

Creating Portable Hygiene Hand Washer Stations as an Effort to Prevent COVID-19 Transmission

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Abstract Currently, there is an outbreak of a new infectious disease in Indonesia, namely coronavirus disease 2019 (COVID-19). This disease is spread quickly through close contact and droplets expelled when coughing, sneezing, talking, or contacting contaminated surfaces. Some effective methods include always wearing a mask outside the house, maintaining a distance of at least 2 meters when interacting with people, and diligently washing hands with soap for at least 20 seconds. The community service program aimed to make portable and hygienic handwashing stations as a form of participation in preventing the spread of COVID-19 in the community. The station is easy to move, and users do not need to touch the faucet and soap dispenser. The user only needs to step on the foot pedal to open the faucet and soap dispenser. Viruses, bacteria, or germs can stick to the handle, and the touchless faucet will minimize contact. This station is expected to prevent the transmission of COVID-19. This community service program was carried out in Gunungkidul Regency, Special Region of Yogyakarta and supported by partners such as, Nglipar I, Ponjong, Tepus 1 and 2, Patuk 1 and 2, Semin 2, Panggang 1 dan 2, Gedangsari 2, and Girisubo Community Health Center. The distribution of the station ran smoothly, and it could be used properly. The Community Health Centers were helped with this program.

1. INTRODUCTION

Prevention and mitigation measures are the keys to successfully handling the COVID-19 pandemic in health facilities and the community. Currently, the government is working hard to stop coronavirus disease 2019 (COVID-19). How to prevent COVID-19 is by wearing a mask outside the house, maintaining a distance of at least 2 meters when interacting with people, and diligently washing hands with soap for at least 20 seconds (WHO, 2020). COVID-19 can be transmitted through close contact and droplets. A number of sources also state that the transmission can occur through air. People who are most at risk of infection are those who have close contact with or who are caring for

people with COVID-19 (Kementerian Kesehatan Republik Indonesia, 2020). The government has set a policy of reducing crowds to prevent the transmission of COVID-19, but various places are still crowded with people because of needs that must be met, such as markets and health service centers. In areas that have the potential to become gathering places for many people, handwashing facilities are needed so that efforts to prevent COVID-19 can run optimally.

The Community Service Team from Vocational College of UGM had the idea of participating in efforts to prevent the transmission of COVID-19 by making touchless hand washing stations. Viruses, bacteria, or germs can stick to

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the faucet (Naufal et al., 2020). The touchless handwashing station was designed with a faucet and a soap dispenser which could be used simply by stepping on the foot pedal attached to the station. The making of touchless hand washing stations was expected to prevent the transmission of COVID-19. Most hand washing stations in the community were not paying attention to significant things, including hygiene, ease of movement, and the water level in their reservoirs. It was frequently found that hand washing stations running out of water or users had to touch directly, even though we were currently under the COVID-19 prevention principle, they should not often come into contact with the shared washing stations. The benefit expected from this community service program was providing the availability of touchless hand washing stations. Hence, there would be no interaction between users which could be a means of transmission of the virus.

2. METHOD

The partners of this program were community health services that are located in Gunungkidul Regency: Nglipar I, Ponjong, Tepus 1, Tepus 2, Patuk 1, Patuk 2, Semin 2, Panggang 1, Patuk 2, Gedangsari 2, and Girisubo. This program was implemented by creating touchless handwashing stations. The making of the station was carried out in collaboration with workshops that the team had appointed. The process of making this station began with a literature study on the use of the station, finding a proper method where user can wash their hands with only a simple step on the pedal to open and close the faucet and soap dispenser. After that, the team made a prototype and learned how these handwashing stations work most effectively and efficiently. At the end of June 2020, the team started looking for a workshop partner. Afterwards, there was a discussion about design with the workshop partner. The team-appointed workshop was the GMS Art Polyclinic workshop, located in Sayegan, Sleman, Special Region of Yogyakarta. The workshop started to build the stations on July 3, 2020. The station builder began by preparing a water reservoir with a volume of 80 liters, an iron frame, a sink container made from a freon tube that was no longer used, pedals, an information board, faucet, tissue roll holder, four wheels with four locks, handwashing poster, dispenser soap, hose, glue, and sewer tube. Figure 3 shows the poster design that will be attached the station. After meeting the standard, mass production was carried out and adjusted to the funds and human resources availability. The workshop needed about 2 to 3 weeks to make the stations. Figure 1 shows the design of a portable touchless handwashing station, while Figure 2 shows the stations and materials used to make the station.

3. RESULT AND DISCUSSION

Washing hands with soap and clean water provides more significant benefits than using an alcohol-based hand sanitizer or hand sanitizer (Purwandari & Ardiana, 2013). Water and soap are the core mixture to clean dirt on

objects, while hand sanitizers generally contain alcohol as the main ingredient of hand sanitizer. Alcohol has a rapid bactericidal effect against gram-positive and gram-negative vegetative bacteria, MRSA (*methicillin-resistant Staphylococcus aureus*), *Mycobacterium tuberculosis*, several types of fungi, and non-envelope virus (Desiyanto & Djannah, 2013). Alcohol acts on bacteria by denaturing proteins and destroying the bacterial cytoplasmic membrane. Hand sanitizer can only be used if your hands are not too dirty and *cryptosporidium*, *clostridioides difficile*, or harmful chemicals such as pesticides and heavy metals (Kementerian Kesehatan Republik Indonesia, 2021). In pandemic conditions, the habit of washing hands is crucial to prevent the transmission of COVID-19 caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (Antriani, 2018).

This program was focused on the making of portable touchless handwashing stations. Figure 4 shows the portable touchless handwashing station. It is called Box Portable Hygiene Hand Washer. The number of stations that were successfully made was 12. The station's structure and shape were evaluated repeatedly to achieve the desired design: ergonomic, following the average height of Indonesian people so that it could be used comfortably.

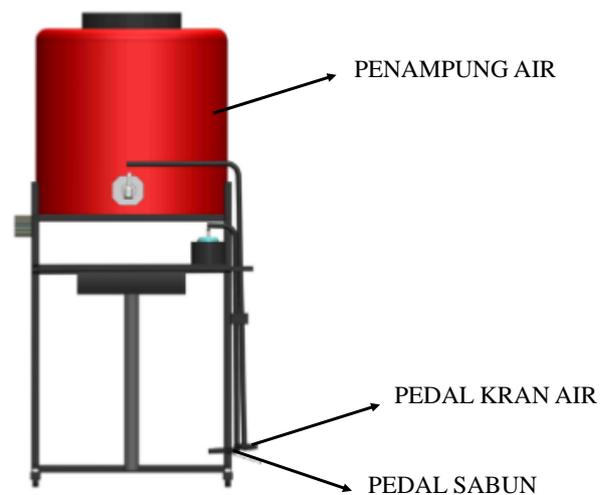


Figure 1 . Design of a touchless hand washing station



Figure 2 . (a) Water storage material from used drums; (b) Sink material from used Freon tubes that have been painted; (c) Painted sink frame



Figure 3 . The poster that promotes handwashing method is attached to the station



Figure 4 . Hand washing stations are ready to be distributed

The purpose of making the station was so that users could wash their hands without touching the station so

that COVID-19 transmission through hand-touch contact could be minimized. While the station-making process had reached 90%, the community service team has begun to prepare a detailed plan regarding the station’s technical and distribution system. The distribution was carried out using a truck rental. To achieve an effective and efficient distribution, we divided the team members. The distribution process was conducted within one day. The distribution preparation included handover reports, dividing teams, truck renting, intended route plan, providing team logistics, scheduling, and communication to community health center recipients in Gunung Kidul Regency, Special Region of Yogyakarta. The team received the recipient list of community health centers that received the stations, and the locations were in Gunung Kidul Regency, Special Region of Yogyakarta. On June 27, 2020, the team distributed a handwashing station “Box Portable Hygiene Hand Washer” to each community health center. The team was divided into two groups using two trucks. Figure 5 shows the handover process for portable hand washing stations.

This program produced appropriate technological stations, namely Box Portable Hygiene Hand Washer. In the future, the stations can be developed using sensors, so we will not need pedals anymore. The community health centers in Gunung Kidul Regency that received them expressed their gratitude and support for this program. Many people who came to the health center in Gunung Kidul feel the benefits of washing their hands without touching the faucet. Users believed the handwashing process would be more hygienic and free from virus exchange.



Figure 5 . The community health center in Gunung Kidul receives a Box Portable Hygiene Hand Washer

4. CONCLUSION

The community service program in Gunungkidul Regency, Yogyakarta Special Region conducted well with the support and enthusiasm of the target parties, which were the community health centers. The distribution of the portable hand-washer station went smoothly. The station could be used properly. On the other side, the health center was helped by this program. Many people who came to the health center feel the benefits of these stations and believed that using this station was more hygienic and freer from virus exchange. With the stations, touching hands-on

faucets and soap dispensers could be avoided. Therefore, the potential transmission of COVID-19 through hand-to-hand contact could be minimized.

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CONFLICT OF INTERESTS

We would like state that there are no known conflict of interests occurred related to this publication. The manuscript submitted is of original work that has not been published elsewhere nor being considered in other journal publications. We confirm that the manuscript has been read and approved by all named authors and that are no persons who satisfied the criteria for authorship but are not listed. All authors have been notified and approved of the corresponding author as the only contact regarding submission, revision, and approval processes of the manuscript.

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