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AN ANALYSIS OF VULNERABILITY OF KABUPATEN SRAGEN AGAINST THE CORONA VIRUS DISEASE 2019 PANDEMIC

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Abstrak

Pada awal tahun 2020, WHO menyatakan bahwa Coronavirus Disease 2019 (Covid-19) merupakan jenis virus corona baru dengan transmisi dan fatalitas tinggi. Indonesia merupakan salah satu negara terpapar Covid-19 dimana terjadi fluktuasi jumlah korban terpapar Covid-19 sejak Bulan Maret 2020. Kabupaten Sragen merupakan salah satu wilayah terdampak Covid-19. Penelitian ini bertujuan untuk mengetahui tingkat kerentanan wilayah Kabupaten Sragen terhadap pandemi Covid-19 dan menganalisis hubungan antara kerentanan wilayah dan jumlah kasus Covid-19 (kasus suspek, kasus probable, kasus konfirmasi dan discarded) di Kabupaten Sragen. Penelitian ini dilakukan secara kuantitatif dengan analisis statistik deskriptif dan inferensial menggunakan uji Spearman Rho yang didahului dengan uji normalitas dan homogenitas sebagai uji prasyarat. Hasil analisis mengindikasikan bahwa kerentanan wilayah Kabupaten Sragen terhadap Covid-19 tergolong ke dalam kelas tinggi, sedang dan rendah. Kelas tinggi mendominasi pada 11 kecamatan, kelas sedang 8 kecamatan dan kelas rendah 1 kecamatan. Lebih lanjut, hasil uji Spearman's rho sebesar 0,084 > 0,05 yang berarti bahwa terdapat hubungan antara variabel kerentanan wilayah dan jumlah kasus Covid-19 tetapitidaksignifikan. Hal itu karena penanggulangan pandemi Covid-19 oleh pemerintah yang efektif dan tingkat kesadaran masyarakat Kabupaten Sragen yang tinggi.

***Kata Kunci**: Bencana, Covid-19, Kerentanan Wilayah, Pandemi, Sragen*

Abstract

In early 2020, WHO stated that Coronavirus Disease 2019 (Covid-19) is a new type of Coronavirus with high transmission and fatality. Indonesia is one of the countries exposed to Covid-19, where there has been a fluctuation in the number of victims exposed to Covid-19 since March 2020. Kabupaten Sragen is one of the areas affected by Covid-19. This study aims to determine the level of vulnerability of Kabupaten Sragen to the Covid-19 pandemic and analyze the relationship between regional vulnerability and the number of Covid-19 cases (suspect, probable, confirmed and discarded cases) in Kabupaten Sragen. This research was conducted quantitatively by descriptive and inferential statistical analysis using the Spearman Rho test which was preceded by tests of normality and homogeneity as a prerequisite test. The results indicated that the vulnerability of Kabupaten Sragen to Covid-19 was classified into high, medium, and low classes. High class dominated in 11 districts, medium class in 8 districts, and low class in 1 sub-district. Furthermore, the results of the Spearman's rho test were 0.084>0.05, which means that there was a relationship between the regional vulnerability variable and the number of Covid-19 cases, but it was not significant. That is because of the effective

handling of the Covid-19 pandemic by the government and the high level of community awareness in the Kabupaten Sragen.

Keyword: *Covid-19, Disaster, Pandemic, Regional Vulnerability, Sragen*

INTRODUCTION

In December 2019, a distinct type of Corona Virus was found that attacked humans in Wuhan City, Hubei Province, China(Mustafa & A Selim, 2020). The virus was named Coronavirus 2 (SARS-CoV-2) by the International Committee on Taxonomy of Viruses. Coronavirus is a virus that also causes acute respiratory syndromes such as Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS) (Hamid et al., 2020). Identical to the type of Coronavirus found previously, the Coronavirus found in China also causes acute respiratory problems. The Coronavirus pandemic is developing rapidly until this case has been reported to have attacked almost the entire world (Nakamura & Managi, 2020). The disease was initially referred to as the novel Coronavirus 2019 (2019-nCoV2), which was later officially named by the World Health Organization (WHO) as the acute respiratory syndrome coronavirus 2 (SARS-CoV2) or more popularly known as Coronavirus Disease 2019 (Covid-19) (Hamid et al., 2020).

The spread of Covid-19 occurs very quickly, both through direct contact by someone with another person, through droplets, or other physical intermediaries who have previously been infected or exposed to Covid-19 (Adekunle et al., 2020). The Covid-19 transmission that has spread to various parts of the world has resulted in many countries declaring emergency status. WHO has designated Covid-19 as a global pandemic or specifically referred to as a Public Health Emergency of International Concern (Ministry of Health/Kemenkes RI, 2020a).

Covid-19 can be fatal to humans because it can lead to death (Montgomery & Macdonald, 2020). Most of the patients infected with Covid-19 experience mild symptoms such as dry cough, sore throat, and fever (Sohrabi et al., 2020). Furthermore, the average incubation is 5-6 days, where the most prolonged incubation period is 14 days (Tian et al., 2020). Therefore, the condition of the patient's body or immunity is critical (Mustafa & A Selim, 2020). This is because Covid-19 can survive in the human body for up to 14 days. If a patient exposed to Covid-19 has a good body condition and immunity, it can last until the recovery and recovery phase. However, if a patient exposed to Covid-19 has poor immunity or even has a history of chronic disease, the potential for recovery is relatively tiny (Ghosh et al., 2020).

Judging from the number of cases, fatality, and speed of transmission, the government officially designated Covid-19 as a National Disaster, which was started in the Presidential Decree of the Republic of Indonesia Number 12 of 2020 concerning the Determination of Non-Natural Disasters for the Spread of Covid-19 (BPK, 2020). When Covid-19 entered Indonesia, it is unsure when it happened, but the number of Covid-19 cases continues to rise (Ministry of Health/Kemenkes RI, 2020b). One of the regions with the highest Covid-19 cases in Indonesia to date is Central Java Province. Kabupaten Sragen is one of the areas in Central Java Province with relatively high Covid-19 cases. According to data from the Kabupaten Sragen Government, the total number of positive patients with Covid-19 on June 3, 2020, was 34 cases spread across 14 districts of 20 sub-districts in Kabupaten Sragen (Zamani, 2020). On April 13, 2020, two Covid-19 patients were identified in Kabupaten Sragen based on the Swab Test results; these results became the basis for determining Covid-19 as an Extraordinary Event (KLB) in Kabupaten Sragen (Hariwoto, 2020).

In terms of area size, population density, number of health facilities, number of public facilities, distance from other areas, and regional accessibility, Kabupaten Sragen is an area that is prone to be affected by Covid-19. This is due to the high population density and the large number of migrants working outside the Kabupaten Sragen (Munandar, 2010). In addition, Kabupaten Sragen is directly adjacent to East Java Province and is traversed by a road that connects Central Java and East Java Provinces. Furthermore, the distance between the Kabupaten Sragen and areas with the status of the Covid-19 red zone, namely Surakarta City and Karanganyar Regency, is relatively close (<40 km) (Solopos, 2020).

The accessibility and availability of public facilities can also affect the potential for the spread of Covid-19. The accessibility factor is very influential on various sectors of activity both in the economic and social sectors because it determines the ease and smoothness of people and goods and services from one area to another (Munandar, 2010). Areas with the spread of Covid 19 with high transportation frequencies have the potential to experience an increase in cases even though they are not areas with high accessibility. Therefore, it needs to be vigilance and comprehensive prevention and socialization efforts to break the Covid-19 transmission chain in an area (Yusup, 2020). Furthermore, the government's vigilance and readiness in determining policies must be supported by public awareness (Chatterjee et al., 2020). Policies related to the response to the Covid-19 pandemic, especially in the health sector, need to be evaluated and reorganized so that they are better prepared (Rahman & Bahar, 2020). The government and society are required to take preventive measures so that the transmission of Covid-19 does not spread (Lin et al., 2020).

Preventive action cannot be carried out spontaneously in the field and requires careful planning (Djalante et al., 2020). One of the basics of planning for the Covid-19 pandemic is through spatial analysis of the factors that trigger the spread of Covid-19 (Franch-Pardo et al., 2020). Spatial restrictions have been carried out in Indonesia by applying to zone related to the frequency of the spread of Covid-19 in Indonesia (Yusup, 2020). Therefore, spatial analysis of regional vulnerability parameters and quantitative studies are indispensable as one of the primary considerations for policymaking. The parameters used in this study focus on regional characteristics, which include population density, number of health facilities, number of public facilities, accessibility, and distance from surrounding cities/regencies that are in the status of the Covid-19 red zone.

Furthermore, in addition to these parameters, several researchers have researched regional vulnerability to Covid-19 from a spatial perspective with various variables and parameters of vulnerability. Ghosh et al. (2020) and Karaye & Horney (2020) conducted a study with parameters of vulnerability in the form of health facilities, poverty ratios, unemployment ratios, vulnerable age population ratios (> 65 years), income, and education levels. Amram et al. (2020) used slightly different parameters, namely population based on race, type of occupation, and comorbidities. In terms of the parameters used, both studies focus on socio-demographic parameters. Pourghasemi et al. (2020) conducted something entirely different, which combines socio-demographic parameters in the form of population density (villages and cities), accessibility in the form of distance from public facilities and roads, and ecological parameters in the form of temperature and precipitation. Furthermore, (Sasidharan et al., 2020) used parameters of population density, daily needs of residents, and health facilities. This research emphasizes the vulnerability of the Kabupaten Sragen in terms of its regional characteristics. This emphasis is evidenced by the use of parameters for the number of health facilities, the number of

public facilities, accessibility, and distance from the Covid-19 red zone area. Furthermore, this study also uses socio-demographic parameters in the form of population density. This was done because the population was the main subject of Covid-19 transmission and the subject most affected by the Covid-19 pandemic. This research focuses on analyzing the vulnerability of the Kabupaten Sragen area to the Covid-19 Pandemic. It seeks to analyze the relationship between the area's vulnerability parameters and the number of Covid-19 cases in the Kabupaten Sragen. This research is expected to provide insights and feedback in handling the pandemic Covid-19, especially in the Kabupaten Sragen.

RESEARCH METHOD

This research was conducted in Kabupaten Sragen, Central Java Province, which is located between 7 ° 15 '- 7 ° 30' South Latitude and 110 ° 45 '- 111 ° 10' East Longitude. Kabupaten Sragen is directly adjacent to Grobokan and Boyolali Regencies in the north, East Java Province in the East, Boyolali and Karanganyar Regencies in the South, and Boyolalı Regency in the West (Figure 1).

Figure 1. Research Location (Kab. Sragen)

This research is quantitative research with a survey design. The unit of analysis in this study is the sub-district administration area. The variables used in this study were the level of regional vulnerability and the number of Covid-19 cases in the Kabupaten Sragen. The level of regional vulnerability includes parameters of population density, health facilities, public facilities, access to reach from other cities/districts, and distances from surrounding cities/regencies in the red zone status (Table 1). According to the analysis unit used, the location of the patients in this study was generalized within the boundaries of the sub-district administration area. The number of Covid-19 cases includes the number of suspected cases, probable cases, confirmed and discarded cases (Ministry of Health/ Kemenkes RI, 2020b).

The data used in this study are secondary data obtained from the Central Bureau of Statistics (BPS), Ina-Geoportal of the Geospatial Information Agency (BIG), the Ministry of Health of the Republic of Indonesia (KEMENKES), and sragenkab.go.id (2020) (Table 1). Descriptive statistical analysis was used to determine the level of regional vulnerability. The level of regional vulnerability is divided into five classes (Very High, High, Medium, Low, Very Low) through a weighting and scoring process using the mean and standard deviation. The levels of vulnerability are classified into five classes for more detailed results. The weight of each vulnerability parameter is a modified version of the Regulation of the Head of the Indonesian Disaster Management Agency (BNPB), number 2 of 2012, concerning General Guidelines for Disaster Risk Assessment. In contrast to the level of vulnerability, the relationship between regional vulnerability and the number of Covid-19 cases was analyzed using the Spearman Rho Test. It was chosen because the characteristics of the data obtained were under the Non-Parametric Statistical Test. The test is intended to test the research hypothesis, namely, to determine the relationship between the variables in the study (Lin et al., 2020). Statistical analysis was performed using IBM SPSS Statistics 20 and Microsoft Excel software.

Table 1 Research variables and parameters of the vulnerability of Kabupaten Sragen to Covid-19

No.	Variables	Parameters	Unit	Weight (%)	Description	Data sources
1.	Regional Vulnerability	(a) Population density	people/ square kilometer	40	The higher the population density, the higher the level of vulnerability due to the potential for exposed populations	▪ Population data for each district was obtained from the Central Bureau of Statistics, Kabupaten Sragen
		(b) Health Facilities (number of Health Centers/PUSKESMAS, Auxillary Health Centers and Hospitals)	Unit	20	The more health facilities in each district, the response to suspected cases, probable cases, confirmed and discarded cases can be handle immediately	▪ number of Health Centers/PUSKESMAS, Auxillary Health Centers and Hospitalswas obtained from the Central Bureau of Statistics, Kabupaten Sragen
		(c) Public Facilities (number of traditional markets, malls, modern markets)	Unit	20	The more public facilities there are, the greater the potential for crowds, so the potential for transmission of the SARS-Cov2 virus is even higher	▪ number of traditional markets, malls, modern markets were obtained from the Central Bureau of Statistics, Kabupaten Sragen
		(d) Accessibility (affordability by land-wheel 2 and/or> 2, trains, airplanes, ships)	Mode	10	The more transportation modes that can pass through the sub-district area in Kabupaten Sragen, the more vulnerable it is. The assumption is that if the modes of transportation are more diverse, the number of travelers will be higher, so the potential for Covid-19 transmission will also be higher	▪ Analysis of transportation mode data from the Transportation Agency of the Kabupaten Sragen ▪ Analysis of road network data in Shapefile format from the Geospatial Information Agency-inageoportal using the GIS application
		(e) Distance from surrounding cities/ regencies that are in the Covid-19 red zone status	Kilometers	10	The closer the sub-district in Kabupaten Sragen to the city/regency in the Covid-19 red zone status, the more vulnerable it is. The assumption is that if the distance is getting closer, the shuttle migration or the number of Travel Actors will be higher so that the potential for Covid-19 transmission will also be higher	▪ Analysis of road network data in Shapefile format from the Geospatial Information Agency-inageoportal using the GIS application
2.	Number of Covid-19 cases	(a) the number of Covid-19 cases (suspected cases, probable cases, confirmed and discarded cases) in each sub-district in Kabupaten Sragen from March to June 2020.	People/sub-district	-	The higher the number of suspected cases, probable cases, confirmed and discarded cases, the higher the potential for Covid-19 transmission	▪ Data from the Ministry of Health and https://corona.sragenkab.go.id/

Sources: (BNPB, 2012; Ghosh et al., 2020; Karaye & Horney, 2020; Pourghasemi et al., 2020; Sasidharan et al., 2020)

RESULT AND DISCUSSION

Parameter Analysis of Regional Vulnerability

Population density

In general, population density is the ratio between the total population and the area inhabited (Christiani & Masalah, 2014). The population density in this study is obtained from the population in one sub-district divided by the sub-district area. Kabupaten Sragen is classified as a very high class because it is influenced by the large population and area growth (Central Bureau of Statistics Sragen/BPS Kabupaten Sragen, 2020) (Figure 2).

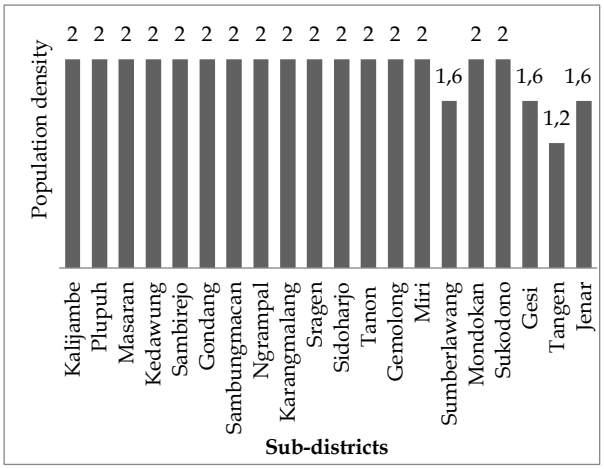

Figure 1. Population Density in Kabupaten Sragen

The population is the main element in disaster analysis. An increase in population density will increase the need for housing. Areas with high population density have high mobility and community interaction, so the potential for the spread of Covid-19 will be high in these areas (Montgomery & Macdonald, 2020). Central Bureau of Statistics noted that the population density of the Kabupaten Sragen in 2020 was 943 people/ square kilometers (Central Bureau of Statistics Sragen/BPS Kabupaten Sragen, 2020). More than 75% of the districts in the Kabupaten Sragen have a very high population density. Sragen sub-district is the most densely populated sub-district with 2,545 people/square kilometers and the sub-district with the highest number of Covid-19 cases in Kabupaten Sragen (Central Bureau of Statistics Sragen/BPS Kabupaten Sragen, 2020; sragenkab.go.id, 2020) (Figure 6). It shows that Kabupaten Sragen in terms of population density is very vulnerable to Covid-19. It can be concluded that the supporting infrastructure will greatly influence the population density of an area.

Number of Health Facilities

The health facilities analyzed in this study are health facilities that can provide first aid if a Covid-19 case is found (Lee & Morling, 2020; Rainisch et al., 2020). The health facilities include several health centers, auxiliary health centers, and hospital attendants in each sub-district. Based on the results of data analysis, health facilities in all sub-districts in Kabupaten Sragen have a weight of 0.2, which was included in the very low level.

One of the supporting facilities closely related to vulnerability to Covid-19 is the availability and access to health facilities (Amram et al., 2020; Beaunoyer & Dup, 2020; Lakhani & Lecturer, 2020). The number of health facilities available and affordable by the people of Kabupaten Sragen is minimal. Until June 2020, there were only 11 Hospitals, 25 health centers, and 51 Supporting auxiliary health centers in the Kabupaten Sragen (Central Bureau of Statistics Sragen/ BPS Kabupaten Sragen, 2020). Non-ideal conditions occur when the limited number of health facilities must serve 887,889 residents of the Kabupaten Sragen, especially in a pandemic condition (Central Bureau of Statistics Sragen/ BPS Kabupaten Sragen, 2020). It was reinforced by the results of the regional vulnerability analysis based on the number of health facilities, which shows that all sub-districts in the Kabupaten Sragen were classified as very low level. The availability and affordability of health facilities dramatically affect the dynamics of the number of Covid-19 cases in an area because less optimal handling tends to result in fatalities (Lescanne et al., 2020). It is supported by data from the Ministry of Health, which states that Indonesia only has 309,100 hospital beds, most of which are in Java

(Setiati & Azwar, 2020). Therefore, it can be concluded that health facilities are one of the primary forms of capacity to reduce the region's vulnerability to Covid-19 (Grech, 2020).

Number of Public Facilities

Public facilities include the number of traditional markets, modern markets, some large-scale industries, universities, shops, and stalls in each district. Public facilities are used as a parameter of vulnerability in this study with the assumption that a facility that is a gathering place or a large number of community interactions can increase the potential for the spread of Covid-19 (Ministry of Health/ Kemenkes RI, 2020b; Sasidharan et al., 2020). The implication is that there are many interactions that all components of society must avoid to reduce the spread of Covid-19 (Nurhalimah, 2020). Public facilities in Kabupaten Sragen were classified as very high (weight 1) and high (weight 0.8), which was known from the number of small to large scale companies or industries in each district (Figure 3). The number of small industries was 1,188, medium industries were 28, and large industries were 14. The industry produced various kinds of batik products, arrowroot chips, *wayang beber*, stones, and furniture (Sragenkab.go, 2020).

Furthermore, humans are social and economic creatures who will undoubtedly interact to meet their daily needs. One of the locations where this interaction occurs is in public facilities. Public facilities that can become a cluster of Covid-19 transmission are industrial areas, universities, markets, both traditional and modern, shops and stalls (Pourghasemi et al., 2020; Sasidharan et al., 2020). These facilities are very vulnerable to Covid-19 if they are opened without proper supervision and health protocols(Ministry of Health/ Kemenkes RI, 2020b). It is because the people who visit these facilities are very diverse. In addition, public facilities will cause a relatively large crowd of people that it is difficult to control their activities and interactions. Furthermore, the level of awareness and compliance of visitors will significantly affect the potential spread of Covid-19 (Khan et al., 2020). Field facts show 26 confirmed cases at the Cileungsi Market in Bogor Regency, West Java, 20 cases at Klender Market in East Jakarta, and 14 others at Serdang Market, Central Jakarta (The Jakarta Post, 2020). These theoretical and empirical facts also can occur in the Kabupaten Sragen because there are 12,203 units of public facilities (traditional markets, modern markets, shops, stalls, industry, and universities) (Central Bureau of Statistics Sragen/ BPS Kabupaten Sragen, 2020). The analysis results in this study indicated that the high regional vulnerability level dominated the Kabupaten Sragen in terms of public facilities. Therefore, it is necessary to implement regulations and monitoring of health protocols.

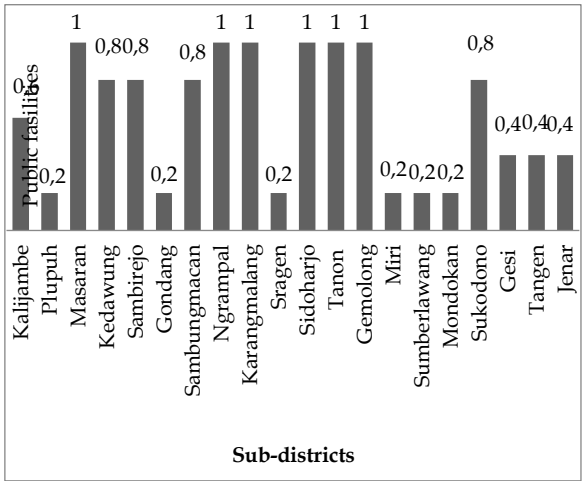

Figure 2. Levels of Public Facilities in Kabupaten Sragen

Accessibility

Accessibility shows the affordability of the Kabupaten Sragen from other cities/regencies, which include two and > 2-wheeled land routes, trains, airplanes, and ships. Accessibility is the ease with which a person can reach the area (Saha et al., 2020). According to Geurs & van Wee (2004), accessibility components can be identified into four, namely: land use components (quantity, quality, and spatial distribution); transportation components

(speed, time, and cost of travel); temporal component (travel period); and individual components (travel-based stratification). Indeed, no research conclusively states that there is a direct relationship between the affordability of an area and the level of the spread of Covid-19. However, as a preventive measure, accessibility was used as one of the vulnerability parameters in this study (Figure 4).

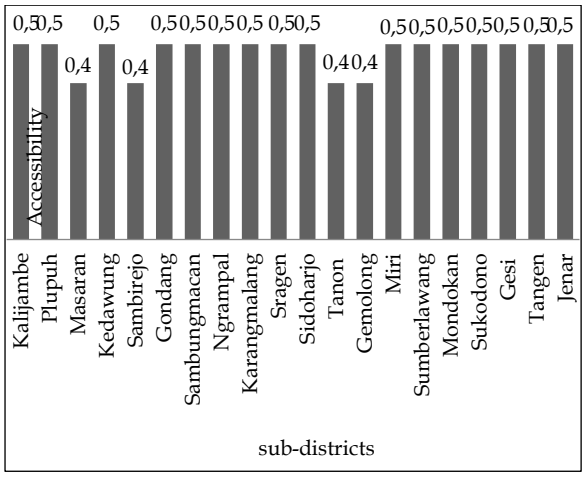

Figure 3. Levels of Public Facilities in Kabupaten Sragen

The accessibility of each sub-district in Kabupaten Sragen was classified as a high and very high class. Due to the class of roads and means of transportation, various types of land transportation modes can pass. The community's daily activities almost certainly use land transportation modes (2 and or> 2 wheels) because it is easier to access the destination.Therefore, an area with a high level of accessibility tends to be more vulnerable than an area with a low level of accessibility because the mobility of the population to and from the area becomes easier (Sasidharan et al., 2020). Yusup (2020) found a similar thing in analyzing the potential for the spread of Covid-19 in the Lembang sub-district. The analysis results in this study indicated that the population mobility was high. The distribution was evenly distributed due to the high level of accessibility of the region, a potential area to be exposed to Covid-19. *Distance to Big City in Red Zone Status (hot spot).*

The distance from cities/regencies around the Kabupaten Sragen in the red zone status of Covid-19 was obtained by analyzing the best route to the city/regency in the red zone status. Furthermore, based on this route, the length of the road connecting each sub-district to the city/regency in the red zone is measured using a Geographic Information System (GIS). The city/regency that was used as the center point is the City of Surakarta.The analysis results showed that the weight of the distance per district was 0.1, or it is a very low level. The analysis used is that the closer the distance between the sub-districts in the Kabupaten Sragen and Surakarta City, the easier it is for the community to do round-trip or go-and-come migration.

The red zone status is determined by the levels of the Coronavirus transmission in the region. The term red zone refers to an area that can only be accessed by certain people who have the authority and ability to serve or be assigned to the area because the area has a very high level of vulnerability. Based on this statement, the red zone or hot spot in the Covid-19 pandemic is an area with a high number of cases and potential for transmission. The locations that usually become the red zones or hot spots are big cities or main cities because they are centers of growth with complete facilities for fulfilling people's needs economically, health, services, and education(Karasneh et al., 2020).Therefore, the community's level of shuttle migration to and from these areas is very high. Furthermore, Surakarta City has a high level of accessibility because it can be reached by various modes of land transportation and even air transportation modes. It is the basis for determining the city of Surakarta as a red zone area or Covid-19 hot spot, which can affect the spread of Covid-19 in the Kabupaten Sragen because of its relatively close distance and high accessibility. The distance of an area is closely related to the existing accessibility and size dimensions. The distance can be divided into the physical distance (measured in units of distance),

time distance (measured in units of time, namely hours), and economic distance (measured by the number of fees or costs required to move other people)(Hardati, 2016). If this happens and without supervision according to the Covid-19 countermeasures protocol, the Kabupaten Sragen area becomes vulnerable to being exposed to Covid-19.

Regional Vulnerability Analysis of Kabupaten Sragen

When a disaster hits an area, the community component is the component most at risk. Differences in social, economic, cultural, and regional characteristics also influence disaster risk(Amram et al., 2020). It is because the region's characteristics can trigger the loss of both property and even casualties (Shammi et al., 2020). Therefore, spatial-based social vulnerability analysis is needed as a basis for disaster management policymaking.

Karaye & Horney (2020) conducted a study of social vulnerability to Covid-19 with detailed parameters in the form of minority status and language, composition of household members, access to transportation facilities, and people with disabilities. Apart from these parameters, other parameters have a significant effect, namely the availability of health facilities and accessibility (Amram et al., 2020; Beaunoyer & Dup, 2020; Lakhani & Lecturer, 2020). Furthermore, Sasidharan et al. (2020) only emphasized human mobility in analyzing regional vulnerability to Covid-19. The vulnerability parameters to Covid-19 in this study are population density, number of health facilities, number of public facilities, accessibility, and distance from big cities in the red zone status. These parameters were determined by considering potential virus transmissibility, interaction, and means of human mobility. The analysis results in this study were carried out from a spatial perspective, resulting in data that can be presented on a map (Figure 6).

The vulnerability of Kabupaten Sragen to Covid-19 was classified as high class, indicated by the weight of 3.4 - 4.2 (Figure 5). In the Kabupaten Sragen, 11 sub-districts fell into the high vulnerable category, including Kalijambe, Masaran, Kedawung, Sambirejo, Kontakmacan, Ngrampal, Karangmalang, Sidoharjo, Tanon, Gemolong, and Sukodono sub-districts. Therefore, it can be stated descriptively that the factors of population density, health facilities, public facilities, accessibility, and distance from big cities in the red zone status significantly affect the region's vulnerability. However, this analysis must be further proven quantitatively to determine the significance and direction of the relationship between the variables used.

The analysis results showed that more than 50% of the districts in the Kabupaten Sragen were classified as very vulnerable to Covid-19. It is in line with the Covid-19 vulnerability research in the Lembang sub-district with community-based vulnerability parameters and public facilities(Yusup, 2020). Furthermore, there are three parameters related to vulnerability to the spread of Covid-19, namely the zone of population and settlement density, the density of road access conditions, and strategic location for the spread of Covid-19 (LAPAN, 2020). Therefore, the findings in this study stated that the Kabupaten Sragen area was very vulnerable to being exposed to Covid-19, which was very relevant when viewed from the region's characteristics.

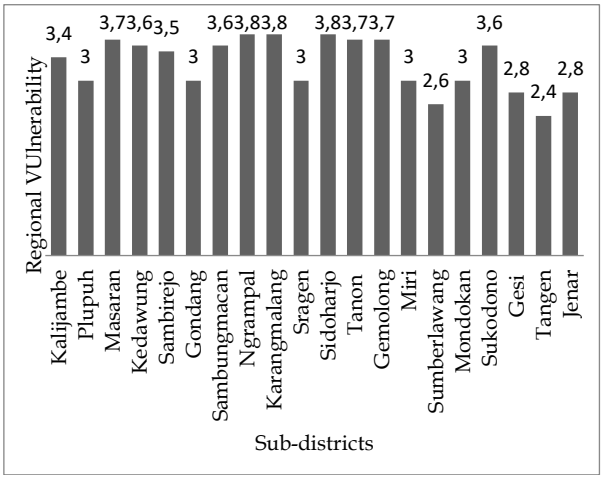

Figure 4. Weight of Regional Vulnerability to Covid-19

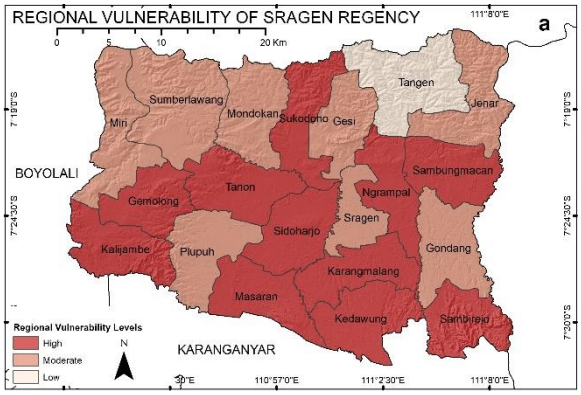

Figure 5. Regional vulnerability against Covid-19 of Kabupaten Sragen

The number of Covid-19 cases in the Kabupaten Sragen

The number of Covid-19 cases is the total number of suspected cases, probable cases, confirmed and discarded cases in the Kabupaten Sragen recorded from March to June 2020 (Figure 7).

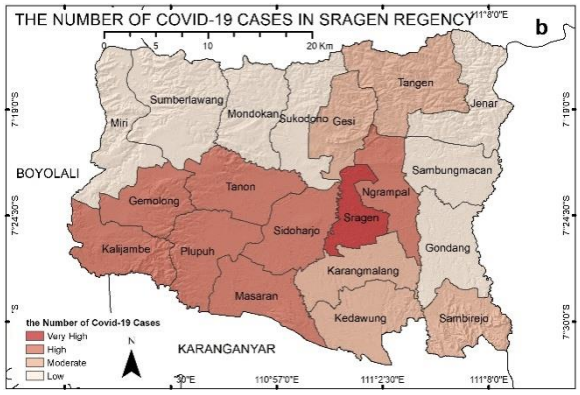

Figure 6. The number of Covid-19 cases in Kabupaten Sragen

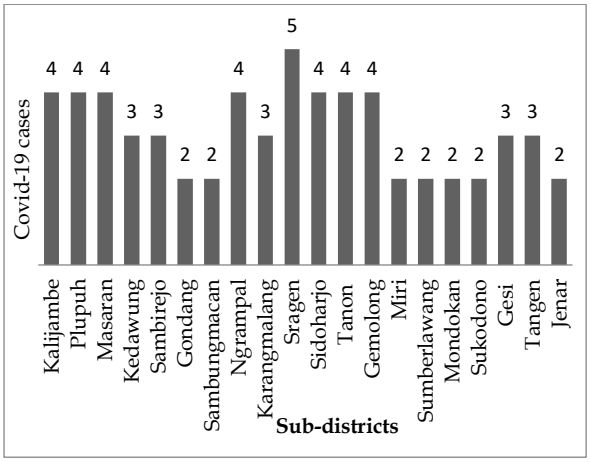

Figure 7. Number of Covid-19 Cases in Kabupaten Sragen

Covid-19 cases (suspected cases, probable cases, confirmed and discarded cases) in the Kabupaten Sragen were dominated by high level with a score of 4 (number of cases ≥4 - <8 cases) and low level with a score of 2 (1 case per district) (Figure 7). Furthermore, the very high level with a score of 5 (14 cases) and the moderate class with a score of 3 (2-3 cases per district) was not so dominant (Figure 8). It can be triggered by regional vulnerability factors or even the knowledge and behavior of the community. The class classification showed that the high number of Covid-19 cases (suspected cases, probable cases, confirmed and discarded cases) in the Kabupaten Sragen could result in the region being severely affected both socially and economically, educationally and socially.

The relationship between regional vulnerability and the Covid-19 case in Kabupaten Sragen

Normality test

The Kolmogorov-Smirnov test carried out the normality test because the data used in this study were less than 30. The level of significance used in this was α = 5%. The decision-making criteria in this test are Ho is accepted if the significance value (sig.) ≥ 0.05 and Ho is rejected if the significance value (sig.) <0.05.

The research hypotheses are:

Ho: There is no significant relationship between the level of vulnerability of the region and the number of Covid-19 cases.

Ha: There is a significant relationship between the level of vulnerability of the region and the number of Covid-19 cases.

Based on the results of the analysis using the Test of Normality table, it was known that the statistical p-value of the Kolmogorov-Smirnov test is 0.00 (<0.05). It means that Ho was rejected or hi was accepted so that the data was obtained from a population that was not normally distributed.

Homogeneity Test

The homogeneity test is a prerequisite analysis test that is used to determine whether the data has a homogeneous variant or not. The basis for decision making in the homogeneity test is that if the significance value is> 0.05, the data has a homogeneous (same) variant, while the significance value is <0.05, the data has a non-homogeneous variant (not the same). Based on the results of the analysis using the Test of Homogeneity of Variance table, it was known that the significance value of the data was 0.037 (<0.05). It means that the data had a variant that was not homogeneous (not the same).

Spearman's Correlation

The Spearman correlation is used to see the relationship's level of closeness (strength), the direction (type) of the relationship, and the significance of the relationship between the variable level of regional vulnerability and the number of Covid-19 cases. The analysis results using IBM SPSS Statistics 20 software showed the significance of Spearman's rho test results was greater than 0.05 (0.084> 0.05). It means that there was a relationship (correlation) between the regional vulnerability variable and the number of Covid-19 cases, but it was not significant (Table 2).

Table 2. Results of Spearman's rho Correlation Test between Regional Vulnerability Levels and Number of Covid-19 Cases

	Sig.	Decision	Description
Vulnerability of the region and the number of Covid-19 cases	0,084	Ho is accepted	There is no significant relationship between the level of vulnerability of the region and the number of Covid-19 cases

Source: Statistical Analysis, 2020.

The need for Covid-19 countermeasures planning is not sufficient only at the vulnerability analysis stage, but further analysis must also be carried out whether there is a relationship between the level of regional vulnerability and the dynamics of the Covid-19 case (McBryde et al., 2020). Statistical tests carried out the analysis by the characteristics of the data. It shows that there was a relationship or but not significant correlation between the level of vulnerability of the region and the number of Covid-19 cases in the Kabupaten Sragen. However, because the relationship between the two variables was positive, there was a potential that the number of Covid-19 cases will be directly proportional to the level of vulnerability of the region even though the opportunity was very small.

The insignificant relationship between the level of vulnerability of the region and the number of Covid-19 cases in the Kabupaten Sragen was influenced by several factors, such as what happened in several other areas. These factors included disseminating information about Covid-19, effectiveness, and firmness in enforcing the implementation of physical distancing, a high level of public understanding and awareness of the dangers of Covid-19, the level of public welfare and health, and access to information about Covid-19. 19 received by the community (Banerjee & Nair, 2020; Glover et al., 2020; Ministry of Health/Kemenkes RI, 2020b). It is supported by the results of research which showed that local governments have implemented many communication strategies to the communities in their respective regions through coercive, informative, canalizing, educative, persuasive and redundancy techniques in packaging messages in the form of instructions, appealing to the public to prevent transmission of Covid-19 (Zahrotunnimah, 2020).

CONCLUSION

The response to Covid-19 must be carried out wisely and comprehensively. One of the databases that are suitable for use is the spatial vulnerability data of the region. The spatial vulnerability analysis showed that the high level of vulnerability of the Kabupaten Sragen to Covid-19 was due to its dense population and proximity to Kota Solo. Kota Solo belongs to the Covid-19 Red Zone which is the center of economy, education, and culture for the surrounding area. The insignificant relationship between the regional vulnerability variable and the number of Covid-19 cases is possible because of the handling of Covid-19 and the high awareness of the people of Kabupaten Sragen. The limitation of this study is that the Covid-19 case data is very dynamic (fluctuating) so that it is very difficult to get real-time results. Moreover, the conditions of applying physical distancing when the research was carried out made it difficult to collect primary data, even almost impossible to get primary data. Therefore, it is expected that further studies can complement the analysis with primary data to obtain more detailed and valid results.

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