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Planting Bamboo Palm to Reduce Air Pollution in Order to Maintain Lung Health in Pp. Assalafi Al Fithrah Surabaya

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A B S T R A C T

Air quality in Surabaya is seriously challenged by motor vehicle emissions, industrial pollution, and lack of green space, which have a direct impact on public health, especially on the respiratory system, which can cause diseases such as asthma and bronchitis. To overcome this, a community service program using lecture and simulation methods was carried out, involving 40 male and female students at the Islamic boarding school. The lecture lasted 40 minutes with PPT and poster media, as well as pre- and post-test questionnaires to measure the increase in participants' knowledge. In addition, the simulation was carried out in collaboration with the Islamic boarding school in planting bamboo palms on May 11, 2024. The results showed a significant increase in students' knowledge regarding the benefits of bamboo palms as an effort to prevent air pollution, with a significant difference in pre- and post-test scores ($p < 0.05$). The lecture approach accompanied by visual media has proven effective in increasing understanding of the role of bamboo palms in reducing pollution in the Islamic boarding school environment, so that this education has succeeded in increasing students' awareness of the importance of efforts to overcome air pollution.

INTRODUCTION

According to the regulation of the Republic of Indonesia Government Number 41 of 1999 concerning air pollution control, air pollution is defined as the entry or insertion of substances, energy, and/or components into ambient air by human activities, so that air quality decreases to a certain level that results in ambient air being unable to fulfill its function. According to the World Health Organization (WHO) in 2014, in 2012 air pollution was one of the causes of eight total deaths worldwide, with an estimated seven million people dying that year. This figure shows a two-fold increase from previous estimates, confirming that air pollution is the world's largest environmental health risk. WHO also stated that indoor air pollution is more dangerous than outdoor air pollution. Indoor air pollution causes 3.3 million deaths, while outdoor air pollution causes 2.6 million deaths (WHO, 2014). Indoor air pollution also causes 12% of all acute respiratory infections in children (Pacific, 2018).

Air pollution refers to the infiltration of foreign materials or substances, whether intentional or not, that disrupt the normal composition of air and are potentially harmful to health. Sources of air pollution can come from two main types of sources, namely stationary sources such as industry, household activities,

and waste burning, and mobile sources such as motor vehicles, motorcycles, ships, and so on. Mobile sources are the largest contributors to air pollution, reaching 70% of total air pollution (Islam et al., 2013). The fuel combustion process in motor vehicles is not as efficient as in industry (A. Tri Tugaswati, 2000). Surabaya is a metropolitan city with a high number of vehicles on the road every day. According to the Air Quality Index (AQI) and PM2.5 air pollution in Surabaya, the air quality in Surabaya is classified as moderate (AQI score: 63), but fluctuates and even reaches >100 on February 7-8, 2024. In fact, Surabaya is ranked 5th with the highest air pollution after Tangerang, Bandung, Jakarta, and Medan (IQAir, 2024).

The main impact of air pollution on health occurs mainly in the respiratory tract, and is closely related to respiratory diseases such as Acute Respiratory Infections (ARI), especially those caused by SO2 gas. SO2 can damage the mucosal layer, increase mucus production, and disrupt cilia movement, facilitating microorganism infections in the respiratory tract (Hood Alsagaff, 2008). About 20% of SO2 gas pollution comes from industry and transportation, with the use of coal and fuel oil as the main sources. SO2 can cause irritation to the respiratory tract, with levels of 5 ppm can cause significant irritation, and levels of 1-2 ppm can irritate sensitive individuals or those with a history of chronic respiratory and cardiovascular disease (Nurdin Zakaria, R, 2013).

One of the lung problems that often occurs in Islamic boarding schools is respiratory tract infections (Sati et al., 2015). The Assalafi Alfitrah Islamic boarding school in Surabaya, located in the northern part of Surabaya, also showed the same thing in line with the high number of ARI cases in Surabaya. Cases of Acute Respiratory Tract Infections (ARI) in Surabaya reached 174,222 during the first semester period, namely January to July 2023, which experienced a significant increase compared to the same period the previous year. Based on the report on the 10 most common diseases referring to ICD X until July 2023, it was found that diseases of the respiratory system contributed 21.43 percent of the total complaints reported, surpassing complaints of the digestive system which only reached 17.46 percent (Widiyana, 2023). The high number of ARI cases in the city of Surabaya indicates an environmental issue, one of which is air pollution which is suspected of contributing to worsening and increasing the number of ARI cases.

Islamic boarding schools have a strategic role in educating the next generation of Muslims who are friendly and care about the environment. As an Islamic educational institution founded independently by the community, Islamic boarding schools have a significant role in maintaining and caring for the environment, both now and in the future. This is because Islamic boarding schools are not only a place to deepen religious knowledge, but also a place to train students to be able to answer various knowledge challenges, including knowledge about the environment. There are four steps that can be taken by Islamic boarding schools towards their environment: First, is the policy of Islamic boarding schools to care for

and have an environmental culture, where Islamic boarding schools are encouraged to issue policies and provide facilities for students to maintain environmental order administratively. Second, is the development of an environmental-based curriculum, which includes the delivery of environmental material to students through an integrated curriculum or special subjects. Third, is the development of participatory-based environmental activities, where Islamic boarding schools must be directly involved in providing environmental education to students and the surrounding community. Fourth, is the management of supporting facilities and infrastructure for environmentally friendly Islamic boarding schools, where Islamic boarding schools must have adequate facilities and reflect environmental management efforts (Mangunjaya, 2014).

By realizing the important role of Islamic boarding schools as agents of change in people's behavior and attitudes towards the environment, it is necessary to examine the extent to which Islamic boarding schools can be examples in their participation in environmental conservation and natural resource management.

METHOD

Method

Overall, the method that will be used in the counseling is a two-way lecture method and question and answer. Before conducting the counseling, post-test sheets will be distributed to students. Students are given time to work on the questions and then collected. Next, a counseling session is carried out for approximately 45-60 minutes. Continued with a question and answer session for 15-20 minutes. After completion, post-test sheets will be distributed to students to be worked on for 10-15 minutes and then collected. Gift packages are distributed and the counseling activity is closed. The details of the activities that have been submitted are as follows:

1. Preparation stage

   The program preparation stage begins with surveys and discussions to obtain the information needed to increase the interest of program targets and the quality of the program provided.
2. Implementation of counseling and training

   This community service program was held at the PP. Al Fitrah As Salafiyah Surabaya Islamic Boarding School. The program was implemented on Sunday, June 21, 2024 for 150 minutes. The event was attended by the person in charge of the clinic and health of the Islamic boarding school.
3. Evaluation and reporting

   Evaluation and reporting include activities to evaluate success and reporting in the form of presentations of program results to the leadership of Islamic boarding schools and also writing program reports that will be published in community service journals.

Time and Place of Implementation

This community service program was held at the PP. Al Fitrah As Salafiyah Surabaya Islamic Boarding School. The program was implemented on Sunday, June 21, 2024 for 150 minutes. The event was attended by the person in charge of the clinic and health of the Islamic boarding school

Target Participants

The target participants are 40 male and female students in the Al Fitrah As Salafiyah Islamic Boarding School, Surabaya.

RESULT AND DISCUSSION

The results of community service regarding the benefits of planting bamboo palms to reduce air pollution in order to maintain lung health in Pp. Assalafi Al Fithrah Surabaya have shown satisfactory results. This is evident from the three indicators of success set by the presenter, namely: 1. There was a significant increase in the knowledge value of students before and after counseling with an average of >80% correct answers (figure 1), 2. Participants who attended the counseling numbered >40 students (figure 2), 3. The implementation of a simulation of planting bamboo palms by students and administrators of the Islamic boarding school in the Islamic boarding school environment.

The knowledge of students before counseling showed that students did not understand the benefits of bamboo palm in preventing air pollution, especially in the Islamic boarding school environment. However, after counseling, students using the lecture and simulation methods significantly increased the knowledge and understanding of students (P <0.05). Planting bamboo palm is useful for maintaining lung health, especially by preventing air pollution.

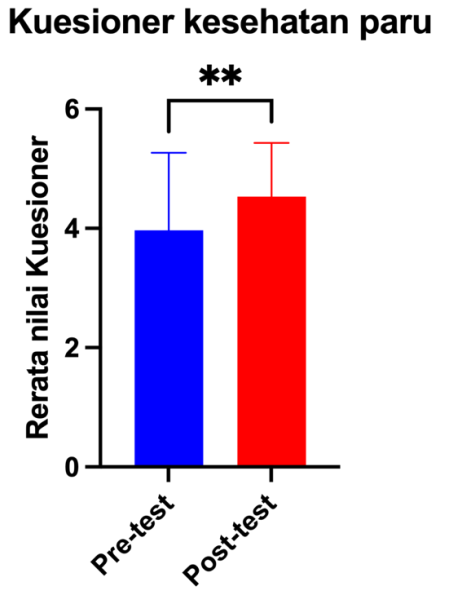

Figure 1. Result of analysis of the average value of the lung health questionnaire before and after counseling. Source:Primary Data Questionnaire (2024)

Figure 2. Documentation of counseling on the benefits of bamboo palm to prevent air pollution and maintain lung health. Source: Community service documentation (2024)

Lung and respiratory health issues are a major concern globally (Susanto, 2018). The lungs, as one of the vital organs, require special attention to stay healthy. Maintaining lung health requires strong commitment and ongoing effort (Nizaar, 2018). The surrounding environment often contains factors that can interfere with lung health, such as smoking habits, consumption of instant foods, and lack of physical activity. Lung diseases have various forms, including exposure to hazardous substances in the workplace, allergies, chronic inflammation such as bronchial asthma, and chronic obstructive pulmonary disease (Nizaar, 2018).

The results of Community Service found an increase in the knowledge of students before and after being given counseling. This is also influenced by age and the ability to grasp and social sensitivity of students towards environmental problems. The results of this study are in accordance with research Imam (2024) which shows that teenagers have the motivation to improve a wrong situation and high sensitivity to social which can affect their level of knowledge. Health education in the form of counseling is able to change individual or community behavior towards healthy living behavior (Tumigolung et al., 2013). Providing accurate and precise information is crucial for teenagers in forming their views on various things. Their attitudes can be influenced by the information they receive through knowledge, attitudes, and practices (Carolina & Tarigan, 2019).

This community service also succeeded in providing knowledge about the benefits of bamboo palm on air pollution and lung health. Bamboo palm has been successfully planted around the boarding school by students and administrators with a simulation approach and direct contribution under the direction of the presenter. Bamboo palm, which belongs to the Arecaceae family, has an extraordinary ability to absorb

various types of toxins and occupies the highest position compared to other plants. This plant is very effective in absorbing toxic gases from vehicle and factory smoke. It is able to absorb hazardous substances such as trichloroethylene, benzene, formaldehyde, xylene, and ammonia in large quantities. Plant propagation is done vegetatively through the separation of shoots. The planting media used consists of garden soil, sand, and humus or manure with a ratio of 1:1:1(General Directory of Horticulture, 2012). Anti-pollutant plants initiated by students and administrators of the boarding school are expected to be a source of enthusiasm for all residents of the Alfitrah Assalafiyah Islamic boarding school in increasing awareness of the importance of maintaining environmental cleanliness and health.

CONCLUSION

Planting bamboo palm trees at the Assalafi Al Fithrah Islamic Boarding School is an effective solution to reduce air pollution in the Islamic boarding school environment. This program not only contributes to improving air quality and the health of students, but also instills awareness of the importance of protecting the environment. With this step, the Islamic boarding school can create a greener and healthier environment, while educating the younger generation about environmental responsibility.

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