

# Knowledge of Public Environmental Health with Covid-19 Prevention Behavior at the Jalan Gedang Public Health Center Bengkulu City

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## ABSTRACT

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**Background:** The highest spread of Covid-19 cases in 9 sub-districts in Bengkulu City was Gading Cempaka District, with 86 positive cases, 46 recovered, and 3 died. People do not comply with health and personal hygiene protocols such as washing hands and using masks, do not behave in a healthy life, and lack public awareness in maintaining environmental cleanliness. In addition, the community still litters in several places and lacks knowledge and understanding of clean water and household waste management properly. This study aimed to determine the relationship between public environmental health knowledge and Covid-19 prevention behavior in the Working Area of Jalan Gedang Health Center, Bengkulu City. **Method:** The design used in this research is quantitative research using a cross-sectional approach. This research took place in the area of Jalan Gedang Health Center, Bengkulu City. This research was conducted in January – February 2021. The population was 15,726 people; a sample of 40 people was taken from the minimum sample calculation using a simple random sampling technique. The process of collecting data using a questionnaire and analyzed by univariate and bivariate. **Results:** The results showed that respondents with good knowledge were 21 people (55%) and 19 people (45%). There is a significant relationship between environmental health knowledge and community behavior toward preventing Covid-19 in the Jalan Gedang Health Center Work Area, Bengkulu City. The results showed p-value (0.001) > 0.05, OR = 7.500 with 95% CI (1.798-31.283). This means that knowledgeable respondents are 7.5 times less likely to behave less well in preventing Covid-19 compared to well-informed respondents. **Conclusion:** Environmental health knowledge has a significant relationship with Covid-19 prevention behavior. Researchers advise the public to always maintain a clean environment and live a healthy life to avoid the transmission of the Covid-19 disease.

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## 1. Introduction

Recently, the world has been shaken by a pandemic of a disease originating from a virus, so it has become a big concern for the world because problems are constantly being caused. Many losses are caused by the virus, one of which is the impact on human health, and over time this virus pandemic has increased the number of people exposed to it. The WHO China Country Office

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reports a case of pneumonia of unknown etiology in Wuhan City, Hubei Province. Then in early January 2020, China identified the pneumonia case as a new type, namely Corona Virus Disease-2019 (Covid-19) [1].

Coronavirus is a large family of viruses that can cause disease in both humans and animals. In humans, it usually causes infectious diseases such as the respiratory tract, and the common cold, to serious diseases such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS). In addition, this coronavirus is also a new type of disease, which was later called Severe Acute Respiratory Syndrome Corona Virus 2 (SARS-Cov2), then caused Corona Virus Disease-2019 or commonly referred to as Covid-19 [1].

The Covid-19 pandemic is a global health problem. In December 2019, the Chinese city of Wuhan reported to the WHO that there was a mysterious case of pneumonia. From December 31, 2019, to January 03, 2020, this case increased rapidly, with 44 cases reported. On January 10, 2020, the cause was identified, and the genetic code was obtained, namely a new coronavirus called Corona Virus Disease 2019 (Covid-19). On March 12, 2020, the world health organization declared Covid-19 a pandemic [2].

Then at the end of January 2020, WHO declared Corona Virus Disease-2019 (Covid-19) as a public health emergency that is troubling the Public Health Emergency of International Concern (KMMMD/PHEIC), where the increase in the number of cases is quite fast and has spread in several areas. In this case, the role of public health, especially environmental health, in handling Covid-19 [3] is very important. Before the 2009 influenza A (H1N1) pandemic, most member states of the European Union (EU) had prepared preparedness plans to respond quickly to the pandemic. Some of these plans involve explicit or implicit planning assumptions about what to expect during a pandemic and about how the pandemic virus might behave [4]. This is very important to do for countries that have global population movements [5]. Prevention is the best way to manage a pandemic like Covid-19. The World Health Organization has issued a public appeal to create awareness by providing knowledge to the public to prevent/protect them from Covid-19 [6]. In the latest Covid-19 incident, there were 43,514,678 cases and 1,159,708 cases of death. Meanwhile, Covid-19 cases in Indonesia have also increased, both in terms of the number of cases, recovered patients, and victims who died. The total number of Covid-19 cases in Indonesia is 392,934 cases, 13,411 Covid-19 patients who died, and 68,975 Covid-19 patients who recovered. On December 12, 2020, in Bengkulu there were 2,384 Covid-19 cases, of which 91 patients died and 1,623 Covid-19 patients recovered. With this increase in cases, the Government has emphasized the implementation of health protocols. In addition to the role of public health workers, public awareness about environmental health is very important to carry out in handling and preventing Covid-19 [5].

Based on the Bengkulu City Covid-19 data, 3,456 people were traveling to the affected area, 2,661 suspected Covid-19 people, and 564 positive Covid-19 people. From this data, 36 patients recovered, and 414 patients died. The highest spread of Covid-19 cases in 9 sub-districts in Bengkulu City was in Gading Cempaka District, where there were 86 positive cases, 46 recovered cases, and 3 cases died [5].

Efforts to prevent the spread of Covid-19 must be carried out in all aspects of the environment, such as maintaining or prolonging a person's life, both those who have been exposed to the virus or those who have not been exposed, improving a person's physical and mental health, efficiency in improving the sanitation of the surrounding environment, individual understanding of personal hygiene, support so that everyone in society has a strong standard of living and maintains health from Corona. To prevent the spread of Covid-19 in all aspects, knowledge, and attitudes of the community are needed in environmental health aspects such as PHBS, safe water and sanitation provision, and a hygienic/clean environment during the Covid-19 pandemic in order to prevent the spread of infectious diseases, like the current Covid-19. Some important information related to washing and handling the Covid-19 outbreak is washing hands properly as often as possible, safe drinking water and sanitation management can be applied for handling Covid-19 and disinfectants to kill Covid-19 quickly [7]. Previous research stated that public understanding and awareness of Covid-19 prevention was still low. In addition, the level of community compliance to carry out social

distance also still looks low, because it is still seen that residents are still active outside the home for recreational purposes, sitting in groups, gathering without using masks or maintaining distance, so the possibility of spreading is still a big task [8]. In addition, based on a UK study, those living in poor areas are the most likely to be diagnosed with Covid-19 and have a worse outcome when hospitalized [9].

The initial survey in March – June conducted by researchers at Jalan Gedang Health Center in Bengkulu city was to educate PPT (Terjangkit Country Travelers) in 44 suspected patients. There are 16 OTG (asymptomatic person) patients and 5 ODP (Person Under Supervision) patients. People in the working area of the Jalan Gedang Health Center still think that Covid-19 is just an ordinary disease that doesn't need to be feared. Therefore, people do not comply with health and personal hygiene protocols such as washing hands, using masks, healthy living behavior, and maintaining environmental cleanliness. In addition, there is still the practice of littering in some places, as well as a lack of knowledge and understanding of the community about the proper management of clean water and household waste.

This research needs to be carried out as basic information to determine the knowledge of public environmental health in preventing Covid-19 and what efforts have been made by the puskesmas so far, so that later it can help reduce cases of Covid-19 in the Jalan Gedang Health Center Work Area, Bengkulu City.

## 2. Materials and Method

The research method used is quantitative, using a cross-sectional approach. This research is located in the area of Jalan Gedang Health Center, Bengkulu City. This research was conducted in January-February 2021. The population was 15,726 people, a sample of 40 people was taken from the minimum sample calculation using a simple random sampling technique. Data collection using a questionnaire was then analyzed using univariate and bivariate analysis using the SPSS application.

## 3. Results and Discussion

### 3.1. Results

Based on Table 1, out of 40 respondents, it is known that most of the respondents are >20 years old (100%), 29 people have a high school education (72.5%), 21 people (55%) have good environmental health knowledge, and 21 people (55%) have good environmental health knowledge. Twenty-one people (55.0%) did not behave well in preventing Covid-19. Based on Table 2, from the results of the chi-squared test, it was found that there was a significant relationship between knowledge of environmental health and community Covid-19 prevention behavior in the Working Area of Jalan Gedang Health Center, Bengkulu City (OR=7.5; 95% CI=1.798-31.283;  $p < 0.05$ ). Respondents who have sufficient knowledge have a 7.5 times chance of misbehaving in preventing Covid-19 compared to respondents who have good knowledge.

**Table 1.** Characteristics of Respondents

| Variables       | n  | %    |
|-----------------|----|------|
| Age             |    |      |
| 20-35 years old | 20 | 50   |
| >35 years old   | 20 | 50   |
| Education       |    |      |
| Bachelor        | 11 | 27.5 |
| High School     | 29 | 72.5 |
| Knowledge       |    |      |
| Fair            | 19 | 45   |
| Good            | 21 | 55   |
| Behavior        |    |      |
| Fair            | 21 | 55   |
| Good            | 19 | 45   |

**Table 2.** Bivariate Analysis

| Environmental Health Knowledge | Covid-19 Prevention Behavior |      |      |      | Total |     | P-Value | OR<br>CI 95%            |
|--------------------------------|------------------------------|------|------|------|-------|-----|---------|-------------------------|
|                                | Fair                         |      | Good |      | F     | %   |         |                         |
|                                | F                            | %    | F    | %    |       |     |         |                         |
| Fair                           | 12                           | 72.2 | 7    | 27.8 | 19    | 100 | 0,001   | 7.5<br>(1.798 – 31.283) |
| Good                           | 9                            | 40.9 | 12   | 59.1 | 21    | 100 |         |                         |

### 3.2. Discussion

Knowledge is something that is captured through the five senses, namely sight, hearing, smell, touch, and feeling towards an object so that it can be understood and understood by someone. From the results of the study, it was found that the respondents who had less knowledge were 19 people (45%), and respondents who had good knowledge were 21 people (55%).

The results of previous studies showed that 100% of respondents (50 people) had a good level of knowledge in Kelurahan Baru, Kotawaringin Barat [10]. Another study also showed that most of the participants (55.11 - 64.42%) had inadequate knowledge about COVID-19 in Turkey [11].

Age and education also affect a person's perception and mindset. As a person's age increases, one's grasping power and mindset will be more developed, so that the knowledge about environmental health obtained is getting better. If someone has higher education, he will have better knowledge of environmental health in preventing infectious diseases such as pneumonia and Covid-19 [12].

The results of this study also show that some people still do not understand when they should clean the water reservoirs. There are 28% of the people who understand the conventional and separate drinking water management methods through filtration and disinfection. Only 10% of the people who understand this is enough to kill the Covid-19 virus. So it is very necessary to educate the public about good environmental health knowledge to prevent Covid-19 and other diseases caused by the environment.

People who have healthy behavior in preventing Covid-19 are a powerful step to ward off the disease. It seems simple, but in practice, this application is not easy, especially for respondents who are not familiar with and do not have knowledge of environmental health. In many cases, the disease arises because of a determining factor, one of which is environmental factors. If environmental sanitation is not healthy, the disease will easily develop and quickly spread to humans. As is the case with the management of used disposable masks, if they are disposed of carelessly, the attached disease agents will more easily attack other humans [13].

The results of this study indicate that from 40 respondents, it was known that 22 people (55%) had poor Covid-19 prevention behavior and 18 people (45%). In a previous study, as many as 23 (46%) respondents had fairly good behavior in preventing Covid-19, and a higher score indicates greater involvement in preventive behavior against Covid-19 in Turkey (11). Another study also showed that in 29 provinces in Indonesia, people's behavior in preventing Covid-19 was categorized as good (93.3%) [14].

Behavior is the result of all kinds of experiences and human interactions with their environment, which are manifested in the form of knowledge, attitudes, and actions. Behavior is the response/reaction of an individual to a stimulus that comes from outside or from within himself. So if someone has good knowledge about environmental health, then they will behave well in maintaining the health of their environment to prevent Covid-19. This study shows that environmental health behavior in preventing Covid-19 is still not good, including only 14 people who use clean water for drinking water only, for other needs using plain water. The results show that there are still many people who use ordinary water in their daily lives, especially for drinking water, even though from the results of cursory interviews with respondents, they do not understand the procedures for managing clean water well. In this case, education on how to manage clean water to become drinking water also needs to be done. If this is allowed, it will have a negative impact on the community, for example, if the source of clean water used is not closed or close to

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the source of pollution. If so, then people who consume the water can be easily exposed to disease [15].

If the acceptance of a new behavior or the adoption of behavior through a process based on knowledge, awareness, and a positive attitude, then the behavior will be long lasting than behavior that is not based on knowledge. Knowledge of cognitive is a very important domain in shaping one's actions; in this case, the knowledge is included in the domain. Thus, the higher the level of one's knowledge, the more precise it is in determining behavior and the faster it is to achieve the goal of improving health status. Previous research suggested that having a deeper understanding of the SARS-CoV-2 structure, transmission routes, and molecular response would help in the prevention and control of future Covid-19 outbreaks [16].

The novel coronavirus, which was identified as a global pandemic, originated in Wuhan, China, and has spread to hundreds of countries around the world, one of which is Indonesia. Indonesia, as a country with the largest population in Southeast Asia, is certainly vulnerable to experiencing the highest cases compared to other countries in Southeast Asia. Indonesia, with its regional autonomy system, as a process of administrative procedures to regulate the people in it, is obliged to ensure health and minimize the increase in the number of positive Covid-19 confirmations in accordance with regional habits and potential. As a form of a global challenge, it is necessary to take action to prevent the spread of the virus by looking at the knowledge and behavior of public environmental health toward the coronavirus [17].

From the results of the study, it was found that a p-value of 0.001 or  $>(\alpha) 0.05$  means that there is no significant relationship between environmental health knowledge and the community's Covid-19 prevention behavior in the Jalan Gedang Health Center Work Area, Bengkulu City. This study is not in line with previous research stating that lack of knowledge and wrong attitudes toward health behavior can directly affect the Covid-19 prevention practice in Egypt [13].

Another study also stated that people's adherence to control measures was influenced by knowledge, attitudes, and practices toward Covid-19 in China, where the COVID-19 knowledge score (OR: 0.75-0.90,  $P < 0.001$ ) was significantly associated with the likelihood of lower than negative attitudes and preventive practices towards Covid-19. Therefore, health education programs aimed at increasing knowledge about Covid-19 greatly help the Chinese people to have an optimistic attitude and maintain proper practices in preventing Covid-19 [18]. Personal protective behavior in a national sample of Polish youth shows that female secondary school students exhibit higher levels of knowledge about hand hygiene and personal protection, as well as better behavior, compared to male students. However, regardless of gender, some erroneous beliefs and inappropriate behavior were observed, which suggests that education is necessary, especially in times of the Covid-19 pandemic [19].

The results also show that there are still few respondents who understand how to wash their hands, which is approximately 15-20 seconds with seven steps to wash hands properly. There are still many people who do not care about the garbage collection, where they do not have closed containers. This behavior has a very bad impact on human health in the surrounding environment; for example, if one of the residents who is infected by Covid-19 is not known to throw away used masks or other garbage in an open container. This action can accelerate the spread of infectious diseases.

As we face the second wave of virus transmission, we must take certain steps and make changes to minimize the impact of the Covid-19 outbreak on society. The time for change is now, and there must be support and enthusiasm for providing valid solutions to reduce this disorder, such as online training and virtual clinical experiences. These steps can then be followed and derived from the hands-on experience provided in a safe environment [20].

From the results of the study, it can be seen that knowledge and behavior to prevent Covid-19 in terms of environmental health must be improved because respondents admitted that they had never received information about environmental health during the Covid-19 pandemic. They only get advice to use masks, social distancing, wash their hands or use hand sanitizer. They hope that further education will be held about increasing public knowledge about maintaining environmental health during the Covid-19 pandemic. Knowledge about the spread of SARS-CoV-2 infection



among workers remains limited, and the impact looks large. This is supported by the death rate among infected workers. Occupational health checks carried out at this time should be analyzed systematically to obtain more information about the epidemiology of Covid-19 among workers in Germany and Malaysia so that the supply and use of PPE increases, the risk of CoV-2 infection in Malaysia appears to be decreasing [21].

The literature review results of several experimental studies having cultured live virus from aerosols and surfaces several hours after inoculation, real-world studies detecting viral RNA in the environment reported very low levels, and only a few were successful in isolating live virus. So it is necessary to pay attention to the health of the community environment. In cases of direct contact, respiratory transmission peaked about one day before the onset of symptoms and decreased within a week of symptoms appearing. Evidence-based policies and practices should incorporate accumulated knowledge about SARS-CoV-2 transmission to help education serve the community and slow the spread of this virus (22). In another case in Italy, it was found that a good level of knowledge about the epidemic and its control was noted in the sample, especially among students pursuing a life sciences degree program. The majority of students did not change their diet and health habits, while most of the sample reported a decrease in physical activity. Preventive interventions should change restrictive measures as well as opportunities to improve lifestyle [23].

On the other hand, hand disinfection is a cost-effective way to prevent transmission. According to the Centers for Disease Control and Prevention guidelines, we should wash our hands with soap and water for at least 20 seconds. If soap and water are not available, alcohol-based hand sanitizers (ABHRs) with at least 60% alcohol are an alternative. With diligent hand disinfection strengthened During Covid-19, there has been an increase in the prevalence of contact dermatitis. These comments highlight the fact that contact dermatitis is an easily treatable condition and should not cause any deviation from proper hand hygiene. In irritant contact dermatitis (ICD), management strategies are a selection of less irritating hand hygiene products, frequent use of moisturizers to rebuild the skin barrier, and education about proper hand hygiene practices. In allergic contact dermatitis (ACD), identification and avoidance of contact allergens are key to treatment. However, ACD is less common and accounts for only 20% of cases. Allergens identified in hand sanitizers are mostly preservative excipients because ABHR is very rare. Alcohol-free hand sanitizer is widely available in the market, but it is not a recommended alternative by the Centers for Disease Control and Prevention [24]. On the other hand, it was found that residents who do not have good air ventilation can also increase the transmission of pneumonia and other infections [25].

The Covid-19 pandemic, Brazil has been one of the most affected countries. Apart from public health and economic impacts, social isolation has also caused indirect environmental impacts. Recent data on solid waste in Brazil reveals that more than 35% of medical waste is not handled properly. In addition, improper disposal of face masks has been reported in some cities and may increase the risk of spreading Covid-19 [26]. Covid-19 can have different direct and indirect effects on the environment. Among various environmental problems, municipal solid waste management is the most challenging environmental issue in Tehran during the Covid-19 pandemic [27]. Our findings seem to indicate that Italian consumers are developing a level of awareness about food waste with potential positive impacts on the environment in terms of reducing greenhouse gas emissions and groundwater pollution, thereby preventing transmission of Covid-19 infection [28]. Since the Covid-19 pandemic, households are the most prominent contributors to food waste, and given that Covid-19 has had a significant impact on hunger and food insecurity, it is important to know whether households have increased or reduced food waste during the pandemic [29].

Research on the positive and negative indirect impacts of Covid-19 on the environment, particularly especially in the most affected countries such as China, the United States, Italy, and Spain, shows that there is a clear significant relationship between contingency measures and air quality improvements, clean and environmental noise reduction. On the other hand, there are also negative secondary aspects such as a reduction in recycling and an increase in waste, which further jeopardizes the increase in contamination of the physical environment (water and land), which can easily lead to the risk of disease transmission [30].

#### 4. Conclusion

There is a significant relationship between environmental health knowledge and community Covid-19 prevention behavior in the Jalan Gedang Health Center Work Area, Bengkulu City. It is hoped that they will be more active in seeking information regarding the prevention of Covid-19 in the field of environmental health, which has been recommended by WHO or other sources. In addition, the community must also increase its awareness of environmental cleanliness.

#### Declaration

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