

Uncertain Supply Chain Management

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Optimizing health protocol compliance through supply chain management in Surabaya's COVID-19 response

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ABSTRACT

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This study examines the impact of social and economic factors on community adherence to COVID-19 health protocols in Surabaya, Indonesia, through a supply chain management perspective. It applies the five-component supply chain model encompassing supply chain policies, governance structures, consumer attitudes, process efficiency, and the integration of culture/technology. The primary data is derived from a survey of 119 participants, supplemented by secondary data on national health protocols and local COVID-19 cases. The analysis reveals critical gaps in compliance with health protocols, particularly regarding mask usage, social distancing, and avoiding crowded spaces. Specifically, only 17.6% of religious adherents follow these protocols, while 82.3% do not. In traditional markets, compliance stands at 19.2%, while 80.8% of participants ignore the guidelines. Among the youth, only 12.4% adhere to the protocols, with 87.6% disregarding them. The study highlights the need to improve the supply chain of public health interventions, from awareness campaigns (demand generation) to efficient delivery systems (process optimization) and monitoring mechanisms (evaluation and feedback loops). Emphasizing a supply chain approach, the findings suggest that strengthening the upstream (policy and governance), midstream (public behavior and attitudes), and downstream (cultural and technological adaptations) components can enhance compliance rates and reduce COVID-19 transmission. The study concludes with actionable recommendations, such as increasing public health awareness, strengthening governance frameworks, targeting interventions for vulnerable groups, and fostering multi-stakeholder partnerships to create a resilient health compliance supply chain in Surabaya, Indonesia.

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1. Introduction

The health protocol (HP) is one of the priority efforts to suppress the spread of COVID-19. HP (Nofita Fachryandini et al., 2022; Parvaie & Osmani, 2022a) refers to the measures and guidelines put in place to control the spread of the virus and protect public health (Byomuhangi et al., 2021). This includes measures such as physical distancing, wearing masks, and

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routine testing and tracing. This condition was marked by the COVID-19 (Susilawati et al., 2020) pandemic sweeping the world, and people around the world were faced with big challenges. People must follow the HPs issued by the government, which bring about major changes to the way people live and operate. COVID-19 in Indonesia is known to have occurred for the first time in March 2020 which spiked the following month and was almost evenly distributed throughout Indonesia with a wave of COVID-19 victims (PSBB, 2020). Since the first case was reported, Indonesia has tried to suppress the spread of COVID-19. Efforts are made in the form of detection of modes of transmission, populations most at risk, clinical disease spectrum, and the most effective ways to detect, interrupt, and prevent transmission from human to human. Epidemiological (Aassve et al., 2021) evidence shows that COVID-19 is transmitted from one person to another most often through droplets, personal contact, and contaminated objects. To understand the dynamics of compliance within the community, the study population was divided. Our sample distribution included fifty-one participants from traditional markets, forty-two people from coffee shops, and fifteen participants from other places, such as mosques. These segments, consisting of religious groups, traditional market participants, and youth groups, represent different social actors within the community. By studying these specific segments, we aimed to comprehensively analyze adherence patterns among different social groups and assess the influence of social and economic factors on HP adherence. This segmentation approach makes it possible to capture different perspectives and attitudes within society and shed light on the socio-economic dynamics that influence adherence.

Therefore, strategic (Palmieri & Mazzali-Lurati, 2021) preparedness and response plans are carried out in a tiered structure from the central government to the regions. The structure established aims to outline public health (Byomuhangi et al., 2021) measures in national and regional operational plans. Priority considerations have an impact on development stagnation because they are all focused on handling COVID-19 (Purnomo et al., 2021). Priorities are directed at limiting human-to-human transmission, including reducing secondary infections among close contacts and health care workers, preventing the amplification of transmission events; identifying, isolating, and treating patients early, including providing optimal care for infected patients; identifying and reducing transmission from animal sources; tracking clinical severity, transmission and infection rates, treatment options, and accelerating the development of diagnostics, therapies, and vaccines; actively communicate critical risk and event information to all communities, and combat misinformation; save the social and economic impacts (Tang & Li, 2021). The main driver of the positive and negative dynamics observed in the population's behavior toward COVID-19 is the social and economic (SE) domain (Parvaie & Osmani, 2022b). Resilience refers to the ability of individuals, communities, and systems to adapt and recover from adversity. In the context of COVID-19, communities need to have the capacity to respond to and recover from the impact of the pandemic. Understanding of these efforts is then described with HPs. Although they can protect against the spread of the virus, HPs can also cause inconvenience and economic loss. SE factors, such as income levels, access to health care, and job security, have also been badly affected by the pandemic, with many people facing financial difficulties and increased stress. The technical practice of how to limit mobilization and transmission through HPs is community compliance in responding to COVID-19 which is suspected to have occurred in differentiation and heterogeneity due to social-economic interaction and contraction of the community (Prasetyo, Putri Harwijayanti, et al., 2022a).

However, public compliance with HPs in handling COVID-19 in Indonesia has so far been based on a response strategy (Prasetyo, Wahyudianto, et al., 2022). The response strategy developed uses several planning assumptions, due to the uncertainty of the level of the outbreak, the transmission of the virus, and the clinical spectrum of the disease (Oh & Song, 2021). Planning needs to be updated on an ongoing basis due to limited knowledge (Nur Khasanah et al., 2022) about COVID-19 based on agitation nodes. The community has begun to show signs of agitation against the implemented HPs. Most members of the public highlighted the strictness of the measures in place, especially in efforts to limit freedom of movement. Some also criticize that HPs are not comprehensive enough and suggest that policymakers include a broader goal of paying attention to SE resilience (Atalan-Helicke & Abiral, 2021). On the other hand, some policymakers are trying to dampen the nodes of agitation, by looking for ways to make HPs more flexible without compromising the protection they provide. Government efforts to increase public understanding of HPs, by disseminating information widely through various media (Schlechter et al., 2021). The nodes of agitation explored in this study are limited to the first, nodes of agitation of policy and regulatory (PR) (Chiu et al., 2021) that arise due to the dynamics of society that varies in response to COVID-19 which is supported by low referrals related to COVID-19. The achievement of the policy mechanism is in the form of regulations that limit functions and take sides. The second agitation node is governance and organization (GO) (Prasetyo et al., 2023) which is the technical foundation in anticipating the spread of COVID-19, the appointment and determination of organizations responsible for the management of COVID-19 both personnel, producers, regional level management secretariats and regional level forums based on the decision of the stakeholders to become an important element in the supply chain for the management of COVID-19. The third node of agitation, people, and behavior (PB) (Raza et al., 2021) within the community's SE boundaries includes dynamic information about the number of victims of COVID-19. Efforts to build knowledge, develop skills, and have access to information to use and interpret; and building organizational capabilities in communicating into agitation against the handling of COVID-19. The fourth node of the agitation is the process and quality (PQ) (Mandt et al., 2022) of resolving cases at hand are closely related to reducing positive victims exposed to COVID-19, including community compliance in implementing HPs. This node of agitation is important to be anticipated on an ongoing basis, it is believed to be able to help people in the organization see the relationship between the process for handling community compliance and the quality of handling as input and output from organizational processes. The fifth agitation node, culture and technology (CT) (Alshaikh et al., 2021), is affiliated with commitments to accountability, transparency, information, and sustainability

as a culture that is carried out. Culture is faced with how to realize commitments, assign responsibilities along the supply chain for handling COVID-19, reduce obstacles encountered, implement supervision through governance practices, and foster policy-based expected behavior. Meanwhile, it is believed that technology has a role in creating, managing, and analyzing it to become an urgent agitation node (Carrarini et al., 2021).

A study of five agitation nodes—PR, GO, PB, PQ, and CT—in the context of Surabaya, East Java, Indonesia, showed a close link with supply chain management (SCM) during the COVID-19 pandemic. PR helps build public awareness and supports the smooth distribution of health supplies (Amalia et al., 2020), while GO ensures good regulation and governance for logistics efficiency (Yamin, 2021). PB affects demand patterns and compliance with health protocols (Amalia et al., 2020), while PQ ensures product quality and safety during procurement, storage, and distribution (Yusaq Tomo Ardianto & Mokhamad Natsir, 2014). CT supports the application of technology to improve transparency and speed of distribution (Sawik, 2022). The combination of these five nodes provides a framework to strengthen SCM in dealing with the pandemic and maintaining the socio-economic sustainability of the community. The node agitation of PR; GO; PB; PQ; and CT, is the focus of this study with a population locus in Surabaya, East Java Province, Indonesia, although other agitation nodes still have the potential to emerge. The assumption is that the five agitations summarized in this study can contribute to the resolution of COVID-19 and are the findings of this study. Meanwhile, the demographic position of Surabaya, aside from being the provincial capital, has a diverse and heterogeneous character socially and economically, which is the consideration of this study. It is assumed that the locus can provide a reference for other regions in East Java Province and/or other regions in Indonesia in handling COVID-19 through the arguments of the agitation nodes that are focused on in this study. The five agitation node components studied are PR; GO; PB; PQ; and CT. This study aims to shed light on how socioeconomic factors influence public compliance with health protocols during the COVID-19 pandemic. By understanding these dynamics and their implications for socio-economic resilience, we can develop informed strategies to bolster compliance efforts and mitigate the socio-economic impact of the pandemic. A qualitative (Zlaugotne et al., 2022) descriptive approach will provide an overview of the perceptions, experiences, and attitudes of individuals and communities toward implementing HPs. The combination of in-depth interviews and observations allowed for a comprehensive exploration of the perceptions, experiences, and attitudes regarding the implementation of HPs, contributing to a deeper understanding of the socio-economic dynamics influencing compliance within the community.

2. Method

The approach in the research method uses a qualitative description (John W. Creswell & J. David Creswell, 2018), with a locus in Surabaya, East Java Province, Indonesia. Strengthening the arguments of the five agitation nodes in this study is complemented by samples as the primary data source. The sample size of 119 was based on practical considerations, aiming to capture a variety of perspectives within the resources and timeframe. A purposive sampling technique was used to select participants. This focused on specific social actors such as religious groups, traditional market actors, and youth groups. These strata were selected to understand the dynamics of compliance within different segments of the community and their relevance to the socio-economic resilience of the community. Through this approach, the study aimed to contribute to a comprehensive understanding of socio-economic resilience during the COVID-19 pandemic by providing insights into the perceptions, experiences, and attitudes of these different social groups towards health protocols. Meanwhile, social strata in economic resilience are assumed to be established, surviving, and dependent groups. The assumption of normality uses the One-Sample Kolmogorov-Smirnov Test with $\alpha=5\%$, while the assumption of homogeneity uses Levene's Test of Equality of Error Variances with $\alpha=5\%$. The Mann-Whitney Difference Test with $\alpha=5\%$ is used in the comparison of the three traditional market locations, cafes, and other places. Observations were carried out for seven days with a questionnaire in April 2020, focusing on the substance of public compliance with HPs in the form of wearing masks and keeping their distance. Non-participant observation involves observing the behavior and actions of individuals without actively participating or engaging with them. Secondary data sources come from official local government publications regarding the implementation of HPs in the form of dynamic data on victims positively exposed to COVID-19 from 17 March 2020 to 21 July 2020 or for nineteen weeks. To complement the argument against the implementation of the HP, national, district, and city reports in Indonesia are also presented based on conditions for using masks, conditions for keeping their distance, and staying away from crowds from October 2020 to March 2022. The analysis is based on the five components of agitation nodes, including agitation PR; GO; PB; PQ; and CT. The five components of the agitation node are formulated with integrated visualization to clarify the analysis.

3. Results

In the publication from the Central City Statistics Agency, it is stated that Surabaya City is located between $07^{\circ} 9'$ and $07^{\circ} 21'$ South Latitudes and between $112^{\circ} 36'$ and $112^{\circ} 54'$ East Longitudes. Most of the regions are lowland, which is around three - six meters above sea level. Except in the southern region, the elevation is up to twenty-five - fifty meters above sea level. Region boundaries, The North and East parts are bounded by Madura Bay, the South part is bounded by Sidoarjo Regency, West part is bounded by Gresik Regency. The area of Surabaya City is about $326,36 \text{ Km}^2$ and is divided into thirty-one Districts and 154 Villages, until the end of 2020. The subdistrict with the most extensive area is Benowo district, which is around 23.73 km^2 as stated in the publication from the Central Bureau of Statistics for the City of Surabaya. The smallest is Simokerto district with an area of 2.59 km^2 . Surabaya City's population based on population registration for 2020 was 2.97

million people. Surabaya City has a population growth rate of -0.06 percent in 2020. Meanwhile, the sex ratio of Surabaya Municipality in 2019 was 98,48, this figure can be interpreted that in 100 female population, there is a ninety-eight to ninety-nine male population. The population density in Surabaya City in 2020 reached 9,090 people/km². The highest population density is in the Gubeng district which is 28,224 people/km² and the lowest density in the Benowo district is 2,436 people/km². The population of Tambaksari district was the largest, namely 225,507 people and then followed by Sawahan district and Semampir district, those were 201,743 people and 183,158 people. Availability of adequate facilities and health services was needed to improve public health and nutrition. In 2019, the number of hospitals in all districts of Surabaya City was fifty-nine. Other than that, there were sixty-three public health services, 2,776 integrated healthcare posts, and 343 clinics. To meet the needs of public health services, in 2019 there were 424 doctors, 396 nurses, and 507 midwives. The number of places of worship in Surabaya Municipality in 2019 is 1,739 mosques; 1,927 musholas; 758 Protestant churches; seventeen Catholic churches; ten Hindu temples; and forty-two Budha temples as stated in the publication from the Central Bureau of Statistics for the City of Surabaya.

Next to the COVID-19 pandemic, demography (Hernández-Vásquez et al., 2021) plays an important role in understanding how this virus is affecting different groups of the population and how they are adapting to the situation. Heterogeneous and dynamic interactions (Prasetyo, Putri Harwijayanti, et al., 2022b) between residents make the Covid-19 virus have the potential to spread quickly and complicate prevention efforts. The desire to meet daily needs and social activities makes some people less able to follow HPs and limits social interactions. The government has an important role to play in overcoming this pandemic by carrying out various interventions (Zheng et al., 2020), such as large-scale social restrictions and providing health education and information to the public. However, the COVID-19 virus has a fast spread speed and makes prevention efforts less effective. There is a need to adopt new measures and tighten HPs to help contain the spread of the virus.

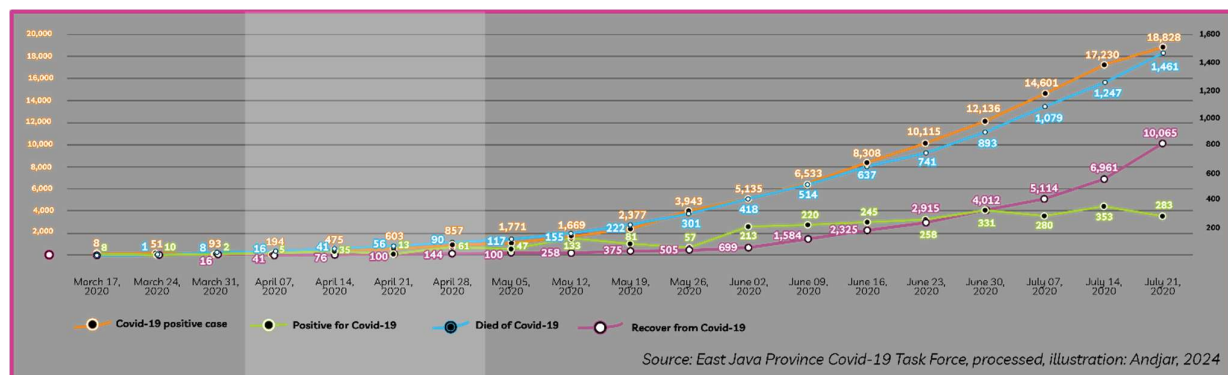


Fig. 1. Positive victims exposed died, and recovered from Covid-19 in the city of Surabaya from March 17 2020-July 21 2022; a day to observe public compliance with HPs

Observation days were carried out for seven days (Fig. 1) at three sample locations. The data found in this study shows that the implementation of HPs is still not effective. The assumption of these three locations is based on the condition that the three locations describe the highest SE activities carried out by the community. From the three sample locations, only around 17.6% of community leaders, 17.6% of religious peoples, and 19.2% of traditional market players complied with the established HPs. Meanwhile, 82.3% of community leaders, 82.3% of religious peoples, and 80.8% of traditional market players violated HP. The social group that violates HPs the most is young people, with 87.6% of this group not complying with HPs. This portrait shows that there are still deficiencies in implementing HPs and further action is needed to increase public awareness and involvement in implementing HPs. This action is very important to help break the chain of transmission (Guo et al., 2022) of the virus and reduce the risk of contracting Covid-19.

COVID-19 victims have a pattern that is directly proportional between being positively exposed to COVID-19, victims recovering, and victims dying, even though the quantity is different. This means that the more people who are exposed to the virus, the greater the number of victims that occur. However, the data also shows an increase in the coverage of victims recovering from March 2020 to July 2020. The coverage of victims recovering from COVID-19 has begun to look significant, occurring since June 2020 (figure 1). Figure 1 shows that there is an increasing trend in the number of victims recovering over time. This proves that the prevention and treatment efforts undertaken by the government and the medical community have yielded positive results in overcoming the Covid-19 pandemic. In the period from March 2020 to July 2020, there were an average of 5,491 positive cases of exposure to COVID-19, then the average number of positive exposures every day was 139 victims, while the average death toll was 421 people and the average number of victims recovered was 1,862 peoples. Nonetheless, the death toll is still quite high and requires further action to reduce the number of victims that occur. This shows that the Covid-19 pandemic is still a serious threat to society and requires a collective effort from all parties to overcome it.

Furthermore, the national scope to strengthen the low implementation of the HP is shown from the results of the report on the COVID-19 National Task Force. HP reports focused on wearing masks, keeping distance, and staying away from crowds, reported periodically for eighteen months from October 2020 to March 2022. In April 2022 the publication of the National Task Force for Covid-19 was no longer available. This shows that there are still many people who do not comply with the HP issued to fight COVID-19. The continuation of the COVID-19 pandemic requires active support and participation from the community to implement the established HPs. Without community support, tackling the pandemic will be difficult and take longer to overcome.

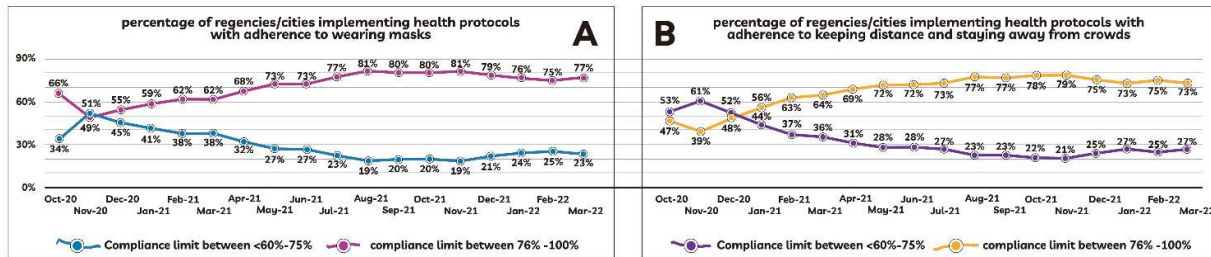


Fig. 2. Percentage of District/City Compliance with the COVID-19 HP in Indonesia during October 2020-March 2022.

Several City Regencies throughout Indonesia report once a week to the Republic of Indonesia's COVID-19 Handling Task Force. The publication of the COVID-19 Handling Task Force describes that reporting began on 27 September 2020 for seventy-eight weeks until 20 March 2022. Not all districts/cities in Indonesia carry out their reporting in an orderly and routine manner (Fig. 2). The mode results show a value of 498 regencies/cities in Indonesia, recorded as having implemented it regularly since the reporting date of compliance with wearing masks, maintaining distance, and staying away from crowds. However, for an average of seventy-eight weeks, as many as 370 districts/cities in Indonesia report regularly once a week. Even though referring to the Decree of the Minister of Home Affairs of the Republic of Indonesia number 050-145/2022, in detail the number of government and island administrative areas throughout Indonesia is 514 regencies and cities, 7,266 sub-districts; 8,506 sub-districts; 74,961 villages; and 16,772 islands. While Indonesia's land area is 1,892,555.47 km², with a population of in Semester I of 2021 of 272,229,372 peoples. This quantity explains that not all districts/cities in Indonesia have reported the HPs that must be implemented, at least three percent do not know how the HPs are implemented. This means that even though there are several regencies/cities in Indonesia that report routinely on the implementation of HPs such as wearing masks, keeping a distance, and staying away from crowds, there are still several regencies/cities that have not reported or reported on an irregular basis. This shows that the implementation of the HP has not been carried out properly and evenly in all regions of Indonesia. Indonesia's large area and population are also factors that affect the implementation of an even distribution of HPs. However, this needs to be addressed immediately so that people can be protected from viruses and the pandemic can be controlled immediately.

Implementation of HPs for wearing masks is indeed one of the most important things in overcoming the COVID-19 pandemic. Based on the results of the analysis of the data provided, public compliance with wearing masks is still unstable, with an average violation rate of 29% (figure 2.A.). There were significant fluctuations in violations, in November 2020, the highest violations reached 51% in 263 districts/cities, but in November 2022, the lowest violations were only 19% or ninety-six districts/cities (figure 2.B.). This shows that it takes a year to achieve better performance and requires agitation in several important aspects, such as PR, GO, PB, PQ, and CT. Communities also need to have a better understanding of the importance of health protocols and how to implement them, because low understanding is one of the reasons for low levels of adherence. The population survey in the city of Surabaya and national reporting also show dynamic agitation that occurs due to a low understanding of and linkage with several important aspects of implementing health protocols. Therefore, the government and the community need to work together and increase awareness and understanding of the importance of health protocols.

4. Discussion

Agitation is a term used to describe a situation or condition that has a high level of tension, anxiety, and a feeling of uneasiness. In the context of health, agitation can refer to factors that influence health protocols, such as PR, GO, PB, PQ, and CT. In SE terms, agitation can affect factors such as the accessibility, efficiency, and security of the health system (Saigi-Rubió et al., 2021). Agitation is a term used to describe actions or activities that motivate or show concern for a problem or issue. In this case, agitation can be in the form of actions that show concern or motivation to improve the situation or fix an existing problem. This term is often used in social, political, economic, and other contexts, and can refer to actions taken by individuals, groups, or organizations (Prasetyo, Putri Harwijayanti, et al., 2022b) to fight for certain rights or interests. Meanwhile, the SE condition of the community refers to the level of social and economic capabilities of a community group. This includes the level of income, level of education, level of welfare, level of openness to technology, level of social mobility, and other factors that affect the level of people's quality of life (Sharma & Abhay, 2022). SE conditions of the community also affect access to health services and other resources needed to maintain health and well-being.

The stage implementing understanding of the five components of agitation has a mechanism that should be fulfilled, at least consisting of 1) Identification (H. Chen et al., 2020) of problems and goals in implementing HPs is the initial stage in implementing an understanding of the five components of agitation. The identification process related to the agitation of the five components in the HP is how these five components affect implementation and can be used to strengthen HPs to ensure that HPs are implemented effectively and appropriately; 2) An analysis (Loewe et al., 2021) of the five components of agitation is carried out to determine how each agitation affects the implementation of HPs and how this agitation can function synergistically and mutually support one another; whether the five-component agitation is effective in ensuring proper and consistent implementation of HPs, and whether it needs to be improved or implemented better. Are there any obstacles in PB and attitudes that impede the implementation of the HP, and how can PB and attitudes be changed or implemented better to ensure proper and consistent implementation of the HP; 3) Determination (Habiburrahman et al., 2022) of priorities: After the five-component agitation analysis has been completed, the next step is to determine priorities in implementing the HP based on the five-component agitation analysis that was carried out. However, no one factor is more priority than the others in the HP because each factor has an important role in determining the success of implementing the HP. PR agitation ensures that HPs have a strong legal basis and meet high-quality standards. GO ensures that health protocols are implemented efficiently and effectively. PB ensures that individuals understand and comply with HPs and that individual behavior is aligned with HPs. PQ ensures that health protocols are implemented with high-quality standards and through the right process. CT ensures that health protocols utilize the latest technology and implement a positive health culture. Therefore, it is important to pay attention to all these factors and strike the right balance between them in implementing health protocols; 4) Planning and implementation (Roman & Fellnhofer, 2022) are carried out to achieve goals in implementing health protocols and to ensure that health protocols are implemented effectively and appropriately. Actions that need to be taken to overcome problems, such as introducing changes in policies and regulations, improving GO, strengthening CT, determining whether the agitation has succeeded in solving problems, and improving conditions in HPs linked to the social, and economic public. 5) Evaluation and monitoring (Prasetyo & Muh Sofyan Budiarto, 2021) is carried out to ensure that the health protocol is implemented by the objectives and to make improvements if necessary. Important aspects of this discussion include at least the process of identifying the goals and objectives of the agitation of the five components related to health protocols; determining the indicators used to measure the performance and results of the five-component agitation; collecting data and information related to the implementation of agitation; perform an analysis of the data and information collected; report evaluation and monitoring results to interested parties; follow up on the results of the evaluation by making improvement plans and corrective actions, if necessary; conduct periodic and continuous monitoring to ensure the implementation of the agitation goes according to plan. These steps must be carried out continuously and pay attention to social (Doi et al., 2021), economic (Padula et al., 2021), and community developments (Atalan-Helicke & Abiral, 2021) and dynamics to ensure that the agitation carried out has a positive impact on health and community protocols.

PR agitation can affect the implementation of health protocols by providing support or constraints for the implementation of these protocols. How PR agitation can affect health protocols is indicated by the existence of 1) Financial (Zhong et al., 2021) support from the government for the implementation of health protocols, such as financing vaccinations, buying health equipment, and rewards for health workers; 2) The government (Padeiro et al., 2021) can issue regulations regarding the use of masks, such as the obligation to wear masks in certain areas or certain situations; 3) The government can issue crowd limits regulations to limit social interaction (Prasetyo, Putri Harwijayanti, et al., 2022b) and prevent the spread of the virus; 4) The government can issue sanctions (Foley & Gurakar, 2022) for individuals or businesses that do not comply with HPs, such as fines or even closing businesses. This will help ensure that health protocols are followed and prevent the spread of the virus. The series of PR already exist and are tiered according to the government structure in Indonesia. However, it is important to pay attention to the measurable aspects of PR agitation in HPs and their relationship (Sundgren, 2022) with the SE community both in terms of the form of regulations implemented by the government and the authorities; changes that have occurred in society after the implementation of the HP and can be seen from the unemployment rate, income, and access to health services; the level of community involvement and awareness in implementing HPs, such as wearing masks, maintaining social distance, and washing hands; and the availability of resources such as health facilities, medicines, and medical personnel needed to implement HPs (Nofita Fachryandini et al., 2022; Parvaie & Osmani, 2022b).

GO can influence the implementation of health protocols by providing structure and direction for protocol implementation. How can goal agitation affect health protocols, at least marked by the existence of an organizational structure in good governance will provide a clear organizational structure, define individual tasks and responsibilities, and ensure that health protocols are implemented effectively; strong and consistent leadership can help ensure that HPs are followed and motivate individuals to adhere to them; good governance will include a monitoring and evaluation system to ensure that HPs are implemented effectively and make improvements where necessary; good governance will also ensure effective coordination and cooperation between various internal and external (Prasetyo, Putri Harwijayanti, et al., 2022b) sections/structures to ensure that health protocols are implemented synergistically, properly and effectively, helping overcome obstacles and ensuring optimal results for public health (Ira Dewi Ramadhani et al., 2022). This condition in practice has been carried out relatively based on the characteristics of each region, but the measurements used have not been demonstrated. Therefore, measures are needed to ensure similarities between regions in governance agitation and organizations that affect the SE community. This measure can be carried out by 1) Organizational structure (Klessova et al., 2020) that manages and leads the implementation of health protocols; 2) Transparency and accountability that communicate and take responsibility for the actions and policies taken in implementing HPs; 3) Management capability in managing resources and ensuring availability

and conformity in the implementation of HPs; 4) Community participation that is involved and accommodates the needs and expectations (Lepik & Krigul, 2021) of the community in implementing HPs; 5) assurance of information and data (Lee et al., 2021) security related to the implementation of HPs; 6) assurance of service quality (Wijesiri & Usgodaarachchi, 2022) in the implementation of HPs.

PB can affect the implementation of HPs, because they have a role as objects and subjects, by ensuring that HPs are complied with and implemented effectively. This condition can be characterized by active participation in complying with HPs and healthy behavior can help prevent the spread of the virus and ensure that HPs are implemented effectively; residents care and are aware of and comply with the importance of HPs, and are an example for others; having sufficient knowledge and information about HPs will better understand and comply with these protocols; and culture and social norms can influence people's behavior and ensure that HPs are followed. The population character of the sample results at this locus is still relatively low in response to HPs. This happens because of community participation, healthy living behavior, adoption of health technology, attitudes towards HPs, and level of awareness in determining public understanding and sufficient information to make the right decisions (Eratne & Malkanthie, 2022). Therefore, in the argumentation of this study, indicators are described that can be used to increase the population's understanding of health protocols that are linked to the SE aspects of society, including 1) Adoption (Marhaeni et al., 2023) of the level of acceptance and use of healthy living behaviors recommended by HPs; 2) Community participation in health programs, such as vaccination programs or early disease detection programs; 3) Public health literacy and their understanding of HPs; 4) Attitudes towards health protocols, including their level of adherence to the protocols; 5) SE factors such as income, education, and accessibility of health services influence the behavior and adoption of health protocols by the community.

PQ can affect the implementation of HPs by ensuring that health protocols are implemented effectively, and the results meet quality standards. This condition is at least marked by a good implementation process that will ensure that health protocols are implemented effectively and the results meet quality standards; Clear and consistent operational standards can help ensure that HPs are implemented effectively and meet quality standards; An effective monitoring and evaluation system can ensure that health protocols are implemented effectively and make improvements where necessary; and good service quality (Wijesiri & Usgodaarachchi, 2022) will ensure that HPs are implemented effectively and meet quality standards. Indicators that can be used in process agitation and quality in HPs that are linked to SE society, are argued in this study 1) Efficiency (W. Chen et al., 2019) and effectiveness (Rahman et al., 2021) of health processes based on the time and costs needed to complete a health process, such as health checks, treatment, and other; 2) Quality of health services based on service quality scales, such as patient satisfaction (Specchia et al., 2021) scale, level of competence of health workers, and others; 3) Accessibility of health services based on distance and time needed by the community to access health services (Ironbar et al., 2021); 4) Standard procedures and quality certification are shown by the existence of standard procedures and quality certifications applied in health services; and 5) Capability of health technology (Ghaleb et al., 2021) and infrastructure as indicated by the level of technological capability and existing infrastructure in health services (Ozaydin et al., 2020), such as whether or not adequate medical equipment and health facilities (Ige & Cele, 2021) are available.

CT can affect the implementation of HPs by helping to ensure that HPs are implemented effectively and facilitating access to information and implementation of protocols, at least marked by a culture that supports health will help ensure that HPs are complied with and implemented effectively; information technology, such as applications and websites, can help ensure that information about HPs can be accessed easily and increase public participation in implementing HPs; medical technology, such as temperature gauges and hand sanitizers, can help ensure that HPs are implemented effectively; and new technological innovations can help ensure that HPs are implemented effectively and facilitate access to information and implementation of protocols. In this agitation, the portrait of the implementation of the HP has also appeared relatively, however, there is inequality between regions in Indonesia. Therefore indicators are needed that can equate perceptions in CT that are linked to social, and economic society including 1) Digital literacy (Soroya et al., 2021) level: how much the public has access to and ability to use digital technology to seek health information; 2) Knowledge of health technology (Ghaleb et al., 2021; Kouvonen et al., 2021): how much the public understands existing health technology and how they use it; 3) Adoption (Ironbar et al., 2021; Marhaeni et al., 2023) of health technology: how much peoples use health technology such as health applications, telemedicine, and telemonitoring technology 4) Changes in lifestyle and culture: how much influence does health technology have on people's behavior and lifestyles; and 5) Level of community participation in health technology activities: how active is the community in utilizing health technology in HPs.

In health resource SCM, PR and GO agitation is essential to ensure timely procurement and distribution. PR plays a role in securing adequate financial support, especially in low- and middle-income countries, where systems are often limited (Kaufmann et al., 2011). In addition, the implementation of an efficient regulatory framework is needed to manage logistics, including vaccine cold chains, to remain effective from production to distribution (Fahrni et al., 2022). PB has an impact on demand and consumption patterns, so SCM must be adaptive to changes in health protocols to ensure the availability of services, personal protective equipment, and medicines (Donohue & Siemsen, 2011). PQ and healthcare fragmentation demands an integrated approach to improve treatment efficiency and capacity (Rouse et al., 2019). Process and quality management, including the implementation of Total Quality Management, is essential in SCM to ensure safety and compliance with health standards (Ali TURKYILMAZ et al., 2015). On the other hand, CTs such as digital tracking and telemedicine

have improved the transparency and efficiency of supply chains, allowing for faster access to essential health supplies (Pinna et al., 2015).

The description of each of these components when linked to the implementation of the HP has a relationship with one another in ensuring that the health protocol is implemented effectively and appropriately. Good HPs require strong and consistent rules and regulations, good GO, good public behavior and attitudes towards health protocols, good processes and quality in implementing health protocols, and good CT in realizing HPs. All these things greatly affect the SE conditions of society. If the HP is implemented properly, it can help maintain public health and reduce negative SE impacts on the community. These five agitation components affect the SE community, such as the level of public trust in HPs, the level of community participation in implementing protocols, and the increasing SE welfare of the community through disease prevention and control. In HPs, the application of good PR can improve effectively GO, as well as influence human behavior in maintaining health. PQ and a health-oriented culture can also support this effort. This will affect the SE conditions of the community because if the community is healthy, it will be more productive and able to meet its food needs. Conversely, if HPs are not implemented properly, this will affect public health and reduce productivity, which in turn will affect food security (Monroy-Torres et al., 2021). Therefore, it is very important to ensure that health protocols are implemented consistently and effectively to ensure the SE well-being of the community.

PR ensures that HPs are implemented by established rules and standards, while GO ensures that HPs are implemented properly and efficiently. GO can influence people's behavior in implementing HPs, and PB can influence GOs in implementing HPs. PQ ensures that HPs are implemented correctly and effectively, and CT helps ensure that HPs are implemented effectively and facilitate access to information and implementation of protocols. Thus, the relationship between agitation is very important in ensuring that HPs are implemented correctly and effectively. Therefore, it is important to ensure that the agitation functions synergistically and mutually support one another in implementing HPs. Even though it is an important component, the limitations of this study still have potential in the development of further studies, for example, the components of infrastructure and available resources (such as health facilities, health personnel, and medical equipment); available funds for disease prevention and control; community education and sensibilization about health protocols and how to practice good health behavior; adaptability of individuals, organizations, and communities to adapt to changes in the environment and health situation; and consistent and coordinated government policies and strategies in fighting the disease can affect the implementation of health protocols. The agitation of policies and regulations on health protocols is government regulations regarding the implementation of mandatory vaccinations for the public. Agitation of GO can be seen in the work processes of health institutions which ensure that health protocols are implemented regularly and efficiently. Agitation of PB can be a sin from agitation PB in maintaining physical distance and wearing masks when on the move. Agitation of PQ involves aspects of the manufacturing process of vaccines and health products that must meet quality standards. Agitation of CT can be seen from the use of technology in monitoring and dealing with virus pandemics, as well as changes in people's culture in understanding the importance of health and HPs. About the SE community, an example is the economic impact of the virus pandemic on society, such as unemployment and lack of income. HP also has an impact on the level of consumption and market demand for health products and staple products. In this case, GO can play a role in ensuring that the supply and distribution of basic needs products remain stable thereby affecting the SE aspects of society.

5. Conclusion

The investigation identifies key factors influencing public compliance with COVID-19 health protocols: rules and regulations, organizational structure, behavior, process quality, and cultural/technological elements. Notably, non-compliance is observed in practices like mask-wearing and distancing. Encouraging awareness and active participation becomes imperative for change, necessitating support and collaboration with the government, community organizations, and healthcare providers. Improved compliance is pivotal in effectively controlling the pandemic and fostering community resilience.

To address these issues, recommendations are categorized across the five agitation components. Clarity and effectiveness in regulations, coordination, and continuous monitoring are crucial for rule agitation. Coordinated government efforts, capacity building, and robust information systems are recommended for goal agitation. Human agitation requires education, support, and effective rewards and sanctions to encourage desired health behavior. Process quality agitation emphasizes enhancing the implementation process and overcoming obstacles. Lastly, cultural/technological agitation highlights the importance of community acceptance, technology innovation, and promoting a health-conscious culture. Successful implementation and sustainability hinge on community engagement, awareness promotion, and strategic collaboration with health professionals, politicians, and community leaders.

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