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Testing the Role of Socioeconomic Levels and Government Policies in Spreading Coronavirus Disease 2019 (COVID-19) in ASEAN

Arafa Rizka Syaputra[1], Oktofa Yudha Sudrajad[2]
[1,2] School of Business and Management, Institut Teknologi Bandung, Jl. Ganesha No 10, Bandung, 40132, West Java, Indonesia
[1]ORCID: 0000-0002-7204-4200

ABSTRACT: Although there has been an enormous scientific attempt to understand the transmission of COVID-19, there are many knowledge gaps yet to be filled. This study aims to investigate the role of socioeconomic level and government response in the spread of COVID-19. The socioeconomic level is represented by gross domestic product, population density, and multidimensional poverty index. Meanwhile, government policies are characterized by a stringency index, and the incidence rate represents the spread of COVID. Using a sample of 10 ASEAN countries, from March 28, 2020, to July 30, 2021, the results show a positive relationship between socioeconomic level and the incidence rate of COVID-19 in communities, meaning socioeconomic factors are the determinant of the incidence rate of COVID-19. In addition, there is a significant negative relationship between the stringency index and the incidence rate, revealing that the more stringent policy was, the less COVID spread.

KEYWORDS: ASEAN, COVID-19 Spread, Government Response, Socioeconomic Level.

1. INTRODUCTION

The worldwide respiratory disease outbreak was first identified in November 2019 [18] at a popular seafood market in Wuhan, China [1], where many people came to buy and sell seafood and wildlife. Coronavirus disease 2019 (COVID-19), formerly referred to as 2019 novel coronavirus or 2019-nCoV [25] by the World Health Organization (WHO) on January 10, 2020 [2], declared as Public Health Emergency of International Concern (PHEIC) [13] since it is inconvertibly not merely represents a delineate global shock, spreading its consequence under numerous respect in comprising health, political, institutional, social and economic aspects [9] but also has become a terrible disease caused by a virus that infects wildlife and can be transmitted to humans [10]. Transmission through humans can occur through direct physical contacts such as a handshake between an infected person and a person susceptible to infection or through indirect contacts [14] such as droplets or aerosol transmission and contaminated objects [14]. Although the seafood market was closed on January 1, 2020, a large influx of tourists during the Chinese Spring Festival (Chunyun) holiday in mid-January led to the rapid spread of COVID-19 throughout China [26] and numerous individuals, companies, and governments to react in various ways in a bid of trying to contain the spread of the virus [19]. On March 11, 2020, the WHO publicized this pandemic as a global pandemic as it created a tsunami of tens of thousands of cases that rapidly overwhelmed the health care country system within a matter of weeks and spread rapidly throughout the world [25], which was a short time that affected all six continents [8] and changed the way we lived [14].

When the COVID-19 outbreak subsided in China, massive contagion spread to many countries in America, Europe, and other countries in Asia. In Southeast Asia, for instance, it was among the first region outside East Asia to be significantly hit by COVID-19. As of July 30, 2021, the highest number of cumulative cases of COVID-19 was Indonesia (3,372,374), followed by the Philippines (1,580,924), Malaysia (1,095,486), Thailand (578,375), and Myanmar (294,460). Vietnam (141,122), Cambodia (76,585), Singapore (64,861), Laos (5,857,639), and Brunei (333), although these figures are undoubtedly much higher due to a significant number of unpublished or undetected cases and limited testing, particularly in countries with brittle medical structures.

On closer inspection, there is currently a massive debate about the pattern of the transmission of COVID-19. Although almost all countries have reported cases of COVID-19, and there are striking differences between continents, regions, and countries. For instance, on the one hand, the most significant number of reported cases are in the United States and Europe, in which the majority are developed countries. On the other hand, fewer cases are found in African countries, the majority of which are poor countries (See [10] ([3]). Therefore, scholars from numerous disciplines are questioning this pattern. The phenomenon of fewer cases in African countries goes against prevalent awareness that contagious diseases are more common and frequently associated

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with low economic development in low- and middle-income countries, indicated by poor sanitary conditions and unhygienic behavior than in high-income countries.

While many would argue on the notion, some have raised doubts whether in practice socioeconomic level leads to the spread of the virus precipitously and whether government policies by implementing mobility restrictions and work-related measures such as physical distancing, travel restriction, patient isolation, closures of schools and workplaces, postponement of public transportation, campaigns for face coverings, reduction of economic activity, postponements of events and lockdowns can reduce the rate of spread of the virus [27].

Our paper is a follow-up study conducted by (Mo et al., 2021) and (Aycock & Chen, 2021), where neither of them takes into account poverty, population density, and government policies in understanding the transmission of the virus. In particular, for ASEAN, to the best of our knowledge, the relationship between socioeconomic levels and government policies on the spread of COVID-19 has not been assessed quantitatively in the scientific literature until the present. In fact, ASEAN has its own internal and unique problems, such as uneven economic development, the size of the country's territory, population density, and different government policy responses regarding the spread of COVID-19.

Therefore, to fill this gap, we attempt to investigate the potential role of socioeconomic development and government policies in ASEAN against the spread of COVID-19. In this paper, we develop a new research framework that has not been studied extensively in the existing literature. We harness the data from our world in data regarding the total COVID-19 cases in ASEAN, socioeconomic indicators that are represented by GDP, population density, poverty, and the stringency index, which reflect the government's response to restrain the transmission of COVID-19. Our motivation is based on the stark difference in the number of reported cases of COVID-19 and the prominent characteristics among ASEAN countries.

Our key finding is that each ASEAN country lacks coherence in harnessing and balancing economic and health frameworks to establish a coordinated response to the pandemic. The new outbreak of the virus's second wave in member states shows that temporary success in containing the virus cannot be taken for granted, as recent episodes have shown. This containment can easily tip the scales of organizational governance, putting national health systems in jeopardy. National coordination has gone quite well, and regional coordination, although a little late, has allowed efforts to be refocused. Communication has been excellent, particularly in terms of giving regularly updated data on COVID-19's impact at the regional level, which enables cross-national comparisons and entry into worldwide databases. These findings can assist governments in controlling the spread of COVID-19 more effectively during critical situations, with the finest scenario for development being to create stability between economic growth and public health.

This paper is structured as follows. In Section 2, we examine a brief literature review. In Section 3 and Section 4, the data sources, data analysis, and methods research methodology are presented. Finally, the findings, robustness check, discussion and conclusions are presented in section 5, section 6, section 7 and section 8 respectively.

2. LITERATURE REVIEW

So, why hasn't this virus been muted? One of the reasons is that researchers are still confused to determine the pattern of the spread of this virus in a country. The COVID-19 virus shatters so many assumptions that we previously believed. However, in the context of the spread of disease, there is common knowledge that disease is more easily spread in dirty areas with poor sanitation, which are characterized by regions or countries with low economic levels. Therefore, [21] conducted a study on the impact of economic growth on the spread of COVID-19 across provinces in China. Surprisingly, they found that a higher level of development, as reflected by a higher GDP, was a factor driving the risk of the spread of COVID-19 across China's provinces.

In addition, as the successor to [21], [11] conducted observations in 50 states in the US and 28 European countries regarding the role of the economic development level in spreading COVID-19. The result shows a positive relationship between the level of economic development, as quantified by GDP, and the transmission of COVID-19, as measured by the total number of reported cases. They, furthermore, elaborated that developed countries with a large GDP, a stable and democratic political situation, and a country with good health care facilities are theoretically relatively ready to face a pandemic situation. In plain view, this assumption makes sense. Countries with strong economies, stable political situations, and qualified health care facilities will certainly be better prepared to control the virus. In other words, the higher the GDP, indicating a country is having a high national income. With the increasing high income, automatically the country has good accessibility for its people, adequate infrastructure and supporting

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facilities and infrastructure to support economic activity. This finding is congruent with research conducted by [21], who analyzed the association between the spread of COVID-19 and GDP within provinces in China, and it has two critical points. On the one hand, higher levels of economic development may enhance the standard of life and invigorate health care structures against infectious diseases.

However, on the other hand, when a country has adequate infrastructure and is supported by a large population, it is very easy for people to interact with each other. The hardest-hit countries are the most humanized internationally, with the world's busiest airports, receiving hundreds of millions of passengers every year. In this regard, residents of high-income countries travel extensively internationally and enjoy global trade relations, especially with China, where the outbreak began. As a result, there is no doubt that international travel has been the cause of the COVID-19 virus spreading rapidly around the world. Disease like SARS were affiliated with the appearance of globalization, as interconnected global cities like Toronto and Hong Kong were gravely influenced [23]. This is due to the alleviation of travel times bring through for the quicker spread of microbes and viruses before governance and healthcare systems could recognize and restrain them. Therefore, in this context, it cannot be refuted that a higher level of economic development may facilitate the transmission of new infectious diseases such as COVID-19 more quickly.

Previous studies have also explored the relationship between poverty and the spread of disease. [5], for instance, revealed that TB transmission is more common in the poor than in the rich, supporting the argument that TB is a disease of the poor. In the context of the spread of COVID-19, this finding is also bolstered by [24], who investigated the relationship between the transmission of COVID-19 and the multidimensional poverty index in Manizales, Colombia. The experimental results show that in poorer communes indicated by larger MPI, the intensiveness of cases per COVID-19 is better, revealing a relationship between these two parameters. In this community, the majority of people have limited funds to cover all the measures set by the government during a pandemic, such as staying at home and working from home. Many people do not have individual transportation and are therefore exposed to transmission through mass transportation. In addition, many people who work in the informal economy do not have a secured monthly income, so they are unable to stop working since it will influence their family needs.

Another study conducted by [7] elaborated on the geographic spread of confirmed COVID-19 cases and fatalities across cities in Mexico. This study demonstrates the transmission dynamics between Stage I (from 23 March to 31 May 2020) and Stage II (from 1 June to 22 August 2020) of social distancing measures. The results show that during Stage I, the clusters of confirmed cases and deaths were for the most part in the center of the country, while in Stage II, these clusters spread throughout the country. In addition, the findings also show that income inequality, the presence of inherited diseases such as fatness and diabetes, and the concentration of fine particulate matter (PM 2.5) are positively associated with confirmed cases and deaths regardless of lockdown.

Population size has been blamed for brutality of the pandemic in numerous countries. In this context, population size is often associated with high rates of virus transmission. For instance, [6], who conducted a study in Zambia, revealed that one of the main factors in COVID-19 infection is population density. This result is in line with [17], who demonstrate the role of population density as a factor in the spread of COVID-19 in Algeria. In this study, cluster analysis was used to separate the cities with the highest number of cases infected with COVID-19 and the highest population density. The results reveal a vigorous correlation between population density and the number of COVID-19 infections in Algeria. This result is also consistent with the study conducted by [20] that population density was significantly positively associated with the high number of active infected cases in Sub-Saharan African countries.

3. DATA

This study introduces a significant difference from the economic level literature about selecting geographic zones that we consider most suitable for our purposes. Our study focuses on observing the spread of COVID-19 in 10 ASEAN countries (Indonesia, Malaysia, Singapore, Philippines, Cambodia, Thailand, Brunei, Laos, Viet Nam, and Myanmar) between 2 March 2020 and 30 July 2021. We harnessed the incidence rate, GDP, population density, human development index, multidimensional poverty index, and stringency index in this study. Our motivation is based on the stark difference in the number of total cases of COVID-19 and the salient characteristics of the area, such as GDP, population density, and different policy responses among ASEAN countries in dealing with the spread of the virus. This research is a follow-up study conducted by [21] and [11]. The incidence rate is a measure of the spread of COVID as the dependent variable, while GDP is a representation of economic development as the independent variable. GDP is then transformed into a natural logarithm to reduce data variance and reduce outliers in the data. In addition, we

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also consider population density and poverty, where both are associated with the spread of infectious diseases in the community ([6] [24]). We also consider the stringency index to represent the different policies among countries in dealing with the spread of the virus. We collected data from various sources: (i) Eikon; (ii) World Bank; (iii) UNDP; and (IV) Our World in Data.

Table 1. All variables that are harnessed in this study

Variables	Proxy	Description
Dep. Variables		
IR	COVID-19 Spread	Incidence rate based on Aycock & Chen (2021)
Ind. Variables		
LNGDP	Economic Level	The log value of GDP from Eikon 2021
LNPDN	Socio Level	The log value of population density
MPI	Socio-Economic Level	Catching the acute disadvantage in health, education and living standards from UNDP 2021
SI	Government Response	The index records the strictness of lockdown style policies from Our World in Data 2021

4. METHODOLOGY

The objective of this paper is to examine the role of socioeconomic level and government policies on the spread of COVID-19. To test this aim, we estimate the enlarged total incidence rate function, which can be written as follows:

$$IR = f(GDP, PD, MDI, SI) \quad (1)$$

Considering the economic level factors extended from Equation (1), the combined regression evaluation can be written as follows:

$$IR_{it} = \alpha + \beta_1(LNGDP_{it}) + \beta_2(LNPDN_{it}) + \beta_3(MDI_{it}) + \beta_4(SI_{it}) + w_{it}, \quad (2)$$

where w_{it} = i + ε_{it}, with μ_i being countries' unobservable individual effects, IR is the incidence rate that is an indicator of the spread of COVID, GDP is gross domestic product, PD is a population density, MDI is a multidimensional poverty index, and ultimately SI is a tightness index that reflects government policies to contain the spread of the virus.

4.1 Measures for the COVID-19 Spread

In this study, we captured the COVID spread from the total cases and total population. To calculate the spread model, we follow [11] by dividing the total cases by the total population. The following equation is the incidence rate:

$$IR_{it} = \frac{TotalCases_{it}}{Population_{it}}$$

5. RESULTS

We first report the summary of the descriptive statistics and Pearson correlation matrix for each variable in the model. Table 2 shows that the average incidence rate (IR) is 0,16934%, with the highest rate being 1,4% and the lowest rate accounting for 0,000000426%. Furthermore, the average GDP (LNGDP) was 1121%, which had a large variation between 696% and 1319%, the same as the population density (LNPD), which had a large variation between 342,37% and 1186%, with an average of 1121%. The multidimensional poverty index (MPI) varied between 0,3% and 17,6%, with an average of 6,46%. For the stringency index, the maximum value was 1%, and the minimum value was 16,67%, with an average of 602%.

Table 2. Descriptive Statistics

Variables	IR	LNGDP	LNPDN	MPI	SI
Obs	4900	4900	4900	4900	4900
Mean	0.0016934	11.21776	6.549098	0.064625	60.23489
Minimum	0.0000000043	6.965685	3.423745	0.003	16.67
Maximum	0.0121115	13.19701	11.86378	0.177	100
SD	0.0032771	1.930706	2.93325	0.0700802	16.54412

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Table 3. Correlations Matrix

Variables	LNGDP	LNPDN	MPI	SI
LNGDP	1.000			
LNPDN	-0.1137	1.000		
MPI	-0.5444	-0.26750	1.000	
SI	0.2428	0.21111	-0.1054	1.000

5.1 Link Between Socioeconomic Level and Covid-19 Spread

Our objective is to examine the association between socioeconomic level, government response, and COVID-19 spread, represented by GDP, population density, multidimensional poverty index, stringency index, and incidence rate. Table 4 presents the regression models with incidence rate as dependent variables. We define our regression in five models. In the first one, we include all variables. In the other four models, we set independent variables (LNGDP, LNGPD, MPI, SI) on the dependent variable.

Table 4. the effect of socioeconomic level, government response, and incidence rate of COVID-19 in ASEAN countries

Variables	IR				
	1	2	3	4	5
LNGGDP	0,0032085***	0,0048164***			0,002568***
	(0,000685)	(0,0003228)			(0.000659)
SI	-0.0000266***		-0.0000236***	-0,0000261	
	(2.18e-06)		(2.09e-06)	(2.18e-06)	
LNPD	0,0025767***			0,0013864**	0,0019882*
	(0,0008539)			(0,0006786)	(0,000755)
MDI	0,0071504a*			0,0024741	0,0054173
	(0,0037376)			(0,0029422)	(0,0033063)
Obs	4900	4900	4900	4900	4900
R-squared	0,3029	0,0726	0,0216	0,2984	0.2785
Time effect	Yes	Yes	Yes	Yes	Yes

The R-squared value is from the mean-deviated regression (within model). The standard errors are reported in parantheses (***), (**), and (*) indicate significance at the 1% level, 5% level and 10% significantly

Table 4 shows the effect of socioeconomic level, government response, and incidence rate of COVID-19 in ASEAN countries. LNGDP showed a significant positive impact on IR, implying that a higher-level economy could result in an increase in the COVID-19 incidence rate. A significant association was recognized between LNPD and IR, signifying that high population density could escalate the COVID-19 incidence rate. The same rules apply for MDI, which has a significant positive relationship with the incidence rate. A higher MDI indicates an unclean area, which ultimately may lead to a drastic increase in the incidence rate. Meanwhile, SI presented a negative relationship with IR, suggesting that decreasing the policy could increase the COVID-19 incidence rate. Table 4 also presents the relationship between each independent variable (LNGPD, LNPD, MDI, SI) and IR. The results of all of the observed variables are in line with the general model unless poverty. Because this result is the result of the respective regression of the independent variable to the dependent variable, in the context of poverty, we argue that people who lived in poverty may not all live in densely populated areas in Southeast Asia. We also think that people who live in poverty do not have jobs, so they do not carry out high mobility activities. In this case, when the government implements lockdown, social distancing, and self-quarantine measures, the government provides social assistance for the poor. Therefore, the poor have no reason except to stay at home. Thus, it will reduce the level of mobility of the poor. In the end, poverty has a significant negative, positive direct relationship with the incidence rate.

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6. ROBUSTNESS CHECK

6.1.Comparison of regression models

Tables 5 and 6 present the regression results for the alternative regression robustness test. In the first model, we include all the ASEAN countries in our model. In the second regression model, we use cumulative cases as the dependent variables. In addition, we also harness log GDP per capita as the substitution of log GDP and exclude Laos in the third and fourth regressions. The table results confirm our previous findings, as GDP and population density remain positively significant to the incidence rate, while MDI and stringency index remain negatively significant to the incidence rate.

Table 5. Comparison of regression models (using cumulative cases as the dependent variable)

Variables	CC				
	1	**2**	**3**	**4**	**5**
LNGDP	301812,6***	60715,4			281930
	(49407,33)	(40715.57)			(48427,3)***
SI	-1189,123**		-636.1653*	-1104,518	
	(394,3552)		(379.2774)	(395.7241)	
LNPD	155972,9***			72803,87**	149066
	(39545,2)			(50989,72)	(38705,8)***
MDI	503115,2**			82453,29	472252,1
	(175156,5)			(220813,7)	(17150,6)***
Obs	4900	4900	4900	4900	4900
R-squared	0.3001	0,2591	0.2584	0,2873	0,2979
Time effect	Yes	Yes	Yes	Yes	Yes

The R-squared value is from the mean-deviated regression (within model). The standard errors are reported in parantheses (***), (**), and (*) indicate significance at the 1% level, 5% level and 10% significantly

Table 6. Comparison of regression models (using log gdp percapita as the substitution of log gdp)

Variables	IR				
	1	**2**	**3**	**4**	**5**
LNGDPPC	0,0029248***	0,0060631***			0,002356***
	(0,0007876)	(0,0003949)			(0,0007248)
SI	-0,0000265***		-0.0000236*	-0.0000261***	
	(2.18e-06)		(2.09e-06)	(2.18e-06)	
LNPD	0,0008993*			0,0013864**	0,0004582
	(0,0005408)			(0.0006786)	(0,0003835)
MDI	0,0048802*			0,0024741	0,0031289*
	(0,0025157)			(0,0029422)	(0,0018613)
Obs	4900	4900	4900	4900	4900
R-squared	0,3002	0,0572	0.3079	0.2984	0.2762
Time effect	Yes	Yes	Yes	Yes	Yes

The R-squared value is from the mean-deviated regression (within model). The standard errors are reported in parantheses (***), (**), and (*) indicate significance at the 1% level, 5% level and 10% significantly

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Table 7. Comparison of regression models (exclude Laos)

Variables	IR				
	1	2	3	4	5
LNGDP	0,0036712***	0,0050054***			0,0026564***
	(0,0007042)	(0,0003493)			(0,0006834)
SI	-0,0000481***		-0,0000394***	-0,000047***	
	(3.00e-06)		(2.86e-06)	(3.00e-06)	
LNPD	0,0026844**			0,0012832*	0,0019814**
	(0,0008827)			(0,0006995)	(0,0007828)
MDI	0,0067279*			0,0021939	0,004708
	(0,0037259)			(0,0029465)	(0,0032966)
Obs	4410	4410	4410	4410	4410
R-squared	0,3495	0.0742	0.0414	0.3438	0,3058
Time effect	Yes	Yes	Yes	Yes	Yes

The R-squared value is from the mean-deviated regression (within model). The standard errors are reported in parantheses (***), (**), and (*) indicate significance at the 1% level, 5% level and 10% significantly

7. DISCUSSION

7.1. Possible Influence of Socioeconomic Level on the COVID-19 Incidence Rate

Several factors may shed light on the observed relationship between socioeconomic level and COVID-19 incidence rate. First, in the case of infectious diseases, in several countries in ASEAN, characterized by a concentration of workers in the central business district (CBD) and suburban sprawl, the expansion of cities into surrounding areas occurs in an unstructured or random manner. Thus, without an inclusive development plan – developing economy without considering development appropriate health system – it could create an extensive center for spreading the virus on the commuter transportation network, which may accelerate the spread of disease among countries with high development levels, as revealed by [21] and [11]. In this context, a higher level of development indicated by high GDP will intensify the likelihood of the dissemination of the transmission of COVID-19 since they have modern transportation systems and infrastructure and, therefore, facilitate the rapid spread of the virus. In other words, when a country has a high economic level, high economic activity and increased economic activity will increase state income. When the country earns a high income, the government will provide infrastructure and new facilities for its citizens. In this case, having infrastructure makes things more accessible and faster by significantly reducing travel times. However, this also causes the spread of the virus to move faster.

Second, in terms of population density, high population density implies there are more people per unit area and, therefore, increases exposure among people. The significant spread routes of COVID-19 encompass droplets and fomites throughout close unsafe contact between an infector and infectee. In other words, high population density accelerates the diffusion of COVID-19 in the population. These results are in line with prior research by [6], who argued that escalated population density increases the likelihood of transmission of COVID-19. This increase is also explained by Emilie et al. (2011), revealing that the high number of positive cases and deaths in the Spanish Flu pandemic of 1918 occurred in countries with high population densities. In this context, one of the main factors that increases population density is the increase in economic activity, which indirectly encourages the increase in residential areas, which, as a result, increases population density. Therefore, population density has a role in the spread of COVID-19 by referring to the fact that areas that have a high population density compared to suburban areas will cause faster disease transmission with a more compact and complex spread.

Third, in terms of poverty, poor areas are indicated by a polluted, unhygienic environment where bacteria and viruses generally appear and spread quickly. This condition will be very severe where people who live in poor areas do not care about cleanliness. For these reasons, therefore, MPI is positively significant with incidence rates. This result is in accordance with the findings of [24], who examined the relationship between MDI and the spread of COVID-19 in Colombia.

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Ultimately, the results of this study indicate that there is a significant negative relationship between government policies and incidence rates in Southeast Asia. The findings of this study reveal that the looser the policies implemented by the government are, the higher the incidence rate will be.

7.2 Research Implications

Currently, the most swiftly growing, industrializing, and urbanizing parts of the world are in Southeast Asia. This context of continuous growth also generated new spatial inequalities, for instance, urban slums and shanty town, unprotected planning, and injustices in resource distribution systems. Consequently, continuous growth incubated conditions of social vulnerability and economic precarity, which, in the COVID-19 pandemic, translated into heightened health risks. In response to this, there are several research implications in this paper that are useful for policy in dealing with future pandemics. First, the prevention and control of COVID-19 must be placed at the top priority in all government policies early on. "Precaution at the first level," integration of prevention and control, scientific directions, timely treatment, working principles, and relevant institutions should be organized to formulate and improve technological work and solutions and standardize COVID-19 precaution and control. In addition, health institutions at all levels must follow the instructions of the central/local government, strengthen local epidemic prevention, and control work guidelines and form a COVID-19 prevention and control expert group involving relevant experts and stakeholders.

Furthermore, ASEAN countries need to prioritize in allocating resources. This can be done by targeting areas with a high population density, high poverty and those that do not yet have adequate vaccination coverage. In addition, with the large number of asymptomatic patients, governments in ASEAN countries must also continue to implement the process of burying all corpses with COVID-19 fixed procedures. This step is carried out on the bodies of patients with probable, suspected, or confirmed positive COVID-19. This is important to do to see more clearly what the pandemic trend in ASEAN looks like. Due to the various types of new variants, many asymptomatic cases appear, so it is difficult for us to understand the dynamics of transmission that occurs in the population if we only rely on data on confirmed and symptomatic COVID-19 cases

Second, government policies may have dissimilar effects on the mobility and spread of the virus. Thus, when implementing a mitigation policy, decision-makers should contemplate the possible consequence of implementation, the effect on the transmission of factors other than movement restrictions, and the differential impact of the mitigation policy on subpopulations. In this context, it is significant to scrutinize the cost of a pandemic such as alleviation, lockdown, and economic turmoil at the beginning of the pandemic cycle since these will conform to the demand for health services with the capacity available to decrease the incidence rate briskly.

Third, development programs that focus on the economy must also be balanced with development in the health sector. The COVID-19 pandemic has made all parties aware that high economic activity and high levels of economic development will be fragile and crumble if the health system is not adequate.

Last but not least, The importance of data collection and transparency. As has always been echoed in recent months regarding Big Data and its implementation in inclusive development planning, ASEAN countries must collect data and disseminate it to the public. It's not meant to create panic, but to make all elements of society aware and know what to do in critical times like this. What ASEAN countries have done so far has been quite good in providing data related to the spread of COVID-19. However, this can continue to be improved, especially in the provision of special data and supporting data that can be used to assist the COVID-19 mitigation process.

8. CONCLUSION

New substantiation has been generated by covid allowing an ameliorated in healthcare, education, and work systems. COVID-19 has shown that human beings should adapt swiftly in uncertain conditions. Furthermore, on the one hand, COVID-19 has demonstrated that even developed countries with high socioeconomic levels have difficulty in addressing the pandemic. Still, on the other hand, it has shown how some activities can be changed very quickly with technology such as work from home, school from home and so forth.

This study investigates the socioeconomic level and government response to the spread of COVID-19 in Southeast Asia. The study results show that there is a positive relationship between GDP, population density, and poverty on the incidence rate of COVID-19 in ASEAN. While government policies in terms of lockdown revealed a negative relationship with incidence rate, suggesting that decreasing the policy could increase the COVID-19 incidence rate. The study findings indicate the potential role of

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socioeconomic development in facilitating the spread of infectious diseases, such as more modern transportation networks, big metropolitan cities with high population density and one step ahead domestic and international travel. These factors must be taken into consideration in supervising the transmission of COVID-19 epidemic. However, many other elements that may also contribute to the expeditious spread of COVID-19 in ASEAN countries, such as differences in weather, rainfall, humidity, and people's behavior in each country's behavior. In addition, ASEAN's low- and middle-income countries may have a low number of COVID-19 cases simply due to a lack of testing competences. The results of this study also recommend future research with individual-level data to discover risk factors at the personal stage to understand COVID-19 risk. The findings also demonstrate that there is a negative relationship between government policies on the spread of COVID-19 in ASEAN, revealing that the tighter the restriction policy, the less virus transmission will be.

Our main finding is that there is a lack of coherence in harnessing and balancing the economic and health frameworks to develop a coherent response to the pandemic within each of the ASEAN countries. In member states, the new outbreak of the second wave of the virus demonstrates that temporary success in containing the virus cannot be taken for granted, as complacency can result in recent episodes. This result can quickly jump the scale of organizational governance to overwhelm national health systems. Coordination at the national level has gone very well, and regional coordination, albeit slightly late, made it possible to refocus efforts. Communication has worked very well, especially in providing regularly updated data on the impact of COVID-19 at the regional level, which allows comparisons between countries and inputs to global databases.

This study has two limitations. First, our paper focuses on the macrogeographic level in Southeast Asian countries. The subsequent study could focus on the microgeographic level, such as provinces and cities in Southeast Asian countries. Second, it is essential to note that this study aims to investigate the role of economic development and government policies on the incidence rate of COVID-19. Thus, this study did not include other indicators such as environment, humidity, rainfall, temperature, pollution, ethnicity, age, gender, and minority groups.

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