Epidemiological Pattern of COVID-19 Infection from March to November 2020 in Situbondo District, East Java, Indonesia

Mohmed Gesmalah¹*, Atik Choirul Hidajah²

¹Master Program of Epidemiology, Faculty of Public Health, Universitas Airlangga, Surabaya, Indonesia
²Department of Epidemiology, Biostatistics, Population Studies, and Health Promotion, Faculty of Public Health, Universitas Airlangga, Surabaya, Indonesia

Abstract
The COVID-19 pandemic continues to pose a global threat. As of March 31, 2020, there were 1,528 confirmed COVID-19 cases with 136 deaths in Indonesia. This study aimed to describe the epidemiological features and clinical course of COVID-19 in Situbondo District, East Java Province, Indonesia, to facilitate understanding of the epidemiological situation and the spread of infection in the community to improve the control and prevention measures. This study examined the epidemiological features of COVID-19 cases in Situbondo using descriptive analysis. The results revealed that from March to November 2020, there were 1,622 suspected cases and 816 confirmed cases. Moreover, females (total case 470%) were more likely to be infected than males (total case 346%). Mainly, the cases of COVID-19 infection were in the age group of 19-37 years old (36.8%), and almost half of the confirmed cases (41 cases) were caused by the infection from close contact to confirmed cases, based on the epidemiological investigation report. People with comorbidities were more susceptible to being infected. Hypertension (8.7%), diabetes (8.6%), heart disease (3.7%), kidney failure, and COPD, each by (1%) were the highest reported comorbidities in COVID-19 patients. There was another disease with a low percentage like asthma, pulmonary TB, and cancer.

This study opens the gate to further studies, which are needed to understand more about the epidemiological COVID-19 situation in the community.

Keywords: COVID-19, epidemiological pattern, infection, Situbondo

Introduction
The novel coronavirus disease is caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The COVID-19 pandemic continues to pose a global threat. Despite extensive research efforts worldwide, scientists have yet to develop either an effective vaccine or viable treatment options.¹ As of March 31, 2020, there were 1,528 confirmed COVID-19 cases with 136 deaths in Indonesia.²

After the emergence of many cases of respiratory infection in Wuhan, Hubei Province, China, in December 2019, coronavirus was identified as the primary cause behind the disease and death cases; as of January 31, 2020, this pandemic has spread to 19 countries, where the number of confirmed cases was about 11,791 including 213 deaths. The World Health Organization (WHO) declared this pandemic a Public Health Emergency of International Concern (PHEIC).³

Coronaviruses are members of the Coronaviridae (Coronavirinae) virus family, infecting a wide range of hosts and can spread through direct or intermediate hosts, including avians and bats bovines, camels, canines, civets, felines, murines, and porcine. Bats have been proposed as natural reservoirs for SARS-CoV and most coronaviruses.⁴ The symptoms of infection also ranging from the common cold to severe and ultimately fatal infections such as SARS, MERS, and, most recently, COVID-19. SARS-CoV-2 is one of seven human-infecting members of the Coronavirus family; the International Committee on Virus Taxonomy (ICTV) has named this virus as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).⁵ The transmission of COVID-19 from one person to another can be where aerosols can penetrate the human body, for instance, through the lungs by inhalation through the nose or mouth, which occurs due to close contact with an infected person or exposure to coughing, sneezing respiratory droplets, or aerosols.⁶ Moreover, the transmission of droplets (a diameter of > 5-10 µm) may also occur through evaporation in the natural environment, where the indirect transmission can
COVID-19 infection symptoms usually occur after a period of around 5.2 days of incubation. The average number of days from infection to symptom onset is approximately 14 days. In addition, the time between the beginning of COVID-19 symptoms and death varies between 6 and 41 days. The efficacy of the human body's immune system and age dictate this interval; it is shorter in older age groups (70 years old). The most common symptoms of COVID-19 infection are fever, cough, and tiredness, while other signs and symptoms include sputum production, nausea, and vomiting. Symptoms of lymphopenia include headache, hemoptysis, diarrhea, dyspnea, and lymphopenia. In addition, according to the findings of another study, fever and cough were the most common COVID-19 symptoms, and they were accompanied by myalgia, tiredness, dyspnea, and anorexia.

Individuals infected with COVID-19 rarely had intestinal signs and symptoms (e.g., diarrhea); around 20% to 25% of patients infected with SARS-CoV and MERS-SARS suffered from diarrhea. According to the findings of research conducted in Mainland China, hypertension and diabetes were the most-often reported comorbidities in patients with COVID-19 infection, along with COPD and malignancies. Other studies reveal that obesity also is one of the common comorbidity in COVID-19 patients. The goal of this study was to characterize the epidemiological characteristics and clinical course of COVID-19 in Situbondo District to better understand the epidemiological situation and the transmission of infection in the community and improve control and preventative efforts.

During epidemic week 47, November 2020, there had been an increase in the confirmed cases of COVID-19 in Indonesia. Also, there was an increase of confirmed cases (29,419) which were higher (17.8%) compared to the rise in cases epidemic week 46 (24,995). Twenty-two provinces experienced an increase in confirmed cases, while only 12 provinces experienced a decrease in cases. East Java is still in the second position with the highest number of positive confirmed cases in Indonesia (November 2020). It has a total of 55,286 cases and is still in the first position concerning the highest number of cumulative deaths with a CFR of 7.15%. Situbondo District is one of the regions in East Java Province. This area is located in the northern part of East Java, with a total population of about 685,776. The region is significant in terms of intense economical activity and geographical location, as it is located on the Java-Bali road route, leading to the island of Bali, and has faced an unrelenting rise in the incidence of COVID-19 infection and death. These factors made it critical for the authors to conduct this study in this district. The total of suspected cases was 1,622 (from March-November 2020). The confirmed cases were 816 via the laboratory confirmation testing using the rapid test and SWAB analysis for all the confirmed cases. In addition, the growing of confirmed positive cases suggested that the epidemic has continued to spread in the community, which culminates in a more significant burden on the health system to deal with the epidemic.

Method

A descriptive Epidemiology study was utilized, and the study results were interpreted using percentages, numbers, and graphs. The data of COVID-19 were collected from The Epidemiological Surveillance system in the Situbondo District. Data from March 28 to November 16, 2020, were extracted in this study. The positive cases of COVID-19 were confirmed according to the results of a quantitative Reverse Transcription-Polymerase Chain Reaction (qRT-PCR) assay of throat or inside the nose swab specimens of those identified as confirmed cases of COVID-19. All the cases with incomplete information were excluded. Data were analyzed using (SPSS) Statistics (25.0) Excel program and presented using tables, graphs, and charts for analysis, display, and interpretation.

Results

From March to November 2020, the number of suspected cases was 1,622, and confirmed cases were 816. Females were more likely to be infected with COVID-19 than males, with a total confirmed case of females was 470 (58 %), and the male was 346 (43%) (Table 1). The most significant number of positive confirmed cases, with 36.8%, were in the age range of 19-37 years old. The second-largest percentage was from the age group of 58-66 years old (32.5%). It was followed by the age group of 57-75 years old (18.9%), 0-18 years old (9.4%), and 76-94 years old (1.6%). Some exposure criteria were identified and presented in Table 1 of the confirmed positive cases.

There is still debate about whether gender is a predisposing factor for COVID-19. Many reports conducted in China and other countries stated that the male gender posed a higher risk of infection than females. The present study was conducted in Situbondo District, East Java, Indonesia to examine the age and gender distribution of COVID-19 cases.
has more severity and high mortality.\textsuperscript{16,17} Men’s cases
tended to be more severe than women’s (p = 0.035), ac-
cording to research by Jin \textit{et al.} \textsuperscript{19} Based on statistics in
Situbondo, the number of males who died from
COVID-19 is 2.4 or twice the number of women. The
SARS-CoV-2 virus targets the cells via an angiotensin-
converting enzyme (ACE2) receptor, where had previously been reported that increased ACE2 receptor
protein expression in distinct organs was associated with
specific organ failures as evidenced by clinical data in
SARS patients.\textsuperscript{18} It has been shown that circulating
ACE2 levels are higher in men than in women and
patients with diabetes or cardiovascular diseases.\textsuperscript{19}
There is still no universal surveillance description for
recovery in COVID-19 patients; even though they were
not hospitalized for SARS-CoV-2 infection, many people
experience long-term symptoms, ill health, and
diminished functioning.\textsuperscript{20} Long-haul COVID must
to be transformed from an anecdote into something that
is regularly quantified and tracked, just as deaths and
positive tests are now.\textsuperscript{21}

The COVID-19 cases must be counted in addition to
positive test statistics to make this pass. Healing should
to be described in terms of symptom length, fluctuations,
severity, quality of life, and functions, rather than relying
solely on no active SARS-CoV-2 infection or hospital dis-
charge. Thus, the number of people who have been sick
for a long time must be monitored, not just to provide
treatment and care but also to redefine the true impact of
the epidemic and report the appropriate response. This is
obtained information by knowing the actual number of
recovered cases from infection SARS-CoV-2. It is critical
to improving reporting of clinical cases without laborato-
yr confirmation by defining how current programs should
perform. To assess the actual risk of disease associated
with SARS-CoV-2 infection, public health agencies must
also agree on definitions of what constitutes recovery.\textsuperscript{22}
The findings of the study also indicated that, in
Situbondo (Figure 1), at least 681 persons recovered
from all instances of coronavirus infection (84 %), while
the number of fatalities was 72 (9%).

Transmission of coronavirus infection from asympto-
matic persons is a severe issue in the COVID-19 pan-
demic. This was because individuals with no or mild
symptoms might be unrecognized and would be a source
of infection among the community, especially when
health services are weak or non-existent in some places.\textsuperscript{23} Also, the level of health awareness and the
economic influence transmission of the virus in the
community. Some test results may not identify the
person who carries the virus. Yet, Serologic testing
for SARS-CoV showed a positive rate of 15% in
asymptomatic individuals compared to 82% in severe
disease and 4% with mild symptoms.\textsuperscript{24} The result
obtained in Figure 2 showed that the number of 41%
cases was in close contact with confirmed cases. Also,
the most significant percentage of disease
transmission was among those exposed while going to
their workplaces or by people who interacted with
them daily, either in the work environment or elsewhere.
One of the reasons behind a high infection rate in society
was the failure to follow health protocols in dealing with
infected cases, especially in terms of home quarantine.

On the other hand, the technique of wearing a mask
comprised the following eight steps where health stan-
dards must be included in the use of personal protective
equipment. The use of masks was not just when caring
for sick people at home, which was essential, but also by
those who have symptoms and signs of disease: (1) wash
your hands before putting on the mask; (2) choose the
correct mask scale; (3) make sure the mask’s colored side
is facing outward (for colored masks), or the folds are
facing downward and outward (for folded masks) (for
uncolored masks); (4) keep in mind that the metal strip
is on the upper side of the element; (5) ensure that the
elastic bands or cords are in the right place; (6) press the
steel strip tightly so that it molds according to the nose
and face bridge shape; (7) cover the nose, mouth, and
chin with a face mask; and (8) avoid rubbing the mask
on the face until it has been covered and wash your
hands before and after touching the mask. The following four
procedures should be followed before removing a mask
properly: (1) before removing the mask, wash your

\begin{figure}
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\includegraphics[width=\textwidth]{Figure1.png}
\caption{The COVID-19 Case in the Situbondo Area from March to November 2020}
\end{figure}

\begin{figure}
\centering
\includegraphics[width=\textwidth]{Figure2.png}
\caption{Identify Exposure Criteria of COVID-19 from March to November 2020 in Situbondo District}
\end{figure}
hands; (2) only the elastic bands can be touched; (3) place the used mask in a plastic or paper bag or a trash can with a lid; and (4) after removing the mask, wash your hands.24

According to the total number of COVID-19 positive cases in the Situbondo District, some of the deaths were accompanied by comorbidities such as diabetes, heart disease, malignant uterine tumor, cancer, asthma, pulmonary TB, cardiomegaly, hypertension, COPD, and renal failure (Figure 3).

Comorbidity is a medical term used to describe a condition present simultaneously in those with a related medical condition. Comorbidity basically refers to the impact of any additional conditions, physiological or psychological, that a patient may have, and the primary condition of concern. Combining a long-term illness and a severe viral infection such as COVID-19 thus presents a difficult challenge to the medical community in saving lives.25 The results of this epidemiological study in Situbondo District showed the features and comorbidity in COVID-19 patients. The five highest reported comorbidities in the Situbondo District were hypertension with a percentage of 8.7%, diabetes (8.6%), heart disease (5.7%), kidney failure, and COPD, each by 1%. Other diseases with low prevalence rates included asthma, pulmonary tuberculosis, tumors, and cancer. Diabetes, cardiovascular disease, and hypertension were the most prevalent chronic comorbidities among persons with severe asthma, according to research by Barron et al.26

Hypertension is a prevalent condition that affects the elderly. This group of persons appears to be at a higher risk of contracting the SARS-CoV-2 virus and developing severe COVID-19 symptoms and consequences. Older age is often associated with weakened immunity, which is thought to increase vulnerability to COVID-19 infection.25 It is yet uncertain if uncontrolled blood pressure is a risk factor for COVID-19 infection; nonetheless, even if it does not influence susceptibility to the illness, managing blood pressure is an essential concern for reducing the disease burden when infected with the SARS-CoV-2 virus.27 Diabetes was the second most common comorbidity in the Situbondo District. The host’s defenses, particularly granulocyte and macrophage function, are known to be harmed by this condition. People with diabetes are more susceptible to a variety of dangerous illnesses. Poor glycemic control has been linked to major infections and hospitalization and is thought to increase the hyperimmune response related to severe COVID-19 infection.28

**Conclusion**

The study results showed that the spread of infection within the community is occurring mainly because the community is still not disciplined in carrying out social distancing and independent isolation. In several public places, such as traditional markets, the use of masks is
still not completely obeyed. Additionally, in certain confirmed positive cases with mild symptoms, some had not carried out independent isolation according to the protocol for various reasons, one of which was earning a living according to the people’s daily activity. Additionally, people with comorbidities such as hypertension and diabetes are more susceptible to being infected with COVID 19. Thus, early discovery, diagnosis, treatment, and quarantine, as well as limiting secondary infections among close contacts, are all necessary steps in preventing COVID-19 from spreading from person to person.

Abbreviations

Ethics Approval and Consent to Participate
This study was conducted based on secondary data from the epidemiological surveillance system in the Situbondo District Health Office.

Competing Interest
The authors state no conflict of interest.

Availability of Data and Materials
The result of this study depends on the COVID-19 data from the epidemiological surveillance system department at the Situbondo District Health Office, East Java, Indonesia. The data was gathered from the daily epidemiological activities and follow-up of the pattern of the disease spread in Situbondo District. The data derived supporting the findings of this study are available from the corresponding author on request.

Authors’ Contribution
MG collected, processed, and analyzed the data, and wrote the discussion. ACH analyzed the data and wrote the discussion. MG and ACH have accepted responsibility for the entire content of this manuscript and approved its submission.

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