

Conference Paper

Training in the Manufacture and Utilization of Black Garlic as an Immunity Booster During COVID-19

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Abstract.

Immunity is one of the most important things to be considered when trying to control the spread, and reduce the severity of COVID-19. There are many ways to boost the immune system. One method is the use of the herb Thibbun Nabawi, black garlic. Black garlic contains high levels of *S-allyl cysteine*. It is six times higher than raw garlic. This compound is known to increase the levels and activity of the immune components such as natural killer cell, cytokine IFN- γ , TNF- α , and IL-2. To increase immunity during the Covid-19 pandemic, a training program was conducted to increase knowledge surrounding the use of black garlic. The program was conducted in the Tamansari sub-district, Bandung and used the Training for Trainers (TFT) method. The evaluation of the training was carried out through pre-test and post-test questionnaires as well as through direct questions to participants. Results showed that there was an increase in public knowledge regarding the manufacture and utilization of black garlic to boost immunity. It was 33.546% and 47.151%, respectively.

Keywords: training, immunity, black garlic

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1. INTRODUCTION

The outbreak of Corona 19 virus infection (COVID-19) was first discovered in Wuhan City, Hubei-China at the end of 2019 [1]. The disease that caused by SARS-CoV-2 is spreading quickly throughout the world, so that on March 11th, 2021, WHO declared COVID-19 as a global pandemic through a press conference [2]. In Indonesia, it has been found 3,194,733 positive cases of Covid-19 with the death cases of 84,766 as on July 18th, 2021 [3]. As the fourth most populous country in the world, it certainly requires more concern to deal with the pandemic situation, as the spread of covid-19 is much easier, and it is estimated that the situation will be much more severe and longer compared to countries with low population density [4]. Therefore, the role of various parties, including universities, is essential to reduce the level of the spread and that negative impact it causes. Universities can play an active role in educating and empowering the community

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to prepare for all possibilities that occur during this pandemic. Giving socialization program to the public about the importance of maintaining immunity appears to be one of the important steps to suppress the spread of Covid-19.

So far there is no specific antiviral to treat Covid-19 that has been approved by the FDA. The drugs which have been used is only to reduce the clinical symptoms [5]. The immune system plays a vital role to prevent infection and furthermore help to reduce the severity of the symptoms of patients with Covid-19 [6]. There are many ways to boost immunity system during this pandemic, including a balanced lifestyle, healthy food, and the consumption of multivitamins and minerals [7]. In addition, immunity can also be boosted by using herbal ingredients. Some types of herbal ingredients have been recommended to be used since the time of the Prophet Muhammad saw, and now it is known and studied as the method of *thibbun nabawi*. In Islamic terminology, *thibbun nabawi* (Medicine in the style of the Prophet) is the treatment and or prevention of diseases using herbal ingredients, religious activities, or therapeutic methods based on the Qur'an and Hadith [8].

One of the ingredients used in *thibbun nabawi* is garlic. Garlic has been mentioned in a hadith and some scientific literature that it can cure for about 70 kinds of diseases [9]. In addition, the content of allicin compounds in garlic has been shown to increase the immunity [10]. However, consuming garlic directly as a raw garlic is not recommended because of its pungent and bad smell [9]. To get around this and even increase its benefits, garlic can be used by processing it first, such as fermented into black garlic. The fermentation process of garlic which takes place at a high temperature between 70°C to 90°C and at 80-90% of humidity for 14-90 days causes garlic to undergo Maillard (aging) reactions, so that some of its chemical components were change. The black garlic has slightly different characteristics from raw garlic, black garlic slightly no odour, it has a chewy texture, and the taste is sweet. Some types of garlic's amino acids increase in levels even the antioxidant content can be 10 times more in black garlic [11-13]. To increase public knowledge regarding the process of making and using black garlic as an effort to boost immunity during the COVID-19 pandemic, it is necessary to hold some education and training activity.

Education and training program was conducted for PKK (a regional organization concerned with the Family Welfare Program) cadres in the Tamansari sub-district, Bandung City in the context of community services. The purpose of this activity was to increase the knowledge and independence of the community as well as to empower the potential of the community by applying science and technology.

2. METHODS

This community empowerment program was carried out in the Tamansari sub-district, Bandung City, West Java, with the PKK cadres as participants. This training was conducted through offline activities (for some cadres that are representatives of each community) and online via zoom (for other PKK cadres) by Training for Trainer (TFT) method. The activity is carried out to some representative community members, with the hope that the information obtained can be forwarded and disseminated to the surrounding community, so that its usefulness is greater. The training is divided into two sessions, first is lecture activity related to general knowledge about the importance of maintaining immunity during the Covid-19 pandemic and knowledge related to the benefits of black garlic as a type of herbal *thibbun nabawi* in maintaining immune system. Second is training on making black garlic in a simple way that can be practice individually in their home, the media of the training was using video tutorials that made by detail to explain step by step how to make black garlic.

The program was evaluated through a written pre-test and post-test for offline participants, and online quizzes (via google form) for online participants. Evaluation was also carried out using the direct question and answer method during the training. Furthermore, the data from the pre-test and post-test were processed and analyzed to describe the effectiveness of the empowerment program as indicated by the participants' knowledge increase both before and after participating in the training [14].

3. RESULTS AND DISCUSSIONS

The Community empowerment program was conducted in February 2021 in Tamansari sub-district, Bandung City and attended offline by fifteen representatives of PKK cadres from each community and thirty online participants who were also PKK members via the zoom platform. The method of this training was Training for Trainers (TFT) method. Training was not given directly to the larger community at the same time but only to community groups who were considered to have an ability to deliver or provide education to other community groups. With the TFT method, it is hoped that the effects of the training can be effective in the long term, as the participant of this training will become the information center in their community itself.

Prior to the activity, we did some analysis of the regional situation and problems to obtain some basic data as an initial description of the needs of community. Tamansari is one of the urban districts in Bandung which has a high density of population, so the

risk of Covid-19 transmission in the area is also very high. In addition, the community lacks access to information and education related to maintaining immunity and how to effectively maintain immunity in a safe, convenient, economical and halal ways during this Covid-19 pandemic. Not to mention, several community

groups have been economically affected by this pandemic. Therefore, education and training on the use of *thibun Nabawi* to increase immunity in a convenient, safe, economical and halal ways, become important.

Furthermore, a study was conducted on some reference to choose what *thibbun nabawi's* herbal is suitable to explain that is not only medically beneficial but can also be a source of income for the community. From some of the herbal ingredients we suggest the basis for further study with literature research in some scientific journals to find some herb base scientific activities or programs which will then be used as educational materials for the community. There are many kinds of herbs that can be used and codified in *Thibbun Nabawi* even some of them have scientifically proven in terms of the efficacy. From the many ingredients that can be used, garlic was chosen. But there were some obstacles and inconvenience to use garlic as raw garlic, so the alternative that can be used is to process that raw garlic by fermenting it as black garlic [8]. The Maillard reaction that occurs during the fermentation of raw garlic will change the garlic characteristic to be more chewy, sweet, and less tangy, even more the content of several types of amino acids that contained were increased [11]. The content of polyphenols, flavonoids, and several by-products of the Maillard reaction which acts as an antioxidant is also known to be 4-5 times higher in black garlic compared to that contained in raw garlic [12]. Under high temperature and humidity, the compound Alliin in raw garlic will undergo conversion to S-allyl cysteine (SAC). This SAC compound then plays a very big role in increasing the body's immunity, where high levels of SAC in the blood will increase natural killer (NK) cells, IFN- γ cytokines, TNF- α , and IL-2, those are components of the immune system and have pivotal roles in the body immunity when it is infected. SAC levels in black garlic are known to reach 6 times higher than fresh garlic [11].

The training began with a written pre-test for offline participants and an online quiz for online participants. These questions were about training materials that would describe the participants' knowledge of general immunity knowledge and the use of black garlic and its manufacture. Participants were then given education through persuasive communication supported by visual communication media about the use of black garlic to maintain immunity. At the end of the session, a question-and-answer session was held to measure participants' understanding of the material provided and a post-test

was conducted to measure the increase in participants' knowledge before and after participating in the training [14]. The Fig. 1 is results of the evaluation of participants' knowledge before and after education about the use of black garlic to increase immunity during the Covid-19 pandemic.

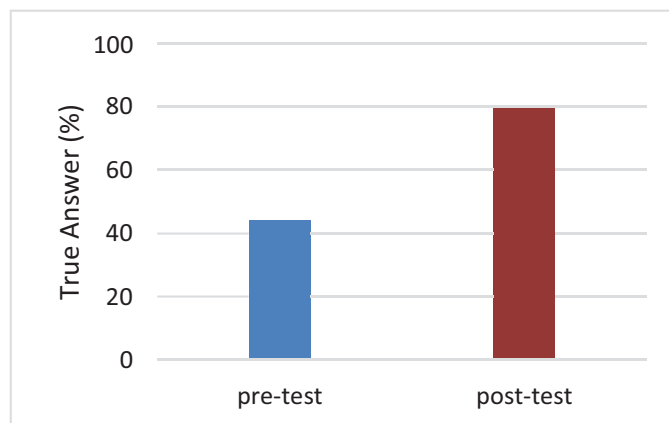


Figure 1: Participants' knowledge regarding the benefits of black garlic to increase immunity before and after education.

From the Fig. 1, it can be seen participants' knowledge regarding the benefits of black garlic on increasing immunity during the Covid-19 pandemic were increase from 44.231% before training to 77.778% after training. This showed that the education in this training carried out a new knowledge for the participants. All the participants have also been given training on how to make black garlic using a simple method that can be done at home by fermentation method. The most important thing that must be emphasized in the manufacture of black garlic is that the fermentation must be carried out at an optimum temperature of 60°C -90°C with a humidity of 80% - 90% for about 14 - 90 days [12]. In simple terms, this condition can be obtained by fermentation carried out in a rice cooker in the warm mode with some modifications. The results of the pre-test and post-test from this training can be seen in Fig. 2.

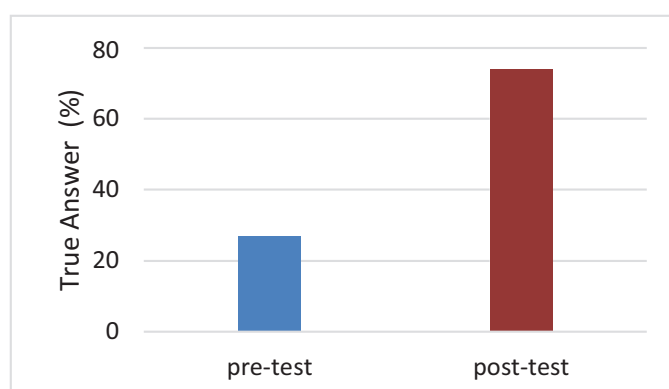


Figure 2: Increased knowledge of participants regarding how to make Black garlic.

From the Fig. 2, there was an increase in participants' knowledge about the procedure in making black garlic with all that critical point. The increase in participants' knowledge was achieved up to 74.07% from 26.92% before the training. This result indicated a significant increase in participants' knowledge. If we compared between Fig. 1 and Fig.2, the increase in participants' knowledge about manufacture of black garlic was higher than the increase in participants' knowledge about the benefits of black garlic for immunity. This is because information related to the benefits of black garlic may be easier for participants to obtain from other media than information related to the black garlic manufacture method.

In addition to the pre-test and post-test at the end of the training event, a question-and-answer session was held with offline and online participants. It was found that all participants stated that they understood the material provided and gained new knowledge from the training they attended, and all participants stated that they would share the knowledge and skills they acquired with the wider community in their area as an effort to participate in suppressing the transmission and severity of COVID-19 infection.

4. CONCLUSION

Community empowerment program conducted for PKK cadres in Tamansari sub-district, Bandung City have succeeded in increasing public knowledge about the use and manufacture of black garlic as an immunity-boosting during the Covid-19 pandemic. The percentage increased in knowledge that occurred respectively was 33.548% and 47.151%.

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