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Factors Associated with the Incidence of COVID-19: A Case Control Study in Tasikmalaya, Indonesia

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ABSTRACT

This case-control study aimed to investigate the relationship between smoking habits, electronic cigarette use, vaccination status, comorbidities, and the incidence of COVID-19. A total of 63 participants, including 21 cases and 42 controls, were included based on specific criteria. Data were collected through a questionnaire and analyzed using univariate and bivariate analyses. The results revealed that there was no significant association between smoking habits (p value= 0.287), e-cigarette use (p value= 0.114), and vaccination status (p value= 0.287) with the incidence. However, a significant relationship was observed between comorbidities and the incidence (p value= 0.000). These findings suggest that while smoking habits, e-cigarette use, and vaccination status may not be significantly associated with the incidence, comorbidities play a significant role. Further research and public health efforts are needed to explore preventive strategies and support individuals with comorbidities in reducing their susceptibility to COVID-19.

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Introduction

The COVID-19 pandemic has emerged as a global crisis, profoundly impacting communities worldwide [1]-[3]. This infectious disease caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has demonstrated significant variability in its severity

and outcomes among individuals. Understanding the factors contributing to the incidence and severity of COVID-19 is crucial for implementing effective preventive measures, developing targeted interventions, and mitigating the impact of the disease.

Numerous factors have been identified as potential risk factors for contracting and experiencing severe complications from COVID-19. Age has been recognized as a significant determinant among these factors, with older adults at higher risk of severe illness and mortality [4]. Additionally, the prevalence of pre-existing health conditions, such as diabetes, hypertension, cardiovascular diseases, and respiratory disorders, has been associated with increased susceptibility to severe forms of the disease [5]. Moreover, recent research has highlighted the influence of sex as a risk factor, with evidence suggesting that men may be more susceptible to severe COVID-19 outcomes than women [6].

Certain behaviours like smoking have also been identified as potential risk factors for COVID-19. Studies have shown that active smokers, particularly men, may have a higher risk of contracting the virus and experiencing severe complications [7]. Smoking weakens the respiratory system and compromises the immune response, making individuals more susceptible to respiratory infections, including COVID-19 [8]. Understanding the relationship between smoking habits and the incidence of COVID-19 can inform targeted interventions aimed at reducing the disease burden.

In addition to individual-level factors, implementing public health measures and adherence to health protocols are crucial in controlling the spread of the virus. Vigilance in personal hygiene practices, such as frequent handwashing with soap, has been emphasized as an effective measure to reduce transmission [9]. Adopting and complying with these preventive measures by the general public is essential in curbing the spread of COVID-19.

Furthermore, the COVID-19 vaccination campaign is pivotal in reducing the number of cases, hospitalizations, and deaths associated with the disease. Vaccination coverage is an essential indicator of the population's protection against the virus and the potential achievement of herd immunity [10]. Monitoring the status of COVID-19 vaccination in specific communities, such as in Indonesia, can provide insights into the effectiveness of vaccination programs and help identify any gaps or challenges.

In light of the global impact of the COVID-19 pandemic, this study aims to investigate the factors associated with the incidence of COVID-19 in Tasikmalaya, Indonesia. By examining smoking habits, hand hygiene behaviours, vaccination status, and comorbidities, this research seeks to contribute to the understanding of the dynamics of COVID-19 within this community. The findings of this study can inform public health initiatives, guide policy decisions, and contribute to global efforts to prevent the spread of COVID-19.

Identifying the factors contributing to the transmission and severity of COVID-19 is essential for developing strategies to control and mitigate its impact on the community. By examining the prevalence of risk factors such as smoking habits, hand hygiene practices, vaccination status, and comorbidities, this research aims to provide valuable insights into the dynamics of COVID-19. The findings of this study can inform public health initiatives, guide policy decisions, and contribute to the overall efforts to prevent the spread of COVID-19. This study aims to contribute to understanding the factors influencing the occurrence and spread of COVID-19, enabling evidence-based recommendations and interventions to combat the disease effectively.

Material And Methods

The method study conducted was a quantitative analytic case-control design. It was a retrospective study that examined the relationship between confirmed COVID-19 cases and non-sufferers. The research was conducted in Singaparna Village, Tasikmalaya, West Java, Indonesia, from June to December 2022. The population of the study included the entire population of Singaparna Village, while the sample consisted of adults aged 20-60 years who met the inclusion criteria. The inclusion criteria included being a resident, while the exclusion criteria included being seriously ill during the study or being unable to participate. Sampling was done using purposive sampling, which involved selecting cases and controls based on specific criteria, matching respondents' age in both groups. The total sample size was 63 individuals, with 21 points and 42 controls.

Data collection involved a questionnaire with various sections, including smoking habits, handwashing habits, COVID-19 vaccination status, and comorbidities. Primary data was collected through interviews using the questionnaire, while secondary data was obtained from government agencies and health centres. The research instrument used in the study was a questionnaire called Kesionary, which had been previously validated and tested for reliability. The validity and reliability tests confirmed that the questionnaire was valid and reliable for data collection.

Data processing included inspecting and editing the collected data, coding the answers, entering the data into a computer program, tabulating the data, and cleaning the data to remove any errors or inconsistencies. Data analysis included univariate analysis, which involved descriptive analysis using frequency distribution tables, and bivariate analysis, which examined the relationship between independent and dependent variables. The bivariate analysis was conducted using the Chi-square test and odds ratio to determine the significance of the relationship between variables.

The conceptual framework of this research proposal involves examining the relationship between independent variables (x) and the dependent variable (y) through the formulation of hypotheses. The hypotheses in this study are as follows:

- Ha: There is a relationship between smoking habits and the incidence of COVID-19.
- Ha: There is a relationship between handwashing with soap and the incidence of COVID-19.
- Ha: There is a relationship between COVID-19 vaccination history and the incidence of COVID-19.
- Ha: There is a relationship between comorbidities and the incidence of COVID-19.

These hypotheses will be tested to determine if there is a significant relationship between the independent variables (smoking habits, handwashing with soap, COVID-19 vaccination history, and comorbidities) and the dependent variable (incidence of COVID-19) in the specified community.

Results

A. Demographics Data

Out of the total respondents (63), 49.2% were male (31 individuals), and 50.8% were female (32 individuals). All respondents (100%) were adults between the ages of 20 and 60 years (63 individuals). No respondents were in the age groups of 0-1 year, 2-10 years, 11-19 years, or over 60 years. The highest proportion of respondents had completed high school (36.5%), with 23 individuals. The lowest proportion was observed in completing junior high school and having a diploma or bachelor's degree, accounting for 19% of the respondents (12 individuals each). Most respondents (63.5%) had an income below the regional minimum wage (UMR), less than Rp. 2,326,772.46. A smaller proportion (11.1%) had an income equal to the UMR, and 25.4% had an income above the UMR (16 individuals). These demographic characteristics provide an overview of the respondents participating in the study, including their gender, age, education level, and income level. Results should be clear and concise.

B. Univariate

In the analysis of the data, the following key points can be summarized:

- COVID-19 Status: Among the respondents in the Singaparna Village, Tasikmalaya Regency, 33.3% (21 respondents) were confirmed to have COVID-19, while 66.7% (42 respondents) were not confirmed to have COVID-19.

- Screening, Treatment, and Isolation: All confirmed COVID-19 cases (100%) underwent screening, treatment, and isolation independently.
- Smoking Habits: Among the respondents, 49.2% (31 respondents) had a smoking habit, while 50.8% (32 respondents) did not.
- Smoking Habits Inside the House: Among those with a smoking habit, 77.4% (24 respondents) reported smoking inside the house, while 22.6% (7 respondents) did not.
- Daily Cigarette Consumption: Among the respondents with a smoking habit, 51.6% (16 respondents) smoked fewer than ten cigarettes daily, while 48.4% (15 respondents) smoked more than ten cigarettes daily.
- Hand Washing Habits: 76.2% (48 respondents) habitually washed their hands with soap, while 23.8% (15 respondents) did not.
- Behaviour in Hand Washing: Regarding specific hand washing behaviours, 76.2% (48 respondents) reported wetting their hands, rubbing soap on their palms, and rubbing their palms together in a rotating direction. Similar proportions were observed for other handwashing behaviours.
- Use of Hand Sanitizer: 76.2% (48 respondents) reported using hand sanitisers, while 23.8% (15) did not.
- Knowledge of Vaccination: All respondents (100%) knew vaccination as a preventive measure for COVID-19.
- COVID-19 Vaccination Status: Among the respondents, 74.6% (47 respondents) had received the COVID-19 vaccination, while 25.4% (16 respondents) had not.
- Dose of Vaccination: Among those who received the COVID-19 vaccination, 80.8% (38 respondents) had received the second dose, while 4.3% (2 respondents) had received the first dose, and 14.9% (7 respondents) had received the third dose.
- Location of Vaccination: The majority of respondents (74.5%) received their COVID-19 vaccination at the local village hall, while smaller proportions were vaccinated at other sites.
- Comorbid History: 31.7% (20 respondents) had a history of comorbidities related to COVID-19, while 68.3% (43 respondents) did not.
- Routine Health Checks: An equal proportion of respondents (50%) reported undergoing regular health checks and not undergoing them.

These findings provide insights into the respondents' COVID-19 status, health habits, and vaccination behaviours in Singaparna Village, Tasikmalaya Regency.

C. Bivariate

The provided text describes the analysis of bivariate relationships between various factors and the incidence of COVID-19 in Singaparna Village, Singaparna District, Tasikmalaya Regency, in the year 2022. See Table 1.

Table 1. Bivariate relationships between various factors

Factors	Case		Control		OR	95% CI	p-value
	Freq.	%	Freq.	%			
Smoking							
Yes	8	38.10%	23	54.76%	0.508	.174-1.482	0.287
No	13	61.90%	19	45.24%			
Hand washing							
Yes	13	61.90%	35	83.33%	0.325	.98-1.076	0.114
No	8	38.10%	7	16.67%			
Vaccination							
Yes	13	61.90%	34	80.95%	0.382	.119-1.232	0.130
No	8	38.10%	8	19.05%			
Comorbid							
Yes	14	66.67%	6	14.29%	12.000	3.428-42.012	0.000
No	7	33.33%	36	85.71%			
Total	21		42				

The analysis is based on data obtained from research results and utilizes the Chi-Square test to assess the associations.

- The first analysis examines the relationship between smoking habits and the incidence of COVID-19. The data is presented in Table 1, which shows the number of cases and controls categorized by smoking habits. The Chi-Square test results indicate no significant relationship between smoking habits and the incidence of COVID-19 in this village.
- The second analysis explores the connection between the habit of washing hands with soap (CTPS) and the incidence of COVID-19. Table 1 presents the distribution of cases and controls based on the habit of washing hands. The Chi-Square test results reveal no significant relationship between handwashing with soap and the incidence of COVID-19 in this village.
- The third analysis investigates the correlation between COVID-19 vaccination status and the incidence of COVID-19. Table 1 displays the distribution of cases and controls according to vaccination status. The Chi-Square test results indicate no significant relationship between COVID-19 vaccination status and the incidence of COVID-19 in this village.
- The fourth analysis examines the association between the history of comorbid COVID-19 and the incidence of COVID-19. Table 1 presents the distribution of cases and controls categorized by the history of comorbid COVID-19. The Chi-Square test results

reveal a significant relationship between the record of comorbid COVID-19 and the incidence of COVID-19 in this village, suggesting that individuals with a history of comorbid COVID-19 have a higher risk of contracting the virus.

In summary, based on the conducted analysis, no significant relationship was found between smoking habits, handwashing with soap, and COVID-19 vaccination status with the incidence of COVID-19. However, a meaningful relationship is observed between the history of comorbid COVID-19 and the incidence of COVID-19, indicating a higher risk for individuals with such a medical history.

Discussion

A. Smoking habit

The study conducted in Singaparna Village, Singaparna District, Tasikmalaya, in 2022 aimed to examine the smoking habits of the respondents and their potential association with the incidence of COVID-19. The results revealed that among the respondents, a slightly higher proportion (50.8%) did not have the habit of smoking than those who did (49.2%). These findings align with a previous study by Ref. [11], which also reported a higher number of non-smokers than smokers.

Smoking habit refers to the daily act of smoking cigarettes, which is often considered an unavoidable habit for individuals predisposed to smoking. Cigarettes contain many chemicals, including nicotine, tar, carbon monoxide, and hydrogen cyanide. Nicotine, in particular, is a toxic substance that affects the nervous system and is commonly used as an insecticide. Despite its poisonous nature, nicotine acts as a stimulant and contributes to the addictive properties of cigarettes. The addictive nature of smoking and numerous harmful substances explain the widespread prevalence of cigarette use, even in public places [12].

While smoking itself may not directly cause COVID-19, several studies and surveys suggest that it can exacerbate the symptoms of the disease. Ref. [13] conducted a study examining the risk factors associated with a smoking history and the severity of COVID-19 symptoms. The study found that having a smoking history was not a significant risk factor for contracting COVID-19. However, among individuals who tested positive for the virus, those with a smoking history tended to experience more severe symptoms than non-smokers. These findings were supported by a study by the World Health Organization (WHO), which revealed that most COVID-19 patients admitted were non-smokers [14].

In the current study, the distribution of smoking habits among the respondents was almost evenly split, with 32 individuals reporting that they did not smoke and 31 individuals reporting that they did. It is worth noting that various factors, including age, education, media influence,

and socioeconomic and cultural factors, influence smoking habits. Ref. [15] highlighted several factors that contribute to the development of smoking habits, such as parental influence, peer influence, personality traits, and exposure to media. These factors shape individuals' perceptions and behaviours related to smoking. While some individuals may view smoking as a regular activity, it is widely recognized that smoking poses significant health risks to both the smoker and those exposed to secondhand smoke.

The statistical analysis using the Chi-square test indicated no significant relationship between smoking habits and the incidence of COVID-19 in the village (p-value = 0.287). These findings are consistent with a study by Ref. [16], which also found no connection between smoking status and COVID-19 incidence among patients examined for pneumonia.

However, it is essential to note that other studies have had conflicting results. For example, Ref. [17]Hidayatullah (2022) found a significant relationship between smoking and the severity of COVID-19 infection in another location, while Ref. [18] reported an association between smoking status and the incidence of COVID-19 in a different province. These conflicting results highlight the need for further research to understand the potential impact of smoking on COVID-19.

Smoking has been studied extensively for its effects on various diseases, including its potential impacts on COVID-19. Cigarettes contain harmful chemicals such as hydrogen cyanide (HCN), which can damage the respiratory tract and weaken the body's defence against foreign objects like viruses and bacteria. Studies have shown that smokers may have a higher risk of severe symptoms and complications when infected with COVID-19. The ACE2 gene, which plays a role as a receptor for the SARS-CoV-2 virus to enter host cells, is upregulated in the lungs of smokers compared to non-smokers.

While this study did not find a significant relationship between smoking habits and the incidence of COVID-19, it is essential to note that a substantial proportion of respondents (49.2%) reported having smoking habits. Awareness regarding the negative impact of smoking should be promoted, as smoking not only affects individuals but also poses risks to those around them. Efforts should be made to encourage smoking cessation and educate the public about the potential risks associated with smoking, particularly COVID-19.

In conclusion, the study in Singaparna Village did not find a significant relationship between smoking habits and the incidence of COVID-19. However, it is essential to continue studying the effects of smoking on COVID-19, as previous research has shown conflicting results. Promoting awareness about the risks of tobacco and implementing smoking cessation

programs remain crucial in reducing the potential harm caused by smoking for individuals and those nearby.

B. Washing hands with soap

The findings indicated that most respondents (76.2%) habitually washed their hands with soap, while a smaller proportion (23.8%) did not. These results are consistent with a previous study by Ref. [19], which reported a similar distribution of respondents with good CTPS behaviour and poor CTPS behaviour.

CTPS is an individual's effort to maintain health and prevent illness. According to the Ministry of Health Regulation, handwashing is essential to community-based total sanitation and involves six proper and effective steps [20]. Ref. [21] conducted a study that demonstrated a significant association between handwashing practices with soap and the incidence of COVID-19. Employees with poor handwashing practices were found to have a twofold higher risk of COVID-19 infection compared to those with good handwashing practices. The Indonesian Ministry of Health [20] also emphasizes that inadequate hand hygiene contributes to the spread of COVID-19, highlighting the importance of handwashing with soap to prevent transmission.

Research conducted across 16 countries has provided evidence that diligent handwashing and maintaining cleanliness can help prevent the transmission of COVID-19, although it cannot provide 100% protection. Handwashing with soap remains an effective precautionary measure and plays a significant role in preventing the spread of the virus. Hands can come into contact with various surfaces and serve as carriers of germs and pathogens. Hand washing hands with soap is an integral part of a healthy lifestyle. It is considered one of the pillars of health development, alongside healthy behaviour, creating a healthy environment, and providing quality and accessible healthcare services.

Despite most respondents in this study practising CTPS, a significant proportion (24.8%) still needed to have this habit. Factors influencing CTPS behaviour include knowledge, attitude, availability of infrastructure, and environmental support. Ref. [22] conducted research highlighting the effectiveness of handwashing with soap and using antiseptics in preventing the transmission of the COVID-19 virus.

In conclusion, the study conducted in Singapore Village shed light on the prevalence of CTPS among the respondents. The findings emphasize the importance of promoting and encouraging the habit of washing hands with soap as an effective measure in preventing the transmission of diseases, including COVID-19. Enhancing knowledge, attitudes, and infrastructure related to hand hygiene and creating a supportive environment is crucial in

increasing the adoption of CTPS behaviour. These efforts contribute to overall public health and the prevention of infectious diseases.

The statistical analysis using the Chi-square test indicated that there was no significant relationship between handwashing with soap and the incidence of COVID-19 in the village (p-value = 0.114). These findings are consistent with a study by Ref. [23] that found no connection between handwashing with soap and COVID-19 incidence.

However, it is essential to note that other studies have had conflicting results. For example, Rozenfeld et al. found a significant relationship between preventive practices such as handwashing with soap and the incidence of COVID-19. Similarly, Ref. [24] found an association between handwashing discipline using soap and COVID-19 among pregnant mothers in a specific region. These conflicting results suggest further research to understand better the relationship between handwashing with soap and COVID-19.

Handwashing with soap is recognized as a crucial hygiene practice for disease prevention. It effectively removes germs and pathogens from the hands, preventing the transmission of viruses, including the coronavirus. Compliance with handwashing using soap and water has been associated with a lower risk of COVID-19. Washing hands with soap and running water following the six-step technique has been identified as the most effective method for disease prevention.

The study assumes that handwashing habits may not be directly related to the incidence of COVID-19, as respondents take other preventive measures, such as using hand sanitisers, maintaining cleanliness in the environment, and practising personal hygiene. While the study did not find a significant relationship between handwashing with soap and the incidence of COVID-19, it is essential to note that a considerable proportion of respondents (23.8%) reported not having the habit of handwashing with soap. The frequency and proper implementation of handwashing with soap are crucial in reducing the risk of COVID-19 infection.

C. Vaccination status

The findings revealed that most respondents (74.6%) had received the COVID-19 vaccination, while a smaller proportion (25.4%) had not. These results align with a previous study by Ref. [25], which reported a similar distribution of respondents who had taken the COVID-19 vaccination and those who had not.

The Ministry of Health in Indonesia defines COVID-19 vaccination as administering a vaccine to induce immunity or protection against the disease. Vaccines contain antigens or substances that generate specific immunity against certain diseases. Vaccination stimulates the

formation of antibodies in the body, providing particular immunity against the targeted disease. The purpose of COVID-19 vaccination is to reduce the number of severe cases and deaths caused by the virus.

It is important to note that the COVID-19 vaccine does not guarantee prevention of the virus's entry into the body. However, it can help prevent or reduce the severity of symptoms after infection and reduce the risk of transmission. Vaccinated individuals still have the potential to become infected with the virus, but the vaccine significantly reduces the likelihood of experiencing moderate to severe symptoms. Vaccination plays a crucial role in achieving herd immunity and alleviating the burden on healthcare facilities. It is recommended by the World Health Organization (WHO) that individuals continue to adhere to health protocols such as wearing masks, maintaining distance, and practising hand hygiene, even after vaccination.

Various factors influenced the decision to participate or not in the COVID-19 vaccination. Factors that influenced respondents not to participate in the immunisation included fear of needles, the belief that adhering to health protocols is sufficient to prevent exposure to the virus, medical history, and concerns about vaccine side effects. On the other hand, factors that influenced respondents to participate in the COVID-19 vaccination included the desire to comply with government recommendations, occupational demands, and a desire to reduce the risk of exposure to the virus.

The statistical analysis using the Chi-square test revealed no significant connection between vaccination status and the occurrence of COVID-19 in the village (p-value = 0.287). These findings contradict a study by Faizul Rahman (2021) that found a relationship between vaccination status and COVID-19 status among health workers, with a significant p-value and odds ratio indicating a connection.

Vaccination is a crucial public health measure in preventing infectious diseases. COVID-19 vaccination aims to reduce transmission, lower the number of cases and deaths, achieve herd immunity, and protect communities, allowing them to remain socially and economically productive. It is a government policy program implemented worldwide to combat the COVID-19 pandemic. Evaluations of COVID-19 vaccine effectiveness have shown a reduction in infection risk, hospitalization, and mortality among vaccinated health workers.

The researchers speculate that some respondents in the study may have had underlying health conditions that prevented them from receiving the COVID-19 vaccine. Additionally, some respondents might have focused on maintaining their immune system through alternative methods, such as consuming herbal drinks, engaging in regular physical activity, and taking vitamins. While a significant proportion of respondents (74.6%) had already

participated in COVID-19 vaccination, 25.4% had not been vaccinated, according to this study. Local health services are recommended to monitor the population who have not received the COVID-19 vaccine as a preventive measure against transmission. The researchers also advise those who have been vaccinated to continue following health protocols, as there remains a possibility of virus exposure.

In conclusion, the study found no significant relationship between COVID-19 vaccination status and the incidence of COVID-19 in Singaparna Village. However, it is vital to encourage and monitor vaccination efforts to prevent the transmission of COVID-19. Vaccination remains a crucial strategy in reducing infection rates and protecting communities. Public health authorities should continue to promote vaccination and ensure that those vaccinated adhere to health protocols to mitigate the risk of virus exposure.

D. History of comorbidity

The findings revealed that most respondents (68.3%) did not have a history of comorbid diseases concerning COVID-19, while a smaller proportion (31.7%) had a history of comorbidities. These results are consistent with a previous study by Ref. [26], which reported a similar distribution of respondents without comorbid diseases compared to those with comorbidities.

Comorbidity refers to the presence of two or more diagnosed diseases in addition to the primary disease in an individual. Comorbid conditions include hypertension, diabetes mellitus, heart disease, chronic obstructive pulmonary disease (COPD), and kidney disease. Studies have shown that comorbidities can increase the morbidity and mortality rates of COVID-19 patients. These underlying conditions play a role in the severity of symptoms and complications associated with COVID-19.

In this study, 31.7% of the respondents had a history of comorbidities concerning COVID-19. Previous research has consistently shown that comorbidity is a risk factor for the severity and mortality of COVID-19 patients. Patients with pre-existing comorbid diseases are more vulnerable to experiencing severe symptoms and complications when infected with the virus.

Understanding the prevalence of comorbidities among the population is essential for effective healthcare planning and management. Individuals with comorbidities may require additional support and targeted interventions to reduce the risk and impact of COVID-19. It is crucial to prioritize vaccination and preventive measures among individuals with comorbidities to minimize their susceptibility to severe illness.

The statistical analysis using the Chi-square test revealed a significant relationship between a history of comorbid diseases and the occurrence of COVID-19 in the village (p-value

= 0.000). These findings align with a study by Ref. [27] indicating a connection between comorbid diseases and the incidence of COVID-19. However, these results contradict a study by Sanyaolu et al., which found no association between comorbidities and the incidence of COVID-19.

Comorbidity refers to the presence of additional medical conditions alongside the primary disease. Individuals with comorbidities are considered vulnerable to the COVID-19 virus. Hypertension is one of the comorbidities that increase morbidity and mortality rates in COVID-19 patients. Hypertension can cause immune system dysregulation, lymphocyte count elevation, CD8+T cell dysfunction, ineffective response to viral infection, and increased cytokine production leading to complications like cytokine storms and organ failure. The risk of death from COVID-19 is higher in individuals with hypertension due to the high levels of ACE2 receptors, which facilitate the spread of the coronavirus in the body. Increased ACE2 levels are associated with disease severity, resulting in alveolar cell damage and systemic reactions that can lead to death. Comorbidities pose a significant risk for individuals in terms of COVID-19 susceptibility. In this case though medically not recommended discontinuation ACE and ARB but for reduce the risk of COVID-19 there should be an alternative therapy cardiovascular disease can be tried drug therapy that has no effect side as well as enhancing style healthy life so a person protected from COVID-19 [28]

In the study, 31.7% of respondents had a history of comorbidities, with hypertension being the most prevalent. Various studies have indicated that comorbid diseases can worsen the prognosis of COVID-19. ACE inhibitor drugs and ARBs (commonly prescribed for hypertension) can negatively affect COVID-19 infection. ACE inhibitors facilitate viral entry and replication, while ARBs blunt AT2, triggering acute inflammation and immune reactivity in the lungs. Individuals with cardiovascular diseases are often prescribed drugs that contain ACE2 and ARBs, which can adversely affect COVID-19. Hypertension is identified as a comorbidity associated with increased morbidity and mortality in COVID-19 patients.

Efforts to prevent the transmission of COVID-19 among individuals with comorbidities include lifestyle improvements such as maintaining a healthy diet, engaging in physical activity, managing emotional well-being, quitting smoking, consuming vegetables and fruits, reducing alcohol and salt intake, engaging in 30-minute exercise sessions, adhering to medication schedules, regularly monitoring health, and following health protocols diligently. in epidemiology this is called preventive measures in terms of specific protection which is part of the five levels of prevention [29].

In conclusion, the study found a significant association between comorbid diseases and the incidence of COVID-19 in Singaparna Village. Comorbidities, particularly hypertension,

increase the vulnerability and severity of COVID-19. Individuals with comorbidities must take preventive measures, including lifestyle modifications and adherence to health protocols, to reduce the risk of COVID-19 transmission and improve their overall health outcomes.

Conclusion

The findings of the study conducted in Singaparna Village, Tasikmalaya, West Java, Indonesia in 2022 provide valuable insights into the factors associated with the incidence of COVID-19. The research explored the relationships between various factors, including handwashing behaviour, vaccination status, and comorbid diseases, with COVID-19 in the village.

The results indicated no significant relationship between handwashing with soap behaviour and the incidence of COVID-19 in the village. This finding contrasts with previous studies that have suggested a positive association between hand hygiene practices and the prevention of COVID-19 transmission. However, it is essential to note that a considerable percentage of respondents did not have the habit of washing their hands with soap, highlighting the need for continuous education and proper hand hygiene practices to reduce the risk of COVID-19 infection.

Similarly, the study found no significant connection between vaccination status and the occurrence of COVID-19 in the village. This result contradicts previous research that has demonstrated the effectiveness of COVID-19 vaccination in reducing the risk of infection and severe illness. However, it is essential for individuals who have received the COVID-19 vaccine to continue adhering to health protocols to minimize the possibility of exposure to the virus and to protect themselves and others.

On the other hand, the study identified a significant relationship between comorbid diseases and the incidence of COVID-19 in Singaparna Village. Comorbidities, particularly hypertension, were associated with increased morbidity and mortality rates among COVID-19 patients. This finding aligns with existing evidence highlighting the vulnerability of individuals with underlying health conditions to the severe effects of COVID-19. It underscores the importance of prioritizing preventive measures and providing appropriate care for individuals with comorbidities to minimize the impact of the virus.

In light of these findings, it is crucial to continue promoting and reinforcing public health measures, including proper handwashing, vaccination campaigns, and targeted interventions for individuals with comorbidities. Education and awareness programs should be implemented to encourage the adoption of effective hand hygiene practices, regardless of the pandemic. Vaccination efforts should be expanded and sustained to ensure broad coverage

and achieve herd immunity. Additionally, healthcare providers should be vigilant in monitoring and managing comorbid conditions and providing support and guidance to individuals at higher risk of severe illness.

By addressing these factors and implementing comprehensive strategies, communities can enhance their resilience against COVID-19 and future infectious disease threats. It is essential to approach public health holistically, considering the interplay of individual behaviours, medical conditions, and preventive measures to safeguard the population's well-being.

Conflict of Interest

The authors declare that there is no conflict of interest.

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