Distribution of Patient Sex Data

Referring to Table 1 and Figure 1, the majority of brain injury patients with COVID-19 infection at Dr. Soetomo Hospital for the period 2020 to 2022 are men. Of the total 56 patients, 39 patients (69.6%) were men and the remaining 17 patients (30.4%) were women.

This data is also in line with multicenter research in South Korea from 2016 – 2018. The study states that the majority of brain injury patients are male. Of the 4468 brain injury patients, 3075 patients (68.8%) were male. (Eom et al., 2020)

A study in the United States that took from the National Trauma Data Bank in 2016 also showed that the majority of brain injury patients were male. The total samples collected amounted to 236,873 patients. Of the 236,873 patients, 151,453 patients (63.9%) were male. (Miller et al., 2021)

Based on the data collected and previous studies, it can be concluded that the sex of brain injury patients is mostly male. This may happen because men tend to do activities that are at risk of brain injury.

Discussion of Distribution of Patient Age Data

Referring to Table 2 and Figure 2, the majority of brain injury patients with COVID-19 infection at Dr. Soetomo Hospital for the period 2020 to 2022 are in the age range of 40 – 49 years and 50 – 59 years. Of the total 56 patients, the age range of 0 – 9 years amounted to 2 people (3.6%), the age range of 10 – 19 years amounted to 5 people (8.9%), the age range of 20 – 29 years amounted to 7 people (12.5%), the age range of 30 – 39 years amounted to 8 people (14.3%), the age range of 40 – 49 years amounted to 12 people (21.4%), the age range of 50 – 59 years amounted to 12 people (21.4%), The age range of 60 – 69 years amounted to 7 people (12.5%), and the age range of 70 – 79 years amounted to 3 people (5.4%).

This data is different from the research conducted at Dr. M. Haulussy Hospital Ambon in 2018. Based on the study, the majority of brain injury patients were in the age range of 15-24 years (33.33%) while the data obtained by the majority of brain injury patients were in the age range of 40-49 years and 50-59 years. (Siahaya et al., 2020)

This data is also different from the research conducted at Meuraxa Hospital Banda Aceh. In the study, the majority of brain injury patients were in the age range of 10-19 years. Of the 173 patients, 55 patients (32%) fell into that age range. (Kemal et al., 2021)

This data is different from research conducted in the United States. The study took data from the National Trauma Data Bank in 2016. The study showed that the highest age range of brain injury patients was precisely in the age range of 75 years and over as much as 16.5% of the total sample. (Miller et al., 2021)

Based on data collected and previous studies, there is a difference between the age range of brain injury patients before the COVID-19 pandemic and brain injury patients with COVID-19 infection in Indonesia. Before the COVID-19 pandemic, the majority of brain injury patients were in the age range of 10 – 24 years. Conversely, during the COVID-19 pandemic, the majority of brain injury patients with COVID-19 infection are in the age range of 40 – 59 years. This may be due to young people who are more obedient to health protocols set by the government so that the number of young people infected with COVID-19 and wandering around is less.

Discussion of Data Distribution of Brain Injury Categories of Patients

Referring to Table 3 and Figure 3, the majority of brain injury patients with COVID-19 infection at Dr. Soetomo Hospital for the period 2020 to 2022 belong to the category of minor brain injuries. Of the total 56 patients, 22 patients (39.3%) were categorized as mild brain injuries. 20 patients (35.7%) were categorized as moderate brain injury and 14 patients (25%) were categorized as severe brain injury.

This data is in line with research conducted at a teaching hospital in Baghdad from 2016 to 2017. According to the study, the majority of brain injury patients are classified as mild brain injuries. A total of 469 patients were involved in the study and 241 patients (51.4%) of whom were classified as mild brain injuries. (Lafta et al., 2023)

In addition, this data is also in line with research conducted at the emergency room of Dr. Achmad Moctar Bukittinggi General Hospital in 2015. The study had a total sample of 41 patients, 16 patients (39%) classified as mild brain injury, 16 patients (39%) as moderate brain injury and 9 patients (22%) as severe brain injury. (Suryati et al., 2015)

The data are also in line with a systematic review examining brain injuries in the Middle East and North Africa. According to the study, the majority of brain injury patients are mild brain injuries. Of the 147 studies used, 63.1% classified mild brain injury, 10.7% classified moderate brain injury and the remaining 20.2% classified as severe brain injury. (Al-Hajj et al., 2021)

This data is different from studies conducted in India. According to data from the study, the distribution of brain injuries was 28.9% mild, 18.38% moderate and 52.7% severe. (Agrawal et al, 2016)

From the data obtained and some previous studies, there are variations between the distribution of brain injury categories in each place. However, overall it is still dominated by minor brain injuries.

Discussion of Data Distribution of Patient Hospitalization Duration

Referring to Table 4 and Figure 4, the majority of brain injury patients with COVID-19 infection at Dr. Soetomo Hospital for the period 2020 to 2022 were hospitalized for a period of 0 – 9 days. Of the total 56 patients, 24 patients (42.9%) were hospitalized for 0 – 9 days, 12 patients (21.4%) were hospitalized for 10 – 19 days, 13 patients (23.2%) were hospitalized for 20 – 29 days, 4 patients (7.1%) were hospitalized for 30 – 39 days, 1 patient (1.8%) was hospitalized for 40 – 49 days, 1 patient (1.8%) was hospitalized for 50 – 59 days, and 1 patient (1.8%) was hospitalized for 60 – 69 days. The average length of stay of patients was 16.4 days.

This data is different from the study in New Delhi, India. According to the study, the average length of treatment for brain injury is 14 days. The study was conducted from November 2007 to January 2009. (Agrawal et al, 2016)

Discussion of Distribution of Patient Outcome Data

Referring to Table 5 and Figure 5, the majority of brain injury patients with COVID-19 infection at Dr. Soetomo Hospital for the period 2020 to 2022 successfully recovered. Of the total 56 patients, 36 patients (64.3%) successfully recovered, 17 patients (30.4%) died, and 3 patients (5.4%) chose to go home forcibly.

According to data from a study conducted in New Delhi, India from 2007 to 2009, the mortality rate of brain injury reached 22%. Of the 2068 cases, 454 patients died. (Agrawal et al, 2016)

A meta-analysis from Iran looking at brain injuries showed that the mortality rate for brain injuries was around 10.4%. The study examined 23,446 brain injury patients from 15 studies. (Mohsen Saheban Maleki et al., 2023)

From the data of this study and previous studies. There is an increased mortality rate in brain injury patients.

Discussion of Distribution of Patient Outcome Data by Brain Injury Category

Referring to Table 6 and Figure 6, as many as 64.29% of severe brain injury patients, 35% of moderate brain injury patients, and 4.17% of minor brain injury patients died. From this data, it can be concluded that severe brain injuries experience the highest mortality rate.

Pneumonia in COVID-19 causes fluid to fill in the pulmonary alveoli. Alveoli filled with fluid will be disrupted by the diffusion process so that the exchange of oxygen and carbon dioxide is not as smooth as healthy alveoli. (Galiatsatos, 2020) On the other hand, brain injury patients are in dire need of oxygen to avoid permanent damage to the brain. (Wettersvik et al., 2020) This may be the cause of the high mortality rate, especially in severe brain injury patients.

Discussion of Data Distribution of Length of Hospitalization of Patients by Brain Injury Category

Referring to Table 7 and Figure 7, the average length of hospitalization of mild brain injury patients is 19.4 days, moderate brain injury patients are 15.4 days, and severe brain injury patients are 13.4 days. From this data, it is known that the more severe the brain injury, the shorter the length of hospitalization. This may be due to pneumonia in COVID-19.

As mentioned in discussion 6.6, the combination of COVID-19 and brain injury can be a very deadly combination. It is this combination that may also cause the length of hospitalization of

mild brain injury patients to take longer to heal and the length of hospitalization of severe brain injury patients to be shorter because patients die faster

CONCLUSION

Most brain injury patients with COVID-19 infection are male. Based on age, the majority fall into the age range of 40 – 49 years and 50 – 59 years. Cases of minor brain injury are the most dominant cases. The average length of hospitalization was 16.4 days and the mortality rate was 30.4%.

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