

IMPACT OF COVID-19 ON PUBLIC TRANSPORT IN INDONESIA

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Abstract

The Corona virus was first discovered in Wuhan City, China in 2019, and this virus was detected in Indonesia on March 2, 2020. In a short time this virus has spread throughout the world with a high number of fatalities. To anticipate the spread of this virus, the Government of Indonesia issued recommendations such as: worship from home, work from home and school from home, thus with this recommendation it is hoped that direct contact between humans will not occur. As a result of this mobility restriction, it has an impact on the transportation sector which results in a decrease in the number of passengers, both land transportation, air transportation and sea transportation. The important of this study is to know the impact of COVID-19 on public transport. The contribution of this study is as an initial effort to provide references of the causes of the impact of COVID-19 on public transport, thus that it will make it possible for policy makers to formulate policies and programs related to public transport.

Keywords: Corona, COVID-19, Physical distancing, Public transport, Virus.

Introduction

To prevent the spread of the corona virus, the government has issued recommendations and policies to the public, including: restriction the number of public transport passengers, physical distancing, the use of masks, the use of gloves, measuring body temperature of public transport passengers, and restriction the public transport operating hours. This restriction significantly impacts people's travel (Hensher *et al.*, 2021; Kartal *et al.*, 2021) especially during the lockdown period. This government policy has an impact on decreasing the number of public transport passengers and also has an impact on the slight increasing in the use of private vehicles (Hensher *et al.*, 2021).

One of the government policy in preventing the spread of COVID-19 is the implementation of Large-Scale Social Restrictions (PSBB). The consequence of determination of this PSBB is the restriction of community activities. Restrictions on community activities have an impact on decreasing the number of public transport passengers. Several provisions related to restrictions on the use of public transport, such as: restrictions on the capacity of the number of passengers and restrictions of the public transport operating hours. In addition, it is quite difficult for public transport operators to adapt public transport operations during this pandemic, this is due to the Standard

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Operating Procedure (SOP) for public transport in the face of this pandemic is not exist yet.

This study aims to explore the impact of the COVID-19 pandemic on the decreasing of the number of public transport passengers. The results of the study show that the COVID-19 pandemic has an important role in causing a decrease in the number of public transport passengers. This study contributes to a comprehensive initial effort by providing references of the causes of the decreasing in the number of public transport passengers during the pandemic, thus it enable to policy makers to formulate long-term policies and programs related to providing safe and comfortable public transport in the face of the pandemic situation in the future.

Materials and Methods

The study data were derived from several useful sources including: journals and proceedings that were obtained offline and online which were accessed from the internet. The preliminary data show supporting evidence related correlation between the effects of the COVID-19 pandemic and the decreasing in the number of public transport passengers in Indonesia.

The COVID-19 pandemic has impacted several sectors, especially the transportation sector, such as the decreasing in the number of public transport passengers, disruption of the distribution of goods and logistics, including rental or charter transportation. The decreasing in the number of public transport passengers has occurred since the early 2020, both land transportation, air transportation and sea transportation (Ministry of Transportation of the Republic of Indonesia, 2020). This argument is supported by statistical data during the pandemic which shows that there has been decreasing in public transport passengers in all modes by 75 percent to 100 percent, while for goods transportation has been decreasing in turnover reaches 25 percent to 50 percent, meanwhile for tourism transportation there was decreasing in turnover by 100% (Ministry of Transportation of the Republic of Indonesia, 2020).

Additional data, for the MRT, of the total passengers in January 2020 by 85,000 people per day, in April 2020 it decreased to 5,000 people per day. Then the Integrated Railroad (LRT) in January 2020 was around 3,800 people per day, on April 15, 2020 it decreased to 264 people per day. Meaning that the decreasing is around 93.05%. Meanwhile, KRL (Commuter Line), the percentage of decreasing in passengers by 78.69%. For the Transjakarta public transport mode on April 15,

2020, the number of passengers has decreased by 83,000 people per day. In the air transport sector, it shows that airports in the cities of Jakarta, Medan, Bali and Surabaya experienced decreasing in the number of domestic passengers by 44% and international passengers by 45%. This argument is in line with previous research, that several countries significantly decreased the number of flights in their country, even the decreasing is below 25% (Sun *et al.*, 2021).

The decreasing in the number of public transport passengers cannot be separated from government policies in an effort to prevent the spread of COVID-19, namely the implementation of Large-Scale Social Restrictions (PSBB). The determination of the PSBB has the consequence of restriction of community activities, including the distribution of goods. Restrictions on this activity have an impact on restrictions on the use mode of public transport (Regulation of Minister of Health of the Republic of Indonesia No. 9 Years, 2020). Several determinations related to restrictions on the use of public transport including:

Land transportation

Public transport such as Transjakarta bus, long distance or inter-city passenger trains services, commuter lines trains services, MRT, LRT as well as internal and/or inter-city bus transportation are still operating, all passengers are required to wear a mask, body temperature is not more than 38 degrees Celsius with restriction the number of passengers are 50 percent of total seating capacity and minimum distance between passengers is 1 metre, public transport operating hours is limited in accordance with the provisions of the DKI Jakarta Provincial Government and/or related institution (Governor Regulation DKI Jakarta No. 33 Years, 2020).

Air transportation

All passengers are required to wear a mask during the flight, body temperature not more than 38 degrees Celsius and fill out a Health Alert Card (HAC), the card must be submitted to the Port Health Office (KKP) at the arrival or destination airport (Regulation of the Minister of Transportation of the Republic of Indonesia No. 18 Years, 2020). Passengers are 50 percent of total seating capacity and minimum distance between passengers is 1 metre (Regulation of the Minister of Transportation of the Republic of Indonesia No. 18 Years, 2020).

River and sea transportation

All passengers are required to wear a mask while on a ship, the body temperature is not more than 38 degrees Celsius with passenger are

50 percent of total seating capacity and minimum distance between passengers is 1 metre (Regulation of the Minister of Transportation of the Republic of Indonesia No. 18 Years, 2020).

As comparative data, other data shows the decreasing in the number of public transport passengers in the Jabodetabek area for January 2020, including: Mass Rapid Transit (MRT) 94.11%, Integrated Railroad (LRT) 93.05%, KRL (Commuter Line) 78.69%, the air sector decreased by 44% for domestic passengers and 45% for international passengers (Luthfiyah and Miro, 2020). For this reason, it is needed real efforts from the government to be able to create safe, comfortable and hygienic public transport in the future.

Results and Discussion

Impact of COVID-19 pandemic

Based on the data that are collected, it confirms that the correlation between the COVID-19 pandemic and the decreasing in the number of public transport passengers and in addition, COVID-19 also has a significant impact on decreasing travel, both travel by public transport and car (Hensher *et al.*, 2021). This argument is also supported by other researchers that there is a strong linear correlation between domestic COVID-19 cases and the number of passengers for regions in China (Lau *et al.*, 2020).

The decreasing in this trips is both in terms of decreasing the duration and decreasing the travel distance, especially during the lockdown period (Katrakazas *et al.*, 2021). However, even though the trips are short distances, there is a tendency for a slight increasing in speed than usual during this pandemic (Katrakazas *et al.*, 2021). The argument of this study was supported by previous researchers, the concern over the corona virus resulted in road users tend to take shorter distances and traveling less frequently during the pandemic (Abdullah *et al.*, 2020).

According to Cui *et al* (2021) the passenger transportation sector experienced a greater decreasing than the freight transportation sector. This decrease in the number of public transport passengers occurred due to passengers feel less safe when on public transport (Dong *et al.*, 2021). This happens because public transport is considered as one of the media in spreading the Covid-19 virus. In addition, during the pandemic, public transport cannot fulfill its service function to public transport users (Hasselwander *et al.*, 2021). Those who are very dependent on public transport and have no private cars are very affected during this lockdown

period (Jenelius and Cebecauer, 2020; Hasselwander *et al.*, 2021).

In addition, public transport operators have experienced difficulties in providing safe and comfortable transportation facilities during this pandemic, such as the difficulty of public transport operators in adapting to the pandemic, this is due to the fact that this pandemic has never happened before, thus there is not SOP for handling it. Thus, the government need to learn more about how to adjust rapidly in changing situation (Tiikkaja and Viri, 2021). This shows that society are not ready to face this pandemic problem (Zhang *et al.*, 2021).

Based on statistical data, it shows that during this pandemic there was a tendency the increasing the use of private vehicles, bicycles including walking compared to the use of public transport which was full of risks (Abdullah *et al.*, 2020). People who have the cars, it has the potential to travel long distances, such as the purpose of working during pandemic (Crowley *et al.*, 2021). In addition, many travelers have drastically changed their mobility patterns by leaving public transport (Jenelius and Cebecauer, 2020). In addition, the purpose of working and traveling, during this COVID-19 pandemic, shopping is the main destination for traveling (Abdullah *et al.*, 2020). Gender, car ownership, employment status, travel distance, main purpose of travel are significant predictors of mode choice during the COVID-19 pandemic (Abdullah *et al.*, 2020).

The impact of COVID-19 is not only affects the number of passengers on public transportation but also affects driving behavior, such as the increasing speed, speeding, the use of cell phones which all of this have the potential to decrease safety levels on roads (Katrakazas *et al.*, 2020). The use of cell phones during the pandemic in Greece, especially during April increased significantly by 42%, this is of course very risky for accidents occurrence (Katrakazas *et al.*, 2020).

In addition, there was also decreasing in traffic violations by 37% and decreasing in the incidence of accidents by 37% (Muley *et al.*, 2021). Likewise, the lockdown imposed by the Spanish Government resulted in a significant decreasing in road traffic accidents in the province of Tarragona (Saladié *et al.*, 2020). Likewise with Greece, during the pandemic, the traffic volume was reduced, causing a slight increase in speed of 6-11%, accidents decreased by 41% (Katrakazas *et al.*, 2020).

Pandemics have contributed to the mitigation of CO₂ emissions, where this decreasing in emission levels and temperatures has resulted in improving air quality (Du *et al.*, 2020; Calderon-Tellez and Herrera, 2021). The impact of the lockdown was mainly in urban areas, where

the decreasing in NO₂ (Brown *et al.*, 2021; Lipsitt *et al.*, 2021) are higher than 60% (Gama *et al.*, 2021). Overall, the trend of variations in air quality, air quality in four big cities in China after the COVID-19 outbreak have improved (Gao *et al.*, 2021). Air quality on the roadside and off-road stations drastically improved during the COVID-19 period (Wu *et al.*, 2021).

Countermeasures on public transport

To prevent the spreading of COVID-19 in public transport, public transport officers must follow health protocols in serving passengers such as wearing masks, social distancing (Dzisi and Dei, 2020), wearing gloves, measuring body temperatures of passenger and having a negative Covid-19 certificate, and ticket sales are carried out online, as well as public transport passengers must follow health protocols (Abdullah *et al.*, 2020; Ministry of Transportation of the Republic of Indonesia, 2020). Besides that, it needs real effort in building a new culture that is followed by changes in behavior that are obedient and orderly according to health protocols in creating hygienic and humanist public transport (Ministry of Transportation of the Republic of Indonesia, 2020).

The government needs to issue regulations relate to the implementation of transportation services that lead to a digitalized system in decreasing contact among public transport passengers, including public transport officers. To prevent the spread of Covid-19, Ministry of Transportation of the Republic of Indonesia, try to achieve a balance point between health interests and economic interests, by prioritizing health to protect

the community during the Covid-19 Pandemic. In decreasing direct contact between passengers, the government needs to differentiate between rates during peak hours and non-peak hours, this is in an effort to avoid overcrowding of passengers during peak hours, thus the number of passenger in the peak hours can decrease. In addition, the government must create bicycle lanes in an effort to avoid the spread of COVID-19, as well as providing pedestrian paths. This research argument is supported by previous research that there is a need for policy related to greater space for bicycles and pedestrians related to efforts to maintain a safe distance between users in preventing the spread of COVID-19 (Katrakazas *et al.*, 2020). In other words, the design of transportation policies must consider a balance between social, environmental and economic dimensions (Calderon-Tellez and Herrera, 2021; Ouadi *et al.*, 2021).

To face prolonged the COVID-19 pandemic is required long term planning (Vickerman, 2021) related to changes in people's lifestyles, such as car users tend to increase, there is even a change from the use of physical space to the use of virtual space (Zhang *et al.*, 2021), such as shopping online which can lead to less travel for a person (Abdullah *et al.*, 2020). Previous researchers related to the pandemic in China, several policies to support the passenger transportation sector, including reducing taxi costs, exempting toll fees, especially for passenger vehicles, decreasing parking fees, and no restriction in vehicle purchases (Cui *et al.*, 2021).

A summary of previous research related to the impact of COVID-19 and Countermeasures on public transport, as shown in Table 1 below.

Table 1. Summary of the impact COVID-19 and Countermeasures on public transportation

Number	Impact of COVID-19 pandemic	Countermeasures on public transport
1	The COVID-19 pandemic has resulted in a decreasing in the number of public transport passengers	1. There is a need for regulations related to the application of health protocols in public transport such as: the use of masks, the provision of hand sanitizers in public transport, measuring body temperature and having a negative Covid-19 certificate
2	The COVID-19 pandemic has resulted in a decreasing in trips, both in terms of duration and distance	2. The sale of public transport tickets uses an online system to decrease contact among public transport passengers
3	Public transportation cannot carry out its service functions during this COVID-19 Pandemic	3. There is a need for regulations relating to the application of transportation services that lead to a digitalized system in reducing the contact between passengers.
4	The users of Public transport who are dependent on public transport and do not have private vehicle are very affected during pandemic	4. There is a need for regulations relating to difference the price of tickets during peak hours and not peak hours in an effort to decrease contact among public transport passengers
5	The use of private vehicles and bicycles has increased, including walking during the COVID-19 pandemic	5. Long-term planning of public transport needs to consider of changes in people's lifestyles during the pandemic, such as the use of the car tend to increase, changes from the use of physical space to the use of virtual space
6	The COVID-19 pandemic has had an impact on changes in driving behavior, such as increasing speed, increasing the use of cell phones while driving	6. Design of Transport policy needs to consider the balance between social, environmental and economic dimensions
7	The COVID-19 pandemic has resulted in a decreasing in traffic violations, a decreasing in the occurrence of accidents, and a decreasing in traffic volume	7. It is necessary to create bicycle lanes and pedestrian paths in an effort to avoid the spread of COVID-19
8	The improving air quality during the COVID-19 pandemic	

Conclusions

Impact of COVID-19 pandemic

The COVID-19 pandemic has resulted in a decreasing in the number of public transport passengers which also has an impact on decreasing trips, both in terms of duration and travel distance. This decrease in the number of public transport passengers occurred due to passengers feeling less safe while on public transportation due to the COVID-19 pandemic. Community activities that are depend on public transport and have no private vehicles are very affected during this lockdown period.

Public transportation operators experienced difficult to adapt during this pandemic because this pandemic has never happened before, resulting in no SOP for handling it. During the pandemic the use of private vehicles increased, including the use bicycles and walking compared to using public transportation which was very risky.

During the COVID-19 pandemic, the variables of gender, car ownership, employment status, distance traveled, and the main purpose of travel influenced users in choice of mode. The impact of COVID-19 not only affects the number of passengers on public transport but also affects driving behavior, such as increased speed, speeding, and the use of cell phones which has the potential to decrease safety levels on roads.

In addition, there was also a decrease in traffic violations. Likewise, the volume of traffic is significantly decrease compared to before pandemic period, thus it cause a slight the increasing in speed. Pandemics have also contributed in decreasing emission levels and temperatures resulting in improved air quality.

Countermeasures on public transport

To prevent the spread of COVID-19 in public transport, both officers and passengers on public transport must follow health protocols. In addition, the government needs to issue regulations related to the implementation of transportation services that lead to a digital system in an effort to decrease contact among public transport passengers. In decreasing direct contact between passengers, the government also needs to differentiate rates between peak and non-peak hours, in an effort to avoid overcrowding of passengers during peak hours. In addition, the government needs to provide bicycle lanes and pedestrian paths in an effort to avoid the spread of COVID-19.

In addition, to support the public transport sector during this pandemic, several things can be performed including: decreasing taxi costs, freeing

toll fees, especially for passenger vehicles, decreasing parking costs, and not restriction vehicle purchases.

Future transportation policies must consider a balance between social, environment and economic dimensions. Thus, there is a need for long-term planning related to changes in people's lifestyles, such as car users tend to increase, there is even a change from the use of physical space to the use of virtual space.

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