Characteristics of COVID-19 Cases in Central Java as the 5th Most Populous Province in Indonesia

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Abstract. Coronavirus Disease-2019 (COVID-19) cases are still increasing, while the epidemiology data is still limited. This study's purpose is to delineate characteristics of 31,407 COVID-19 patients in Central Java. This research involved secondary data acquired from the Health Office of Central Java, which was analysed univariately. The majority of the patients were 19-44-year-old (43.57%), females (50.81%), and private employees (10.53%). The most frequent symptoms were fever (18.85%), cough (18.19%), and shortness of breath (13.71%). Most of the cases were from Semarang City (17.2%), Kudus (6%), Jepara (6%), Demak (5.5%), and Kendal (4.3%), with an Incidence Rate (per 10,000) of 42.79; 14.53; 14.99; 14.90; and 13.84 respectively. Furthermore, most of the patients had no transit history (87.11%), while out of 25 of the foreign transit histories, the United States of America and China contributed 24% and 20%, sequentially. Three-fourths of the domestic transit history was in Central Java, whereas the Special Capital Region of Jakarta, South Sulawesi, and East Java shared 9.79%, 5.99%, and 3.08%. The most common transit history in Central Java was in Semarang City (19.28%) and Kudus (13.91%). In conclusion, the characteristics of COVID-19 cases were varied, and local transmission has occurred, which has spread to 35 cities/districts.

1 Introduction

Coronavirus Disease-2019 (COVID-19) was first recognized in December 2019 in Wuhan City, Hubei Province, China [1]. COVID-19, formerly known as 2019-nCoV, was announced as a Public Health Emergency of International Concern on 30 January 2020 and a pandemic on 11 March 2020 by the WHO [2]. As of 21 October 2020, the cumulative

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COVID-19 cases reported in 235 countries, regions, or territories were 40,455,651 cases, including 1,119,431 deaths [3], while the number of cases in Southeast Asia was 8,610,317 cases [4].

The first reported COVID-19 case in Indonesia was on 2 March 2020 [5]. On 31 March 2020, the Indonesian Government designated COVID-19 as a type of disease that causes a Public Health Emergency [6] and, on 13 April 2020, a national disaster based on Presidential Decree 12 of 2020 [7]. As of 21 October 2020, there were 373,109 cumulative cases of COVID-19 in Indonesia, which were spread across 34 provinces. Meanwhile, Central Java Province ranked 4th of the cumulative COVID-19 cases [8]. One of the probable reasons is because Central Java Province has the 5th most populous population with 1058/km2 in 2019 based on the Central Statistics Agency of Indonesia [9]. The research conducted in Europe showed that inhabitants' density was associated with the COVID-19 spreads [10]. In a study conducted in all Algerian cities, COVID-19 cases increased along with increasing population density by one individual / km2, an increase estimated at 0.48 [11].

Before this study, an article related to the characteristics and travel history of COVID-19 cases in Central Java. However, the case data collected from 3 March 2020 to 3 June 2020 were only 1533 respondents [12]. Due to the increase in cases to date, analysis of more frequency is required. This research aims to provide patient characteristics, occupational distribution, symptoms, case distribution in each district/city, and travel transit history in Central Java involving 31,407 cases.

2 Method

A descriptive study was used in this research involving secondary data from data reports of COVID-19 patients, as many as 31,407 cases, at the Central Java Provincial Health Office up to 21 October 2020. The collected data were demographic information (age, gender, occupation, district) and transit history. In the first stage, the data was processed through editing, coding, cleaning, and tabulating stages.

Editing stage

Editing was carried out on the data obtained from the recording by the Central Java Provincial Health Office. Initially, there was a general condition variable but then combined into a single variable, symptoms, because many data on that variable stated the patients' symptoms. The patient's transit location names (country, district, or city) recorded in the transit variable were edited only to write the name of the city, district, or country visited without any other information.

Coding stage

Coding was used to convert the original data, which was letters, to numerical data. Its objective was to simplify data in order to make processing and analysis easier. Age and gender variables were coded.

Cleaning

The cleaning stage was used to verify the data entered into the data processing application to identify missing data and data variations. This was accomplished by creating a frequency distribution table for each variable and then examining its frequency.

Tabulating

In this stage, the data were classified according to the purpose. Tabulation in this

analysis was done by tabulating the frequency.

After processing the data, the next step was analyzing the data through univariate analysis and presented in tables. After the data was displayed, a discussion was carried out about the frequency distribution.

3 Results

3.1 Characteristics of COVID-19 patients in Central Java

Table 1 shows that the adult age group (19-44 years) had the greatest percentage (43.57%) among the others, followed by pre-elderly (45-59 years) with 30.97%. Meanwhile, the least was in the infant group (0 years) with 0.81%. The average age of COVID-19 patients was 41 years. The case distribution between gender categories was almost the same, in which the percentage of males (49.19%) was slightly lower than the female group (50.81%). Most patients have an unknown occupation with 44.35%. Also, private employees had the highest percentage with 10.53% of the respondents with known works, while health workers contributed 3.95%. The most prevalent symptoms of COVID-19 patients were fever (18.85%), cough (18.19%), and shortness of breath (13.71%). Meanwhile, the others were limp (5.32%), nausea (4.86%), cold (3.28%), headache (2.67%), diarrhea (1.19%), shivering (0.22%), vomiting (1.91%), stomach pain (1.72%), sore throat (2.62%), and muscle cramps (0.05%), and so forth (2.22%). Furthermore, there was 62.70 % from 31,407 cases with not filled symptom data.

Table 1. Characteristics of COVID-19 Patients in Central Java.

Patient Characteristics	Frequency (F = 31,407)	%
Age		
≥ 60 years (elderly)	4713	15.01%
45-59 years (pre-elderly)	9727	30.97%
19-44 years (Adult)	**13,685**	**43.57%**
10-18 years (Youth)	2122	6.76%
6-9 years (Children)	398	1.27%
1-5 years (toddlers)	507	1.61%
0 years (Infant)	255	0.81%
Gender		
Male	15,450	49.19%
Female	**15,957**	**50.81%**
Job		
Employees of Regional/State Owned Enterprises	211	0.67
Police/Army	386	1.23
Freelance	333	1.06
Retired	342	1.09
Teacher	386	1.23
Farmer/ Agriculture Sector	760	2.42
Traders	735	2.34
Civil Servant	1122	3.57
Health workers	1240	3.95
Unemployment	1885	6.00
Minding Household	1904	6.06
Student	2096	6.67
Entrepreneur	2169	6.91
Private employees	**3306**	**10.53**

Etc.	602	1.92
Unknown	13,930	44.35
Symptom		
Cough	**5713/31,407**	**18.19**
Cold	1030/31,407	3.28
Fever	**5919/31,407**	**18.85**
Shortness of breath	**4305/31,407**	**13.71**
Limp	1671/31,407	5.32
Nausea	1527/31,407	4.86
Headache	840/31,407	2.67
Diarrhea	375/31,407	1.19
Shivering	68/31,407	0.22
Vomiting	601/31,407	1.91
Stomach pain	539/31,407	1.72
Sore throat	822/31,407	2.62
Muscle Cramps	17/31,407	0.05
Etc.	696/31,407	2.22
Not Filled	19,692/31,407	62.70

3.2 Distribution of COVID-19 Cases based on District / City in Central Java Province

Based on Table 2, the most excellent Incidence Rate or IR / 10,000 figure estimate in Central Java was in Semarang City with 42.79, which means that for every 10,000 populations of Semarang City, there were 42-43 COVID-19 cases. Apart from that, Semarang City also had the most significant percentage of COVID-19 cases, with 17.2%, accompanied by Kudus (6%), Jepara (6%), Demak (5.5%), and Kendal (4.3%), with Incidence Rate or IR (per 10,000) 14.53; 14.99; 14.90; and 13.84 sequentially.

Table 2. Frequency of COVID-19 Cases in Each District / City in Central Java Province.

District/City	Frequency (F)	%	Total population*	IR/10,000
Semarang City	**5,390**	**17.2**	**1,259,590**	**42.79**
Kudus	**1,893**	**6.0**	**1,302,813**	**14.53**
Jepara	**1,885**	**6.0**	**1,257,912**	**14.99**
Demak	**1,732**	**5.5**	**1,162,805**	**14.90**
Kendal	**1,344**	**4.3**	**971,086**	**13.84**
Semarang	1,149	3.7	891,912	12.88
Kebumen	1,109	3.5	1,197,982	9.26
Wonosobo	1,068	3.4	790,504	13.51
Boyolali	995	3.2	984,807	10.10
Sukoharjo	918	2.9	1,440,698	6.37
Magelang	886	2.8	933,989	9.49
Klaten	795	2.5	1,174,986	6.77
Rembang	757	2.4	890,518	8.50
Cilacap	729	2.3	1,727,098	4.22
Sragen	716	2.3	519,587	13.78
Purworejo	697	2.2	1,814,110	3.84

Surakarta City	684	2.2	897,711	7.62
Temanggung	670	2.1	772,018	8.68
Karanganyar	669	2.1	886,519	7.55
Blora	624	2.0	865,013	7.21
Pati	614	2.0	718,316	8.55
Banyumas	611	1.9	1,693,006	3.61
Tegal	570	1.8	249,905	22.81
Grobogan	569	1.8	1,377,788	4.13
Batang	553	1.8	768,583	7.20
Pemalang	496	1.6	194,084	25.56
Brebes	474	1.5	1,809,096	2.62
Pekalongan	337	1.1	638,188	5.28
Banjarnegara	310	1.0	923,192	3.36
Pekalongan City	291	0.9	1,290,591	2.25
Tegal City	256	0.8	307,097	8.34
Wonogiri	251	0.8	959,492	2.62
Purbalingga	245	0.8	1,053,786	2.32
Magelang City	241	0.8	871,311	2.77
Salatiga City	230	0.7	122,111	18.84
Etc (Unknown)	649	2.1		
Total	31.407	100		

* Central Java Provincial Statistics Agency Data in 2019
IR or Incidence Rate

3.3 COVID-19 Patients' Transit History

The majority of COVID-19 cases had no history of travel transit (87.11%) (Table 3). Meanwhile, the most reported cases had domestic transit history (12.81%), whereas 24 patients had foreign transit history with 0.08%. The majority of foreign transit was from the United States of America and China, sequentially with 6 cases and 5 cases. Meanwhile, the other countries were Japan, Malaysia, Singapore, Qatar, Brazil, India, Turkey, Papua New Guinea, Vietnam, Netherlands and the Philippines.

Table 3. Frequency distribution of COVID-19 patients' transit history.

Transit History	Frequency (F)	%
No history	27,359/31,407	87.11
History of Domestic Transit	4023/31,407	12.81
In Province of Central Java	3011/31,407	9.59
In Other Provinces	1005/31,407	3.20
In Central Java Province and From Other Provinces	7/31,407	0.02
History of Domestic (in Central Java) and Foreign Transit	1/31,407	0.00
History of Foreign Transit	24/31,407	0.08
Japan	1/25	4.00
China	5/25	20.00
Malaysia	2/25	8.00
Singapore	3/25	12.00
Qatar	1/25	4.00
Brazil	2/25	8.00

India	3/25	12.00
United States of America	6/25	24.00
Turkey	1/25	4.00
Papua New Guinea	2/25	8.00
Vietnam	1/25	4.00
Netherlands	1/25	4.00
Philippines	1/25	4.00

According to Table 4, three-fourth of domestic transit history was in Central Java. The other provinces which shared the higher percentage of domestic transit history were the Special Capital Region of Jakarta (9.79%), South Sulawesi (5.99%), and East Java (3.08%).

Table 4. COVID-19 Distribution based on domestic transit in 34 Provinces in Indonesia.

Province	Frequency (F=4,024)	%
> 1 Transit Places	54/4,024	1.34
Aceh	1/4,024	0.02
North Sumatera	8/4,024	0.20
West Sumatera	2/4,024	0.05
Riau	6/4,024	0.15
Jambi	1/4,024	0.02
South Sumatera	7/4,024	0.17
Bengkulu	0/4,024	0.00
Lampung	3/4,024	0.07
Bangka Belitung Islands	0/4,024	0.00
Riau islands	3/4,024	0.07
Special Capital Region of Jakarta	394/4,024	9.79
West Java	98/4,024	2.44
Central Java	3019/4,024	75.02
Special Region of Yogyakarta	55/4,024	1.37
East Java	124/4,024	3.08
Banten	22/4,024	0.55
Bali	8/4,024	0.20
West Nusa Tenggara	3/4,024	0.07
East Nusa Tenggara	0/4,024	0.00
West Kalimantan	1/4,024	0.02
Central Kalimantan	1/4,024	0.02
South Kalimantan	7/4,024	0.17
East Kalimantan	20/4,024	0.50
North Kalimantan	12/4,024	0.30
North Sulawesi	3/4,024	0.07
Central Sulawesi	3/4,024	0.07
South Sulawesi	241/4,024	5.99
Southeast Sulawesi	2/4,024	0.05
Gorontalo	0/4,024	0.00
West Sulawesi	0/4,024	0.00
Maluku	4/4,024	0.10
North Maluku	5/4,024	0.12
Papua	4/4,024	0.10
West Papua	2/4,024	0.05

The most-reported transit history in Central Java was in Semarang City (19.28%) and Kudus District (13.91%), shown in Table 5.

Table 5. COVID-19 Distribution based on Domestic Transit inside Province of Central Java.

Travel History inside Province of Central Java	Frequency (F=3,019)	%
> 1 Transit Places	32/3019	1.06
Semarang City	582/3,019	19.28
Kudus	420/3,019	13.91
Jepara	90/3,019	2.98
Demak	224/3,019	7.42
Kendal	16/3,019	0.53
Semarang	156/3,019	5.17
Kebumen	61/3,019	2.02
Wonosobo	182/3,019	6.03
Boyolali	41/3,019	1.36
Sukoharjo	76/3,019	2.52
Magelang	28/3,019	0.93
Klaten	51/3,019	1.69
Rembang	8/3,019	0.26
Cilacap	84/3,019	2.78
Sragen	28/3,019	0.93
Purworejo	2/3,019	0.07
Surakarta City	209/3,019	6.92
Temanggung	6/3,019	0.20
Karanganyar	86/3,019	2.85
Blora	15/3,019	0.50
Pati	87/3,019	2.88
Banyumas	170/3,019	5.63
Tegal	14/3,019	0.46
Grobogan	105/3,019	3.48
Batang	29/3,019	0.96
Pemalang	112/3,019	3.71
Brebes	33/3,019	1.09
Pekalongan	23/3,019	0.76
Banjarnegara	19/3,019	0.63
Pekalongan City	13/3,019	0.43
Tegal City	3/3,019	0.10
Wonogiri	17/3,019	0.56
Purbalingga	51/3,019	1.69
Magelang City	5/3,019	0.17
Salatiga City	9/3,019	0.30

4 Discussion

COVID-19 cases in Central Java were predominantly adult (19-44 years) and pre-elderly (45-59 years), while the minority aged 0 years, with an average age of 41. This report is almost similar to Basrah Province-Southern Iraq; patients aged 20-44 and 45-59 contributed 38.82% and 31.58%, respectively, while age 0 years shared 0% [13]. Besides, most of the COVID-19 patients in Central Java were female. This result is supported by studies carried in Europe, Jordan, and Korea, with percentages of females being 67.7%, 54.3%, 54.6%, sequentially [14–16]. However, this result was opposed to other studies in Oman, Iran, and China, where the majority of cases were male, with 80.3% [17], 66% [18], and 51.4% [19], consecutively. On the other side, this analysis identified confirmed healthcare workers (HCWs). The research in China found 1716 patients (3.8%) working as

health care workers [19]. HCWs have a double high-risk exposure both for themselves and spreading to others [20].

The most common COVID-19 symptoms were cough, fever, and shortness of breath. It is similar to research in China, where the most clinical features were fever (80.55%), cough (72.86%), and dyspnea (42.63%) [21], in New York [22] and Korea [16]. Meanwhile, research in Iran found dry cough, anorexia, dyspnea, and fever experienced by suspected patients [23]. Among the 35 cities/ regencies in Central Java, the highest COVID 19 cases were from Semarang City. As the provincial capital city of Central Java and Metropolitan city, Semarang City has adequate transportation facilities consisting of port facilities, air transportation, ground transportation such as trains and buses [24]. This improvement leads to increasing population mobility and contributes to the COVID-19 transmission [25]. The availability of an International Airport in Semarang City, namely Ahmad Yani Airport [24], probably affects the COVID-19 spread [13]. The total cases in Semarang were followed by Kudus, Jepara, Demak, and Kendal. The reason was perhaps because of the distance between that regency capital with Semarang City as the epicentre in Central Java, 60 km, 78 km, 26 km, and 28 km [26], which possibly affected peoples' mobility.

Mostly, the recorded COVID-19 patients had no transit history. This analysis is the same as a study carried in Basrah, Southern Iraq, where almost all cases had never travelled outside Basrah (96.1%) [13]. This study proves that most of the patients were infected due to local spread in Central Java. As the highest transit histories and most cases from Semarang City and Kudus District, these zones probably were the hotspot of the COVID-19 transmission in Central Java. Besides, the Special Capital Region of Jakarta, South Sulawesi, and East Java were the most frequent transit histories from other provinces. The Capital Region of Jakarta, East Java, and South Sulawesi ranked first, second, and fifth of the highest total COVID-19 cases with 96,217; 49,474; and 17,593 cases (data up to 20 October 2020) [8].

Meanwhile, the present study reveals that the United States of America and China became the two countries with the most regular international transits. In line with the study in Korea, 75.1% of 16 index cases recorded between 20 January and 10 February 2020 were imported from China [27]. Both China and the United States of America declared their first cases before Indonesia. The case was firstly found in Wuhan City, China, on 8 December 2019 [28]. In January 2020, America announced its first cases from Wuhan, China, and returned on 15 January 2020 [29].

5 Conclusions

This study concludes that there were variations of the characteristics of COVID-19 patients and that local transmission has happened in Central Java. Besides, most cases have no history of transit with 87.11%, while domestic transit shared a higher percentage, which is 12.81%, compared to foreign transit (0.08%). Therefore, it is necessary to strengthen the enforcement of health protocols to control the COVID-19 transmission in Central Java Province and strict guarding at the entrances to Central Java Province, including at ports, land routes, and airports, by increasing the role of relevant institutions and coordination multi-sectors. Additional study is needed to determine the variables that contribute to the spread of infection, such as density of population, geographical conditions, including climatic conditions, rainfall, and humidity levels. Due to the incomplete data, such as job characteristics and the distribution of the cases in each district/ city, it is better to record and report related to the COVID-19 patients' identity to facilitate clusters' determination and interventions.

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