



Environmental Cleanliness Training: Preventing the Spread of Covid-19 for Senior High School Teachers

Ciptono^(✉), Suhandoyo, Tri Harjana, Yunita Fera Rahmawati,
and Tatag Bagus Putra Prakarsa

Yogyakarta State University, Yogyakarta, Indonesia
ciptono@uny.ac.id

Abstract. This community project seeks to strengthen Senior High School teachers' knowledge and abilities regarding the immune system, environmental cleanliness, and the practice of creating sanitizer and how to use it effectively. On Thursday, July 30, 2020, the training was conducted in the form of material explanations and face-to-face instruction in accordance with covid-19 guidelines in the PPG 1 and 2 FMIPA Rooms of Yogyakarta State University. The training materials include immunological and environmental hygiene, as well as how to make hand sanitizers according to the WHO formula. Participants' replies indicated that they expected to be able to produce hand sanitizers during the training, and the training material might assist in overcoming obstacles that may emerge in class. All participants reported that hand washing was the next training item they wished to hold, and all participants expressed an interest in using the training material while teaching. According to the test score analysis, the average post-test score of the participants was greater than the pre-test, with a 58.7% improvement. It was believed that with this training, instructors would have improved understanding and abilities regarding the immune system, environmental cleanliness, and creating hand sanitizers, which would help to prevent the spread of the virus during a pandemic.

Keywords: Hygiene · training · hand sanitizer · Covid-19

1 Introduction

The first instance of unexplained pneumonia was reported in Wuhan, Hubei Province, in December 2019. This case's source of transmission was uncertain, however the initial case was traced to a seafood market in Wuhan [6]. From the 18th to the 29th of December, five patients were treated for Acute Respiratory Distress Syndrome (ARDS) [7]. That instance grew fast between December 31, 2019 and January 3, 2020, as evidenced by the reported 44 cases. The epidemic has spread to neighboring provinces in China, Thailand, Japan, and South Korea in less than a month [3]. The sample studied showed a novel coronavirus etiology [7].

That illness was first known as 2019 novel coronavirus (2019-nCoV), but on February 11, 2020, WHO declared a new name, Coronavirus Disease (Covid-19), caused by the Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) virus. The virus, which may be passed from person to person, has spread significantly in China and over 190 other nations and territories (WHO, 2020). WHO classified Covid-19 a pandemic on March 12, 2020 [8].

The first Covid-19 cases were reported in Indonesia on March 2, 2020 [8]. As of January 23, 2021, there had been 977,474 positive Covid-19 cases and 27,664 fatalities in Indonesia [4]. To far, the virus has been recorded in 220 countries throughout the world, including the Americas, Europe, Southeast Asia, the Eastern Mediterranean, Africa, and the Western Pacific. With the inclusion of additional cases totaling 24,413,331 cases and 406,782 deaths on January 23, 2021, the United States ranked #1 with the most Covid-19 instances, followed by India with 10,639,684 cases, then Brazil with 8,697,368 cases, the Russian Federation with 3,698,273 cases and the UK with 3,583,911 cases. The United States has the highest mortality rate in the world, at 25.2% [9].

Launching data on the overall Covid-19 case from the Worldometers (2021) page on January 24, 2021, it shows that there were 99,387,865 confirmed cases and 2,131,720 deaths [10]. That case exceeds the SARS case in 2003, at first the death rate was relatively low at 2% - 3% but now tends to increase. Recognizing the mode of human-to-human transmission. WHO declared it an International Public Health Emergency in January 2020. That fact was sufficient to illustrate the gravity and complexity of that outbreak.

Currently all provinces in Indonesia have reported cases of Covid-19, the government had taken steps to prevent the spread of this virus [4]. Schools, offices and various public services were closed, only medical and security institutions were still running. The government always educates all parties to always implement health protocols to prevent the spread of that virus from getting wider. The health protocol was our effort to prevent being infected with Covid-19, namely 3M (using masks, washing hands and maintaining distance) and 3K (avoiding crowds, closed rooms and close contact with sick people) [2].

The main principle of preventing the transmission of Covid-19 is to eliminate direct contact with the source of transmission of the virus, in this case the individual infected with the virus and all objects that have the potential to transmit the virus. Keeping a distance of about 1.5 m from other people and always using sterilization tools (alcohol, soap, masks, etc.) should be done to avoid viral infections. One part of society that was vulnerable to infection was students and teachers in schools because of their high mobility, on the other hand they could also been empowered as subjects/agents to prevent the spread of the virus, especially to families and people around them by increasing knowledge and skills to prevent transmission that virus [12].

The objectives of that community service were:

- a. Conducting intra-class activities to increase teacher knowledge about the immune system.
- b. Conducting intra-class activities to develop instructors' knowledge and abilities in environmental hygiene in order to prevent the virus's spread.
- c. Making liquids for individual sanitation and learning how to utilize them appropriately.

Education on personal hygiene and immunity in relation to the breaking of the Covid-19 chain were the responsibility of the whole community, but biology teachers were the one of the frontlines to organize that training. School teachers were the right targets in this training because it was hoped that these teachers will later disseminate the results of the hygiene training in their respective environments.

The human body has a complete ability to fight infection, that was called the immune system. Every infectious agent that enters the body would always be fought so that the body avoids the influence of the infection. The immune system could be divided into two namely natural immunity and innate immunity and both will work together to fight the infectious. In relation to Covid-19, in addition to the natural immune system such as gastric acid, interferon and macrophages, the important as the innate immune system, in this case the T cells, especially cytotoxic T cells, Natural Killer Cells and antibodies. This defense device will fight infectious agents that enter the body [1].

In addition to hygienic living procedures, the use of liquid sanitizers such as alcohol, soap and others were mandatory. Increased knowledge of teachers about the immune system, hygienic living procedures and the use of sanitizers to cut the chain of the spread of Covid-19 was very necessary. By means of a kind of intra-class debriefing and practicum [2].

The solution proposed to avoid the spread of Covid-19 is to convey information on how our self-defense system fought the virus and to provide instruction on how to create hand sanitizers in order to preserve personal cleanliness. This training could be used as an alternative learning media for intra-class activities. Taking socialization solutions because education can form a person who was more introspective and can spread knowledge to the community.

The presentation of the material presentation was delivered using power point by adding pictures/videos with the hope that all participants could more easily understand what was conveyed. In terms of producing hand sanitizers, use the WHO-recommended formula [12].

The procedure for making the hand sanitizer used the following tools and materials (Fig. 1). Tools: large measuring cup (2 L) as a place to mix ingredients, measuring cups (volume 1000 ml, 200 ml, and 50 ml), funnel and stirrer. Ingredients: Isopropyl Alcohol 99.8%: 751.5 ml, Hydrogen.

Peroxide 3%: 41.7 ml, Glycerol 98%: 14.5 ml and distilled water 192.3 ml. While the manufacturing procedure is (1) Ethanol 96% / Isopropyl Alcohol 99.8% is poured into a large measuring cup (as a place to mix the ingredients), (2) Adding 3% hydrogen peroxide (using a measuring cup), (3) Adding 98% glycerol (using a measuring cup), (4) adding aquadest until the total volume of liquid in a large 1 L measuring cup, (5) mixing the ingredients and then slowly stirring with a stirring cup.

All data from that community service were analyzed descriptively quantitatively to interpret the result of the program being implemented.

2 Discussion

The Covid-19 pandemic to date has created dynamics from a social, health, political, educational, and employment perspective. Exit from normal initial conditions and provide new and constantly changing challenges (Espino-Díaz et al., 2020). The dynamics



Fig. 1. Hand sanitizer tools and materials

of the COVID-19 pandemic from its initial stipulation until now requires the public to continue to improve their literacy related to this disease update from Sarcov-2. Moreover, the teachers/teachers who continue to serve at the forefront to educate the nation's children. Various kinds of activities could be carried out to support the demands for increasing literacy. One of them was in Community Service activities carried out by the Department of Biology Education, FMIPA UNY.

The training activities were carried out face-to-face in PPG 1 and 2 Biology Laboratory, FMIPA, UNY for 3 h with details of the implementation as follows.

2.1 Material Presentation

Materials on immunity and environmental hygiene were carried out face-to-face by implementing strict health protocols. Using power point for 60 min (Fig. 2). Before delivering the material, participants first took a pretest in the form of multiple choice as many as 5 questions. The pretest questions are given to each training participant using the google form application at the address https://bit.ly/pretest_CommunityService20. All participants took the pre-test for 10 min using their respective mobile devices. That pretest was given to determine the initial ability of all training participants which would later be observed whether there were an increase in value after all participants have attended the training. Furthermore, the presentation of the material was given by Mr. Drh. Tri Harjana, MP. Which discussed the immune system and how Covid-19 infects the human body (Fig. 2).

2.2 Hand Sanitizer Making Training

The training on making hand sanitizers began with a brief explanation by Mr. Ciptono, M.Si about how to make hand sanitizers according to WHO as a strategy to prevent the spread of Covid-19. Each group sat at a table that had been prepared, then the tools and materials they needed were distributed. Furthermore, all participants sat down with their respective group members to make hand sanitizers in 2 predetermined formulas. Participants were given the opportunity to ask questions if there was something that not understood about the work procedure and was immediately answered by the presenter (Fig. 3).



Fig. 2. Material presentation



Fig. 3. Material presentation

2.3 Independent Task

After receiving materials and training on hand sanitizers, all participants carried out the application of training materials with independent practice involving students as a condition for obtaining certificates. This independent practice activity was carried out with two alternatives. First, it was carried out offline by implementing strict health protocols in their respective schools. Second, it could be done online. The task is carried out for approximately 2 weeks as a condition for obtaining a certificate. It was expected that each participant can report their activities by sending documentation in the form of photos and or videos to the committee's email. At the end of the activity, all participants took a post test using the google form at the address https://bit.ly/posttest_CommunityService20 use their respective smartphones.

Evaluation to determine the level of success of the program activities that have been implemented based on the test scores and participant questionnaires. According to Fig. 4, the average post-test score of the participants was greater than the average pre-test score. During the pre- test, participants got an average score of 57 then at the post-test got an average score of 97. That showed an increase of 58.7%. Thus, it could be concluded that individual hygiene training and the school environment have a positive influence on participants' knowledge.

The next evaluation was to analyze descriptively the results of the questionnaire that has been filled out by all participants. The following result of the contents analysis of the questionnaire determined the level of succeed of the program activities that had been implemented.

As many as 73% of participants expressed hope that when participating in this training they could make hand sanitizers at schools to prevent Covid-19, while 27% of participants hoped that after attending this training they would gain new knowledge.

According to the questionnaire, as many as 93% of participants reported that the training was in line with their expectations. The remaining 7% stated that it was not in line with expectations because there were material constraints that were not available in the school laboratory.

According to the graphic, 93% of participants claimed that the training materials may help them overcome challenges in class, while 7% stated that they were not suitable.

Making hand washing soap was mentioned by as many as 80% of participants as the next training item they would want to hold. The remaining 20% of participants stated that online lecture training was needed if further training activities were to be held.

According to the questionnaire, all participants were interested in putting the training material to use. That showed that the training was beneficial for participants in terms of providing new insights, knowledge, and skills in carrying out classroom learning.

Based on the analysis of the five questions, it was determined that individual hygiene training and school environment in order to prevent the spread of Covid- 19 were carried out in accordance with the training participants' expectations, the material was very useful because in accordance with the conditions experienced by the participants, and all participants would apply the training material on while teaching. That showed that the training was very useful for high school teachers in Kulon Progo region in particular and the teachers in general. In addition, in the future, it was hoped that online learning training for high school teachers in Kulon Progo would be held.

Considering that teachers, both teachers and lecturers as well as students were the one of the subjects affected by this pandemic. Both were required to be adaptive to the online learning and continue to develop it [1].

3 Conclusion

Based on the research that has been done, it could be concluded that individual and school environmental hygiene training in the context of preventing the spread of Covid-19 in high schools in Kulon Progo Regency has been carried out with satisfactory results. Training participants gain new knowledge and insights regarding the manufacture of hand sanitizers and hope to practice it regularly with students, especially during the

pandemic. Furthermore, all participants expressed a desire to use this training material when teaching. It was intended that via this training, participants, particularly teachers, would be able to carry out intra-class activities to strengthen instructors' understanding of the immune system. Additionally, this activity was intended to improve instructors' knowledge and abilities in environmental hygiene in order to halt the spread of the covid-19 viruses.

Acknowledgement. Thanks are given to the Biology Subject Teacher Conference (MGMP) Kulon Progo, Yogyakarta for being willing and helping in this service activity.

Authors' Contribution. Ciptono, Suhandoyo, Tri Harjana, Yunita Fera Rahmawati, and Tatag Bagus Putra Prakarsa conceived of the presented idea. Ciptono, Suhandoyo developed the theory and performed the computations. Tri Harjana, Yunita Fera Rahmawati, and Tatag Bagus Putra Prakarsa verified the analytical methods. Suhandoyo encouraged Tri Harjana, Yunita Fera Rahmawati, and Tatag Bagus Putra Prakarsa to investigate a specific aspect in WHO Standard Hand-Sanitizer and supervised the findings of this work. All authors discussed the results and contributed to the final manuscript.

References

1. Espino-Díaz, L., Fernandez-Caminero, G., Hernandez-Lloret, CM, Gonzalez-Gonzalez, H., & JL Alvarez-Castillo.: Analyzing the Impact of COVID-19 on Education Professionals. Toward a Paradigm Shift: ICT and Neuroeducation as a Binomial of Action. Sustainability. 12, 5646, (2014). DOI: <https://doi.org/10.3390/su12145646>.
2. Flores, MA and A. Swennen.: The COVID-19 pandemic and its effects on teacher education. European Journal of Teacher Education, (2020). DOI: <https://doi.org/10.1080/02619768.2020.1824253>
3. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y.: Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet. (2020); 395(10223):497-506.
4. Ministry of Health of the Republic of Indonesia. Information on Emerging Infections of the Indonesian Ministry of Health. <https://infectionemerging.kemkes.go.id/>, last accessed 13/4/2020.
5. Lauralee Sherwood. 2014. Human Physiology from Cells to Systems. By Brooks Cole, Cengage, Learning.
6. Rothan HA, Byrareddy S.N.: The Epidemiology and Pathogenesis of Coronavirus Disease (COVID-19) outbreak. J Autoimmunity. Published online March 3, 2020. DOI: <https://doi.org/10.1016/j.jaut.2020.102433>.
7. Ren LL, Wang YM, Wu ZQ, Xiang ZC, Guo L, Xu T.: Identification of a novel coronavirus causing severe pneumonia in human: a descriptive study. Chin Med J, (2020). DOI: <https://doi.org/10.1097/CM9.0000000000000722>.
8. World Health Organization. 2010. Guide to Local Production: WHO-recommended Handrub Formulations. https://www.who.int/gpsc/5may/Guide_to_Local_Production, last accessed 13/4/2020.
9. World Health Organization. 2020. COVID-19 Situation Report – 70. https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200330-sitrep-70-covid-19.pdf?sfvrsn=7e0fe3f8_2, last accessed 13/4/2020.

10. World Health Organization. WHO Director-General's opening remarks at the media briefing on COVID-19, <https://www.who.int/dg/speeches/detail/who-director-generals-opening-remarks-at-the-media-briefing-on-covid-19-11-march-2020>, last accessed 13/4/2020.
11. World Health Organization. Situation Report – 42, https://www.who.int/docs/default-source/coronae/situation-reports/20200302-sitrep-42-covid-19.pdf?sfvrsn=224c1add_2, last accessed 13/4/2020.
12. World Health Organization. Situation Report – 42. 2021, https://www.who.int/docs/default-source/coronae/situation-reports/20200302-sitrep-42-covid-19.pdf?sfvrsn=224c1add_2, last accessed 13/4/2020.
13. Worldometer, <https://www.worldometers.info/coronavirus/>, last accessed 24/1//2021.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

