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PUBLIC TRANSPORTATION STRATEGY IN RESPONSE TO COVID-19

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ABSTRACT

The COVID-19 pandemic has had a significant impact on public transportation worldwide. At the beginning of the pandemic, public transportation systems reduced their performance by 80-90% in major cities in China, Iran, and the United States, and by 70% in the UK, including a significant decline in Indonesia. Several studies have shown that public transportation contributes significantly to the spread of the COVID-19 virus. This study aims to review the use of public transportation during the COVID-19 pandemic. Method: A systematic review using the PRISMA guidelines was conducted on literature published between 2020-2023 with inclusion criteria of national and international research articles in English related to the title "Public Transportation Strategy in Response to COVID-19". The database sources used were Scopus, Google Scholar, and PubMed. Results: Based on the literature review, it is concluded that efforts to reduce the risk of COVID-19 transmission in public transportation include providing personal protective equipment (PPE) for all public transportation crew, implementing strict physical distancing policies among passengers inside the vehicle, ensuring good ventilation, and enforcing the use of masks and hand hygiene. Another solution is to provide non-cash payment options to reduce physical contact between passengers and transportation personnel. The government and public transportation operators should consistently prepare supporting facilities and educate users about physical distancing, using masks, and hand hygiene through posters, social media, and regular announcements in public transportation areas. Implementing strategies in public transportation in response to COVID-19 requires collaboration between the government, transportation operators, and the public.

Keywords: *Public Transportation, COVID-19, Physical Distancing, Hand Hygiene*

INTRODUCTION

In December 2019, the first case of mysterious pneumonia was reported in Wuhan, Hubei Province. The source of transmission of this case is still not known for certain, but the first case was linked to a fish market in Wuhan (Rothan & Byrareddy, 2020). From December 18 to December 29, 2019, there were five patients treated with acute respiratory distress syndrome. From 31 December 2019 to 3 January 2020 this case increased rapidly, marked by the reporting of 44 cases. In less than one month, this disease has spread to various other provinces in China, Thailand, Japan, and South Korea (Huang et al., 2020). Initially, this disease was temporarily named the 2019 novel coronavirus (2019-nCoV), on February 11 2020 the World Health Organization named the new virus severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) and the name of the disease Coronavirus disease 2019 (COVID-19). Coronavirus disease 2019 or COVID-19 is a new type of Coronavirus that can be transmitted from human to human and has spread widely in China and more than 190 other countries and territories. Data as of March 2023, there were 761,402,282 cases and 6.8 million deaths worldwide. The number of COVID-19 cases in Indonesia as of March 2023, the total number of COVID-19 cases reached 6.7 million positive cases, with a total of 161,013 declared dead (WHO, 2020).

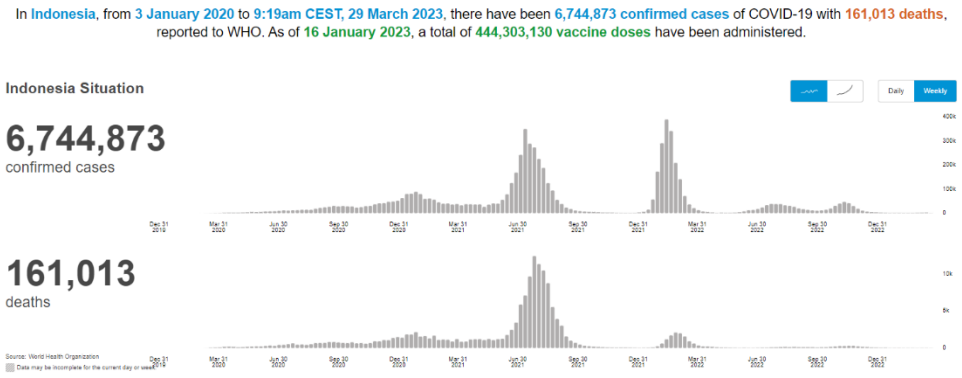


Figure 1. Development of COVID-19 cases in Indonesia

When COVID-19 was declared a global pandemic in February 2020, the Economic Ministers of the Association of Southeast Asian Nations (ASEAN) acknowledged "the devastating impact of the COVID-19 outbreak on the economy, especially including but not limited to the travel and tourism, manufacturing and, retail, and other services as well as supply and financial market disruptions" (Economic Research Institute for ASEAN and East Asia, 2022).

The Indonesian government responded by issuing a "new normal" policy and this has had a significant impact on public transportation. Public transportation providers have implemented various health protocols to ensure the safety of passengers and employees, such as mandatory mask-wearing, frequent disinfection, and implementation of social distancing measures. However, the decline in demand for transportation services due to work-from-home policies and mobility restrictions has resulted in a decrease in income for providers, resulting in service reductions or even suspensions. Despite this, public transportation continues to play an important role in supporting people's essential needs during the pandemic and will continue to be an important factor in supporting people's needs at different stages of recovery. Figure 2 shows that there was a sharp decline in transportation activity after lockdowns or other forms of restrictions were imposed in the second half of the first quarter of 2020. Transportation activity reached its lowest point between mid-April and mid-May (ADB Report, 2020).

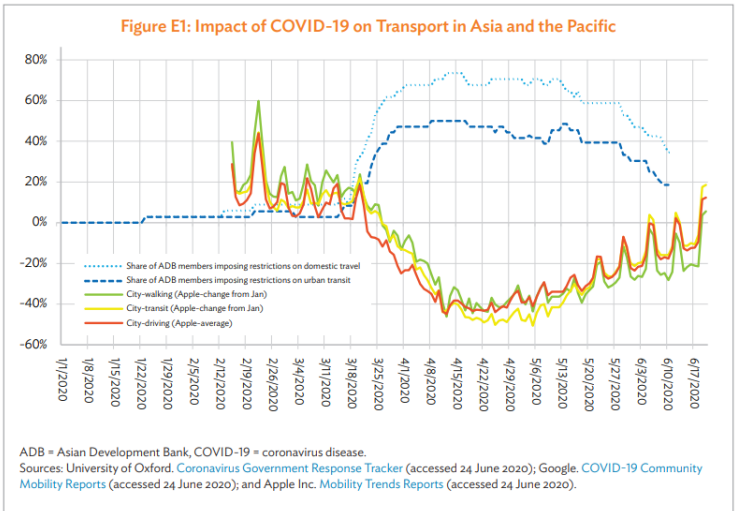


Figure 2. Impact of COVID-19 on public transportation

According to the International Association of public transportation (Gkiotsalitis & Cats, 2021), the public transportation system is one of the sectors most affected by COVID-19. At the start of the pandemic, public transport systems reduced their performance by 80-90% in major cities in China, Iran, and the United States, and by 70% in the UK. Several research results show that public transportation contributes significantly to the spread of the COVID-19 virus, research conducted by (Zhang et al., 2020) found that the frequency of flights and high-speed train services from Wuhan was significantly related to the number of coronavirus disease (COVID-19) cases in the destination city. (Candido et al., 2020) have established the role of intra- and interstate mobility as key drivers of local and inter-regional virus spread, with dense and well-connected urban cities as the main source of virus export in Brazil. (Lau et al., 2020) research results show that there is a significant relationship between domestic COVID-19 cases and passenger volume for regions in China.

Public transportation has been identified as a place with a high risk of COVID-19 transmission due to the small density of people in spaces (Kass et al., 2020). Several countries have implemented public transportation strategies to reduce the spread of COVID-19. For example, in South Korea, public transportation operators have increased the frequency of cleaning and disinfection of public vehicles (Kwon et al., 2020). In Singapore, the Land Transport Authority has implemented various measures such as temperature measurement and contact tracing to ensure the safety of passengers. In the UK, the government has issued guidelines requiring public transport users to wear masks (Gov. uk, 2020). China, Iran, and the United States experienced a decrease in passengers of up to 80-90% in large cities during the lockdown period, while the number of public transport passengers in the UK decreased by 70% (Gkiotsalitis & Cats, 2021). In March 2020, the number of bus passengers decreased by 92.8% compared to the same period in 2019. Meanwhile, in April 2020, the number of train passengers decreased by 95.3% compared to the same period in the previous year). The public transportation sector has been greatly affected by COVID-19 (Lin et al., 2020). Commuters are still reluctant to use public transport, and anxiety levels about public transport hygiene are higher than before COVID.

The Centers for Disease Control and Prevention (CDC, 2021) recommends that in responding to COVID-19 for public transportation users, wear a mask that covers the nose and mouth, maintain hand hygiene by washing hands regularly or using hand sanitizer, avoid touching the face, especially the eyes, nose, and mouth, as well as avoiding crowded areas and limiting time spent in close contact with other people when using public transportation. Additionally, the CDC also recommends considering traveling during peak hours to avoid crowded conditions and reduce the risk of spreading COVID-19. It is important to follow all of these recommendations so that people can stay safe when using public transportation during the COVID-19 pandemic.

According to WHO, public transportation strategies in COVID-19 conditions include the use of appropriate masks by passengers and staff, physical distancing, and increasing cleanliness and sanitation in public transportation. WHO also recommends providing appropriate information and education to the public regarding the safe use of public transportation during the COVID-19 pandemic. Apart from that, the WHO also emphasizes the importance of cooperation between public transportation managers, government, and society

to ensure the implementation of effective public transportation strategies in responding to the COVID-19 pandemic ("WHO Coronavirus Disease (COVID-19) Dashboard," 2020). Indonesia's public transportation strategy in response to COVID-19 includes adopting a mandatory mask policy and providing handwashing stations in every mode of transportation. Apart from that, public transportation operators in Indonesia also check body temperature and provide hand sanitizer to passengers before entering the vehicle. Apart from that, the Indonesian government is also implementing physical distancing or limiting passenger capacity (Dwi Suci Riyani et al., 2021). So it is necessary to review several international studies or articles related to policies on public transportation during the COVID-19 pandemic.

METHOD

The research method used is a systematic literature review, namely carrying out a more careful and thorough review. It can be divided into two, namely meta-analysis and meta-synthesis. In meta-analysis, research results from many articles on the same subject are discussed and then analyzed based on planned statistical procedures. In a meta-analysis, patterns and relationships between research results from various articles are searched for, and analyzed and conclusions drawn. Meta-analysis is included in the deductive approach, in other words, before carrying out a meta-analysis, the author has determined the major premise that will be used (top-down approach). Meta-analysis is usually carried out using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta Analysis) approach.

Document Identification

The initial stage in the PRISMA method is identifying research questions as keywords and then determining the research database as an article search area, a database commonly used by PubMed, Scopus, Google Scholar, Science Direct, and other official sources, and adjusted to the research title, abstract and keywords used to search for articles. In this study, the database sources used were Scopus, Google Scholar, and PubMed. The keywords used are "Public Transportation Strategy" AND "Covid-19".

Inclusion criteria

The inclusion criteria of national and international research articles in English and published in 2020-2023 relating to the title Public Transportation Strategy in Response to Covid-19 and focusing on Physical Distancing, Mask-wearing, and hand hygiene. Research articles that can be accessed in full (full text) are not just abstracts and are free of charge. Articles from the database sources used are Scopus, Google Scholar, and PubMed.

Exclusion criteria

The exclusion criteria in this research are sources from other databases, national and international research articles that are not related to the research problem under study, use of languages other than English, articles published less than 2020, and articles that cannot be downloaded in full.

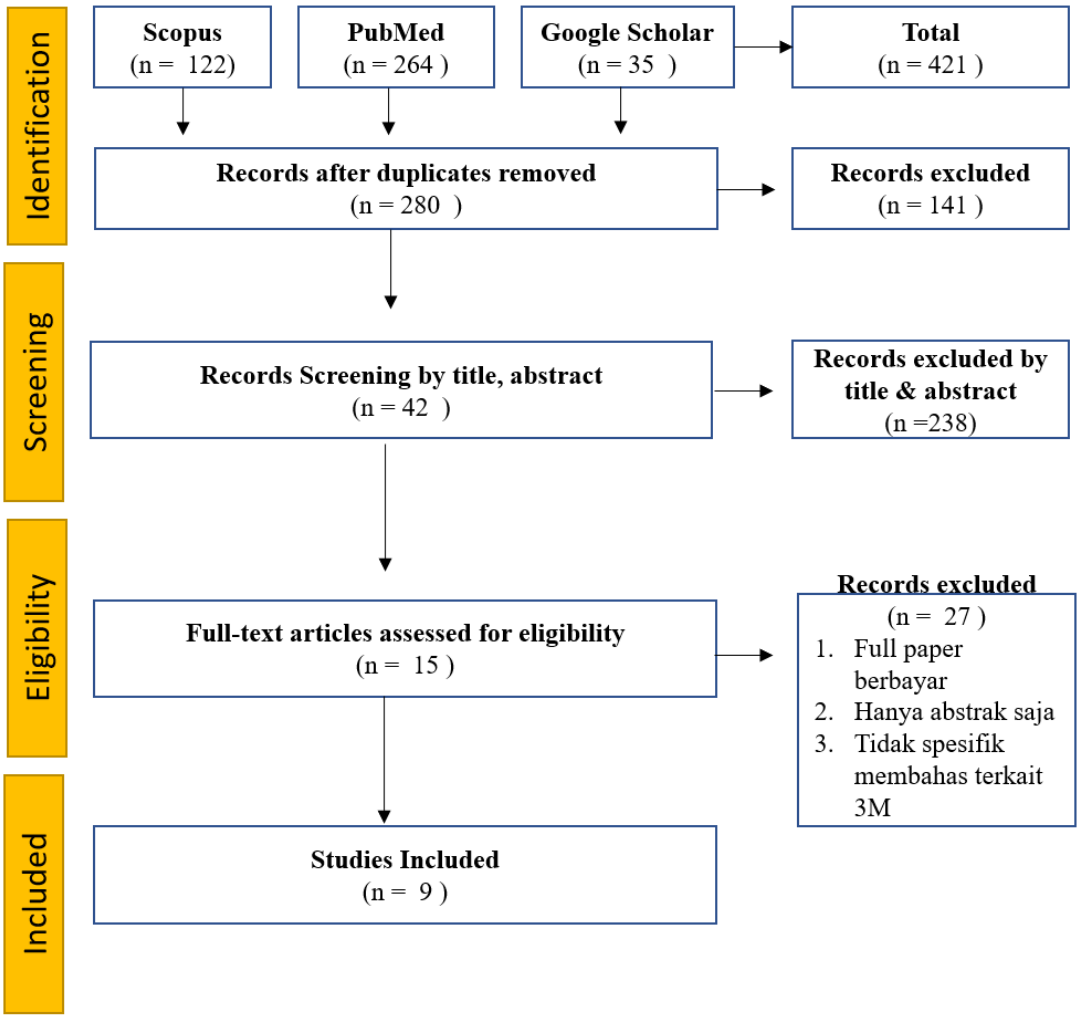


Figure 1. PRISMA Guidelines flowchart

Based on meta-analysis using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta Analysis) approach. A total of 421 articles were obtained from three database sources, namely Scopus (122), PubMed (264), and Google Scholar (35), and after going through a filter process according to the inclusion criteria for national and international research articles in English and published in 2020-2023 relating to the title Public Transportation Strategy in Response to Covid-19 and focusing on Physical Distancing, Mask-wearing, and hand hygiene. Can be accessed in full (full text) not just an abstract and free of charge. Articles from the database sources used, namely Scopus, Google Scholar, and PubMed obtained 9 articles that will be the focus of this research.

RESULTS AND DISCUSSION

Table 1. Selection Results of Scientific Articles

No	Title and Author	Country	Method	Results
1	Prevention and control of COVID-19 in public transportation: Experience from China (Shen et al., 2020)	China	Literature analysis	Some of the key measures taken in China to prevent and control the spread of COVID-19 in public transportation include body temperature checks, use of face masks, enhanced cleaning and disinfection, ventilation, contact tracing, reduced capacity, and public awareness campaigns. This article concludes that the combination of these measures has been effective in preventing the spread of COVID-19 in public transportation in China and allowing the country to gradually restore normal public transportation services.
2	The face mask-touching behavior during the COVID-19 pandemic: Observational study of public transportation users in the greater Paris region: The French-mask-touch study. (Guellich et al., 2021)	French	**Design**: Quantitative method with an observational approach **Sample:** 182 public transport users in France.	The results of this study indicate that the use of face masks among the general public is not optimal. Many individuals touched their masks at a frequency of up to 15 times per hour, and hand sanitation after touching the mask was extremely rare. Further efforts are needed to raise awareness among the general public about the correct use of face masks. It is recommended that messages and recommendations regarding the use of face masks and the importance of avoiding touching masks when possible, as well as the importance of hand sanitation, should be widely disseminated. This can be done through instruction sheets in public transport and public areas, audio message broadcasts in subways and train stations, and other resources such as media platforms and social networks.
3	Social Efficiency of Public Transportation Policy in Response to COVID-19: Model Development and Application to Intercity Buses in Seoul Metropolitan Area. (Park & Kim, 2022)	Korea	**Design:** Quantitative Methods, Development of mathematical models. **Sample**: The data used in this study comes from a survey conducted on intercity bus passengers in the Seoul Metropolitan Area and operational data from transportation operators	This study aims to develop a social model of public transportation policy efficiency in response to the COVID-19 pandemic with a focus on intercity buses in the Seoul Metropolitan Area. The research results show that implementing public transportation policies that focus on the use of masks and *physical distancing* is very important in reducing the spread of COVID-19 in public transportation, especially in densely populated areas such as urban centers, but this has an impact on reducing passenger capacity and increasing operational costs. So policies related to reducing the number of passengers need to be reconsidered because they have a direct impact on the operational costs of public transportation operators and have an impact on the economy.

4	Real-time social distance measurement and face mask detection in public transportation systems during the COVID-19 pandemic and post-pandemic Era: Theoretical approach and case study in Italy (Guerrieri & Parla, 2022)	Italy	**Design:** Artificial intelligence Face Mask Detection **Sample:** Passengers on urban bus transportation.	This research aims to develop a real-time *physical distance measurement system and face mask detection for public transportation during the COVID-19 pandemic and the post-pandemic era.* The research was conducted on urban bus transportation and showed that the proposed system can be effective in measuring the *physical distance* between passengers, detecting passengers with face masks, and providing useful information for transportation operators to optimize bus capacity. So every public transportation needs tools to monitor *physical distancing* and the use of masks quickly and accurately.
5	Transmission of SARS-CoV-2 in Public Transportation Vehicles: A Case Study in Hunan Province, China. (Luo et al., 2020)	China	**Design**: Case study. **Sample**: Data collected from passengers and public transportation staff who were infected with COVID-19 while traveling in Hunan, China in January 2020. Through interviews and contact tracing.	The results of this study show that there is effective transmission of the SARS-CoV-2 virus in crowded and closed environments such as in public vehicles. According to WHO, the main route of transmission of COVID-19 is through respiratory droplets or direct contact with mites (objects contaminated with the virus). Transmission via droplets is usually limited to a distance of 2 meters. Closed windows and poor ventilation on buses can create an ideal environment for aerosol transmission. In tour buses, ventilation ducts are aligned above the windows on both sides, and fans are at the front, which may create airflow that carries aerosols containing virus particles from the rear to the middle and front of the vehicle. Therefore, aerosol transmission cannot be excluded.
6	Adherence to social distancing and wearing of masks within public transportation during the COVID-19 pandemic. (Dzisi & Dei, 2020)	Ghana	**Design:** Quantitative research. **Samples:** 385 respondents who accessed public transportation in Ghana during the pandemic.	The results showed that the majority (98.0 %) of buses complied with the social distancing guidelines set by the Ministry of Transport, but the mask policy was only partially adhered to in the majority of vehicles. About 12.6% of vehicles had fewer than three passengers not wearing masks, while 21.3% of buses had fewer than 3 people wearing masks. These results show public transportation remains a high-risk area in the fight against COVID-19. Another interesting observation is that although the guidelines state that commercial vehicle drivers and guards should wear masks, more drivers than guards wear masks.
7	Community Outbreak Investigation of SARS-CoV-2 Transmission Among Bus Riders in Eastern China (Shen et al., 2020)	China	**Design:** Quantitative research with a *cohort study approach* using the Logistic Regression analysis method	The results showed that individuals who rode a bus with COVID-19 patients at a religious event in Zhejiang Province, China, had a higher risk of being infected with the SARS-CoV-2 virus compared to individuals who rode another bus to the same event. In this study, 24 of 68 people (35.3%) on the same bus as the COVID-19 patient were diagnosed with COVID-19 after the event,

			Sample: 128 individuals who attended a religious service and boarded one of two buses, in Ningbo China	while none of the 60 people on the other bus were infected. During this religious event, 7 of 172 individuals (4.1%) were later diagnosed with COVID-19. This research concludes that airborne transmission is very likely to cause very high infection rates in the affected buses, and prevention and control efforts must consider the potential for airborne transmission.
8	Investigating the COVID-19-related behaviors in the public transport system (Aghdam et al., 2021)	Iran	**Design:** Quantitative method with survey. **Sample:** 365 passengers on the public transportation system in Iran during the COVID-19 pandemic	Based on the results of an analytical study, the majority of public transportation passengers in Iran have complied with behaviors related to COVID-19 such as wearing masks and maintaining physical distance from other people. However, there are still several behaviors that have not been followed, such as using hand sanitizer and avoiding touching surfaces. The study also showed that education level and age were significant predictors of COVID-19-related behavior on public transportation. Therefore, public health campaigns and educational programs are needed to increase compliance with recommended behavior in public transportation systems to help prevent the spread of COVID-19.
9	Limiting the spread of COVID-19 in Ghana: Compliance audit of selected transportation stations in the Greater Accra region of Ghana (Bonful et al., 2020)	Ghana	**Design:** Quantitative method survey **Sample:** 100 public transportation, 50 bus terminals, and 50 train stations	Of the 100 stations inspected, only around 13% of bus stations and 5% of train stations had adequate hand-washing facilities. More than 80% of stations also do not provide printed guidance in the form of posters to educate people about proper hand hygiene. These findings suggest that compliance with proper hand washing at transport stations in Ghana remains inadequate to control the spread of COVID-19. Therefore, it is important to increase access to handwashing facilities and educate the public about the importance of proper hand hygiene in public transport environments.

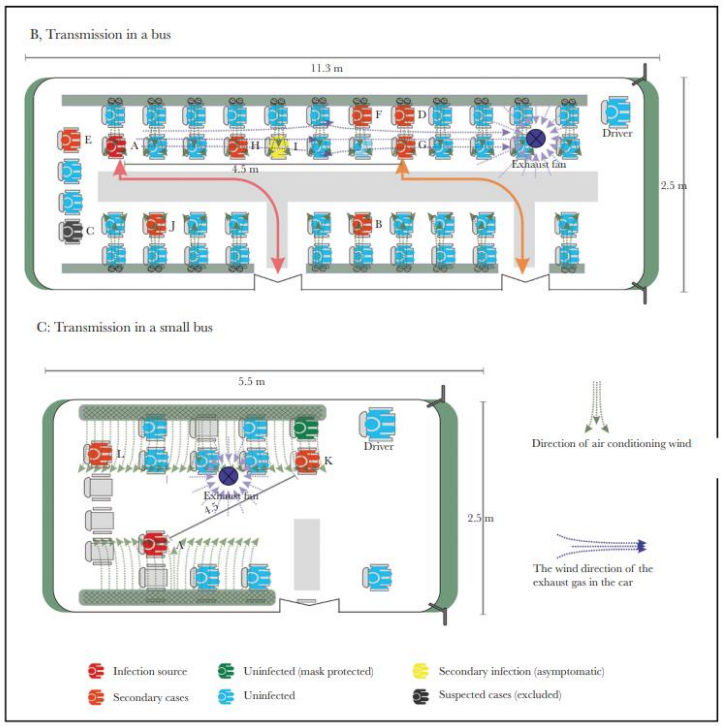
The COVID-19 pandemic has had a significant impact on public transportation, which is a place with a high risk of spreading the virus. Several countries have implemented strategies to minimize the spread of COVID-19 on public transportation. In this literature review, the focus is on the effectiveness of physical distancing, mask use, and hand hygiene as public transportation strategies to respond to COVID-19.

The Emergence of Physical Distancing & Ventilation

The concept of maintaining physical distance (physical distancing) has emerged as one of the most widely implemented non-pharmaceutical measures to prevent the spread of COVID-19. The World Health Organization (WHO) recommends maintaining a minimum distance of one meter from other people (WHO, 2020), while other health organizations recommend a physical distance of two meters to reduce the risk of transmitting COVID-19 (CDC, 2020).

(Park & Kim, 2022), research conducted in Korea shows that implementing public transportation policies that focus on physical distancing is very important in reducing the spread of COVID-19 in public transportation, especially in densely populated areas. Transmission via droplets is usually limited to a distance of 2 meters; Respiratory infections such as COVID-19 are transmitted through droplets (5 to 10 μm) and aerosols (less than 5 μm), which are expelled from infected individuals when breathing, talking, coughing, and sneezing. Shen Y et al. (2020) reported that transmission in indoor environments can occur at a distance of more than two meters due to airborne transmission.

(Luo et al., 2020) on passengers and public transportation staff who were infected with COVID-19 during travel in Hunan, China in January 2020, research results showed that there was effective transmission of the SARS-CoV-2 virus in crowded and closed environments such as on public vehicles. According to WHO, the main route of transmission of COVID-19 is through respiratory droplets or direct contact with objects contaminated with the virus.



Source: Lou et al. (2020)

The tour bus is 11.3 meters long and 2.5 meters wide with 49 seats, fully occupied with all windows closed and the ventilation system turned on for the 2.5-hour journey. Of the 49 passengers (including the driver) who shared the ride with Patient A (Figure B), 8 of them tested positive. The exposure risk rate among passengers was 16.3% (8/49). Attack rates were significantly higher among those sitting within 3 rows of Patient A (66.7%) compared with those sitting further away (3.1%) ($p < 0.001$). The closest transmitter was Patient E (with onset 4 days later), who sat directly behind Patient A, about 1 m away. The farthest transmitters were Patient D and Patient G, who sat 7 rows away (~4.5 m). During the journey, Patient A continued his journey by minibus (Figure C), 2 (Patients K and L) of the 12 passengers (including the driver) were diagnosed with COVID-19. The results of this research indicate that apart from

physical distancing, the ventilation system in the bus is thought to be a contributing factor in the spread of the virus. Air conditioning units are set to recycle air inside the bus, which can facilitate the spread of respiratory droplets containing the virus (Luo et al., 2020).

Advice on safe distances on public transport varies between 1 and 2 meters. The greater the distance, the greater the impact on the effective capacity of the vehicle. In the image below, with a safe distance of 1-2 meters, public transport capacity can be reduced by up to 75%. In other words, to serve the same passenger demand as before the pandemic, the required capacity would have to increase fourfold, which would be a financial challenge for public transport operators. Another thing that needs to be considered is implementing improved ventilation systems to reduce the risk of spread through the air. (Guerrieri & Parla, 2022), propose that every public transportation needs a tool or system to measure in real-time the physical distance between passengers, detect passengers with face masks, and provide useful information for transportation operators to optimize bus capacity.

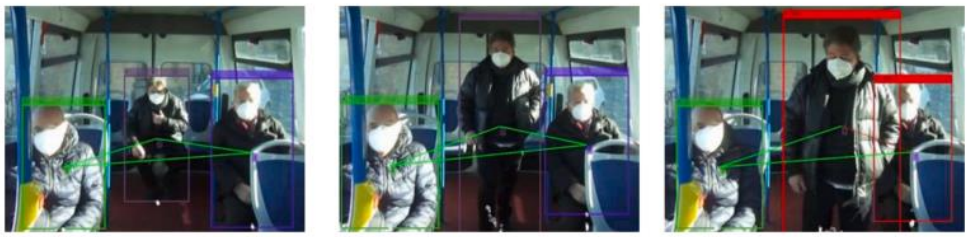


Fig. 18. Detection of users inside a vehicle of the PTS and social distance measurement.

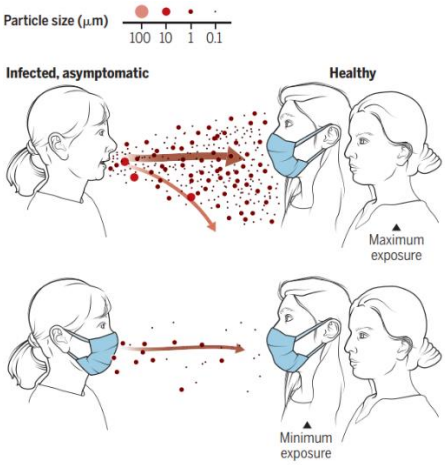
Fig. 19. Detection of users' face masks (FFP2 type) inside a vehicle of the PTS and social distance measurement.

Source: Guerrieri & Parla (2022)

Mask-Wearing

The use of masks has been recommended by health organizations as an effective measure to prevent the spread of COVID-19. The use of face masks can reduce the risk of spreading COVID-19 by 65%, and even homemade masks can be effective in reducing the spread of the virus (Eikenberry et al., 2020). The results of research conducted by (Shen et al., 2020) showed that individuals who rode a bus with COVID-19 patients to a religious event in Zhejiang Province, China, had a higher risk of being infected with the SARS-CoV-2 virus compared to individuals who rode another bus to the same event. In this study, 24 of 68 people (35.3%) on the same bus as the COVID-19 patient were diagnosed with COVID-19 after the event, while none of the 60 people on the other bus were infected. During this religious event, 7 of 172 individuals (4.1%) were later diagnosed with COVID-19. This research concludes that airborne transmission is very likely to cause very high infection rates in the affected buses, and prevention and control efforts must consider the potential for airborne transmission. This shows

the importance of using masks for public transport passengers. Wearing a mask significantly reduces airborne transmission, especially in enclosed spaces (Prather et al., 2020).



(Dzisi & Dei, 2020) a study conducted in Ghana regarding the high number of COVID cases in that country, the results showed that compliance with guidelines for using masks was only 12.6%, while compliance with physical distancing in vehicles was quite good, reaching 98.0%. The graph shows the results of daily observations regarding passenger compliance with wearing masks in public transportation, only ranging from 8.6% - to 18.9%.

Source: (Dzisi & Dei, 2020)

These results show public transportation remains a high-risk area in the fight against COVID-19. Another interesting observation is that although the guidelines state that commercial vehicle drivers and guards should wear masks, more drivers wear masks compared to guards/guards. Calling tasks, which include calling routes to attract passengers' attention, may be difficult to perform with a mask because their voices can be muffled by the mask. However, this raises concerns in the management of COVID-19, because guards/handlers, in their interactions with passengers, could unintentionally become agents of the spread of COVID-19 if they are infected (Dzisi & Dei, 2020)

Table 2
Frequency of touching mask, covered and uncovered area of the face, hair (head), and glasses.

Touched area		
Mask	**External face, n (%)**	87 (47)
	Frequency/h	15 [7.5;30]
Covered area	**(mouth/nose), n (%)**	22 (12.1)
	Frequency/h	10 [16;15]
Uncovered area	**Total, n (%)**	74 (40.6)
	Frequency/h	12 [6.7;20]
Hair (head)	**Total, n (%)**	23 (12.3)
	Frequency/h	15.0 [7.1;23.3]
Glasses (n = 52)	**Total, n (%)**	9 (17.3)
	Frequency/h	7.5 [6.6;15]

Source: (Guellich et al., 2021)

(Guellich et al., 2021) research on 182 public transportation users in Paris. The results of this study indicate that the use of face masks is not optimal for the general public. During that period, 87 (47%) passengers had touched their masks with a high frequency of up to 15 times per hour, 74 (40.6%) had touched the uncovered area of their face at least once, 22 people (12%) had put their hands under the mask and touched the covered part of the face, as many as 23 people (12%) had touched their hair. Another observation result is that hand washing is very rarely done after touching the mask. Therefore, further efforts need to be made to increase passenger compliance regarding the correct use of face masks. (Guellich et al., 2021) recommend providing education and strict supervision for public transportation users to comply with the correct way to use face masks and to always wash their hands after touching the mask, through educational posters, social media or periodically reminding them via audio messages on public transportation. This is necessary because the use of face masks, enhanced cleaning and disinfection, and public awareness campaigns, are some of the measures considered effective in preventing the spread of COVID-19 on public transportation in China and allowing the country to gradually restore public transportation services (Shen et al., 2020). Studies have shown that mandatory mask policies are associated with a reduced risk of COVID-19 morbidity and reduce the risk of infection by 85% (Aghdam et al., 2021). The use of masks is effective because aerosols can collect and remain infectious in indoor air for hours (Prather et al., 2020).

Hand Hygiene & Sanitization

The level of transmission of COVID-19 in public transportation is very worrying, especially when there are passengers who do not follow the established health protocols. WHO recommends that individuals wash their hands regularly with soap and water or use an alcohol-based hand sanitizer (WHO, 2020). Research conducted by (Aghdam et al., 2021)on 365 passengers on the public transportation system in Iran during the COVID-19 pandemic, the results showed that the majority of public transportation passengers in Iran had complied with COVID-19-related behaviors such as wearing masks and maintaining physical distance from people. other. However, there are still several behaviors that have not been followed, such as using hand sanitizer and avoiding touching surfaces. The study also showed that education level and age were significant predictors of COVID-19-related behavior on public transportation. Therefore, public health campaigns and educational programs are needed to

increase compliance with recommended behavior in public transportation systems to help prevent the spread of COVID-19.

(Bonful et al., 2020), conducted research on public transport facilities in Ghana. The research results show that 38 stations have hand washing facilities, of which 5.3% of the stations (n = 2) are never used, almost all of the facilities are used rarely, namely 87.4% (n = 34) and only in 5.3 % (n = 2) handwashing stations are used frequently.

Table 4. Utilisation of handwashing facilities at public transportation stations in the Greater Accra Region.

Observation item	Frequency	Percent
Use of handwashing facilities (n = 38)		
Not used	2	5.3
Infrequently used	34	87.4
Frequently used	2	5.3
Used soap when washing hands (n = 36)	30	83.3
Use of alcohol-based hand sanitizer when boarding/un-boarding buses/cars (n = 44)	3	6.8

https://doi.org/10.1371/journal.pone.0238971.t004

Source: (Bonful et al., 2020)

(Bonful et al., 2020) also explained that around 82% of these stations do not provide printed guides in the form of posters to educate people about proper hand hygiene. This study shows that compliance with hand washing is insufficient to limit the spread of COVID-19. These are basic and cost-effective measures that can make public transport a safer and cheaper mode of transport for a large portion of the population who can rely solely on this option. Checking compliance with hand washing is also not very expensive so developing countries can also use this modality to limit the spread of COVID-19. It is important to provide safe mobility today and start planning for sustainable mobility tomorrow, learning from the experiences gained from the pandemic, including how working remotely can replace daily commuting and how the distribution of essential services across cities can facilitate access.

CONCLUSION

Based on the results of the literature review, it is concluded that transportation operators must prioritize worker safety by providing personal protective equipment (PPE) for all crew involved in public transportation services, physical distancing policies between passengers in the vehicle, good ventilation, use of masks and hand hygiene must be implemented. strictly. Another solution is to provide non-cash payments which should also be considered to reduce physical contact between passengers and transportation officers. Operators must also establish regular disinfection procedures for all public transport vehicles. The government and public transportation operators must consistently prepare supporting facilities and provide education to increase user compliance regarding physical distancing, using masks, and hand hygiene. Through posters, social media, and regular appeals in public transportation areas, users are increasingly aware of the risk of transmitting COVID-19. In implementing strategies for public transportation in response to COVID-19, cooperation is needed between the government, transportation operators, and the community.

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