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High Cholesterol Prevention through Healthy Lifestyle Education and the Use of Bay Leaves (*Syzygium polyanthum*) as a Cholesterol-Lowering Herbal Remedy in Islamic Boarding Schools

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ABSTRACT

Hypercholesterolemia is a growing health problem, including among adolescents in Islamic boarding schools (pesantren) where diets are high in fat and low in fiber, and physical activity is limited. This condition carries a risk of developing cardiovascular disease, necessitating preventive interventions tailored to the characteristics of the Islamic boarding school community. This Community Service (PkM) activity aims to increase students' knowledge and awareness of high cholesterol prevention through healthy lifestyle education and the use of bay leaves (Syzygium polyanthum) as an alternative herbal cholesterol-lowering agent. The program's innovation lies in integrating evidence-based health education with local wisdom, making it easily implemented in Islamic boarding schools. The activity was conducted at the Zainul Hasan Genggong Islamic Boarding School in Probolinggo in May 2025, involving 30 students and 14 religious teachers. The methods used included an initial survey, FGDs, interactive counseling with pre- and post-test evaluations, and free health checks, including anthropometry, blood pressure, and blood sugar measurements, medical consultations, and medication administration. The primary outcome was increased participant knowledge, measured by comparing pre-test and post-test scores and baseline health data from the examination. The results of the activity showed an average increase in participant knowledge of 23.4 points between the pre-test and post-test. Students also gained practical skills in using bay leaves as a daily ingredient beneficial for health.

Keywords: Hypercholesterolemia; Health education; Healthy lifestyle; PP. Zainul Hasan Genggong Probolinggo; Syzygium polyanthum

INTRODUCTION

Hypercholesterolemia is a health problem that is increasingly common across various age groups. Data from the 2023 Indonesian Health Survey shows that young people, particularly those aged 15–24, dominate the prevalence of high cholesterol in Indonesia (Yashilva, 2023). The 2018 Basic Health Research (Riskesdas) also reported that 21.2% of Indonesians had total cholesterol levels above the standard limit, and this prevalence increased with age, reaching 58.7% in the 60 years and older age group (Karwiti et al., 2022; Nur Alfitha U et al., 2023). Although cholesterol plays a vital role in the body, excessive levels can cause plaque buildup in the arteries, leading to narrowing of the blood vessels (atherosclerosis). This condition is a serious concern because high cholesterol can

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trigger various chronic complications, such as heart disease, stroke, blood vessel disorders, and kidney disease (Irfiyanti Fachruddin et al., 2024).

Islamic boarding schools, as dormitory-based educational institutions, have unique dietary and lifestyle patterns that can impact the health risks of their students. Consuming high-fat, low-fiber foods, and a lack of variety in fruits and vegetables remain common practices in Islamic boarding school kitchens (Al Rahmad, 2019). Students' limited physical activity due to their busy study and Quranic study schedules also increases the risk of metabolic disorders, including hypercholesterolemia. Therefore, Islamic boarding schools are strategic environments for educational and healthy lifestyle-based preventive interventions for adolescents.

One approach is health education about a diet low in saturated fat, increased fiber consumption, and the importance of regular physical activity (Kumalasari et al., 2023; Subandrate et al., 2019). Education about food selection is also crucial, including introducing natural alternatives such as bay leaves (Syzygium polyanthum), which have long been used in traditional medicine. This plant contains bioactive compounds such as flavonoids, tannins, and saponins, which have been shown to lower blood cholesterol levels (Emilia, 2023).

Previous research has shown that S. polyanthum extract significantly reduced total cholesterol, LDL cholesterol, and triglyceride levels in animal models of hypercholesterolemia without affecting body weight and exhibited hepatoprotective effects by reducing fat accumulation in the liver (Salim et al., 2022). The plant's mechanisms of action include inhibiting cholesterol absorption in the intestine, increasing cholesterol excretion, and possessing antioxidant and anti-inflammatory effects that protect blood vessels (Hasan et al., 2020; Prianwari & Syafril, 2020; Rahim et al., 2021; Sabandar et al., 2022).

Furthermore, administering bay leaf extract to animal models has shown cholesterol-lowering effects comparable to conventional statin drugs such as simvastatin (Anggrek et al., 2024; Tanjung et al., 2020). This combination of benefits strengthens S. polyanthum's position as a natural therapeutic agent worthy of consideration, particularly for Islamic boarding school communities seeking healthy, accessible solutions that align with Islamic values. The familiarity of bay leaves in everyday cooking facilitates their integration into the students' dietary patterns.

Given the high prevalence of hypercholesterolemia, limited healthcare facilities in Islamic boarding schools, and the availability of bay leaves, integrating health education and the use of S. polyanthum into students' lifestyles is a promising strategy. This approach not only encourages natural disease prevention but also paves the way for Islamic boarding schools to become pioneers of the herbal-based healthy lifestyle movement on the broader community.

LITERATURE OR CONCEPTUAL REVIEW

Hypercholesterolemia is a condition characterized by elevated blood cholesterol levels that can lead to atherosclerosis, a narrowing of the blood vessels caused by fatty deposits on artery walls. This condition is a significant risk factor for coronary heart disease, stroke, and other metabolic disorders (Irfiyanti Fachruddin et al., 2024). According to the 2018 Basic Health Research (Riskesdas), approximately 21.2% of the Indonesian population has high cholesterol, indicating the need for effective public health interventions (Nur Alfitha U et al., 2023).

The high-fat, low-fiber, and low-physical-activity diets standard in Islamic boarding schools (pesantren) have the potential to increase the risk of metabolic disorders in students (Al Rahmad, 2019). Therefore, implementing education about a healthy lifestyle in Islamic boarding schools (pesantren) is a strategic step in preventing high cholesterol levels from an early age (Kumalasari et al., 2023).

Bay leaves (Syzygium polyanthum) are an herbal plant rich in active compounds such as flavonoids, saponins, and tannins, which function to lower cholesterol levels by inhibiting cholesterol absorption in the intestine and increasing fat excretion (Hasan et al., 2020; Sabandar et al., 2022).

Research by Tanjung et al. (2020) and Anggrek et al. (2024) shows that the cholesterol-lowering effect of bay leaf extract is comparable to statin drugs such as simvastatin. Furthermore, research by Salim et al. (2022) also found that bay leaf extract can lower total and LDL cholesterol levels and reduce fat accumulation in the liver. Thus, bay leaves have great potential as a natural alternative in the prevention and management of hypercholesterolemia (Anggrek et al., 2024; Salim et al., 2022; Tanjung et al., 2020).

Health education combined with hands-on practice, such as herbal processing, is effective in increasing participant understanding. Research shows an increase in knowledge of up to 85% after educational interventions (Rismawati, 2024). This shows that educational activities in Islamic boarding schools can be an effective means of instilling a healthy lifestyle and the use of herbs in maintaining long-term health.

MATERIALS AND METHODS

This community service program was held at the Zainul Hasan Genggong Islamic Boarding School in Probolinggo in May 2025. The program targeted 30 students aged 16–18 and 14 female religious teachers (ustadz) who acted as active participants.

The program began with a field survey to map the participants' conditions, including dietary patterns, lifestyle habits, and potential health problems. The survey results were then discussed through Focus Group Discussions (FGDs) with the Islamic boarding school administration to align the participants' needs with the program's objectives. This phase served as the basis for developing intervention plans and logistics for activities.

The program included two main activities. First, an interactive outreach program on "Preventing High Cholesterol through Healthy Lifestyle Education and the Use of Bay Leaves as a Cholesterol-Lowering Herbal in Islamic Boarding Schools." This two-way program evaluated knowledge through pre- and post-test questionnaires. Second, a free health checkup included anthropometric measurements, blood pressure measurements, and blood sugar levels, medical consultations, and medication administration as needed.

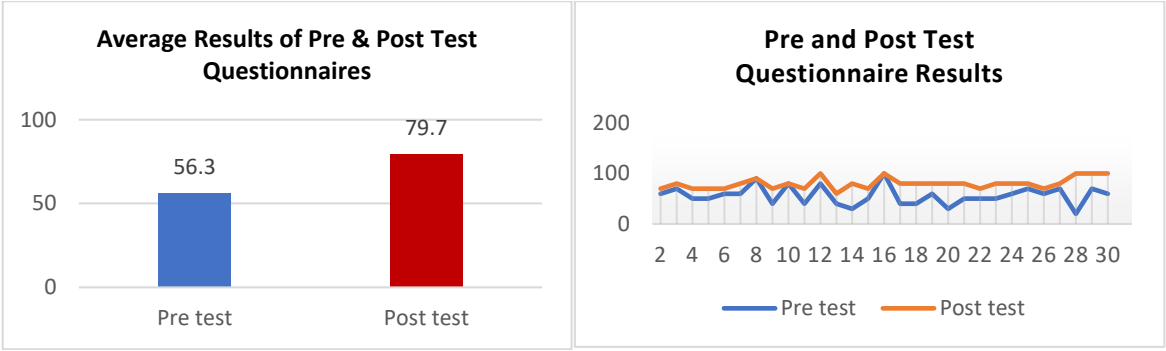
Partner participation was relatively high, demonstrated by the involvement of 30 students (santri) in the counseling session, and 25 students and 14 female teachers (ustadz) in the health checkup. This activity also provided an overview of the health status of the Islamic boarding school community and raised awareness of the importance of preventing metabolic diseases.

The primary outcome measured was increased participant understanding of high cholesterol prevention, as evidenced by a comparison of pre-test and post-test scores. Furthermore, the health checkup data served as the basis for follow-up health education and coaching within the Islamic boarding school.

RESULT AND DISCUSSION

Graphs

The graph illustrates the increase in knowledge among students at Zainul Hassan Genggong Islamic Boarding Schools, based on the outcomes of pre-test and post-test assessments conducted before and after the counseling sessions. A straightforward analysis indicates a 23,4-point difference in the average scores between the pre-test and post-test, signifying a clear improvement in the students' understanding of the material presented.



Garph 1. Average Results of Pre & Post Test Questionnaires; Pre and Post Test Questionnaire Results

This community service activity, entitled "Preventing High Cholesterol Through Healthy Lifestyle Education and the Use of Bay Leaves as a Cholesterol-Lowering Herbal Remedy in Islamic Boarding Schools," has increased the knowledge and awareness of the Zainul Hasan Genggong Probolinggo Islamic Boarding School (PP. Zainul Hasan Genggong Probolinggo) regarding the importance of a healthy lifestyle and the use of bay leaves as an alternative cholesterol-lowering agent in Islamic boarding schools, schools, and the community. The following summarizes the outreach activities:The outreach team provided education on the risks of high cholesterol, its causes, and how to prevent it through a healthy lifestyle, such as consuming healthy foods and regular exercise:

1. The outreach team provided education on processing bay leaves into simple foods, such as siomay topped with bay leaves or boiled bay leaf tea, and provided an understanding of their safe consumption and benefits.
2. The outreach team also provided education on the use of family medicinal plants (TOGA), particularly bay leaves, as a preventative measure against metabolic diseases.
3. The extension team provided free health checks for 25 students and 14 female teachers in including anthropometric checks, blood pressure checks, blood sugar checks, health consultations, and free medication for patients in need.
4. This counseling activity began with the administration of a pre-test questionnaire, followed by the provision of counseling materials, and concluded with the administration of a post-test on the topic of Preventing High Cholesterol Through Healthy Lifestyle Education and the Use of Bay Leaves as a Cholesterol-Lowering Herbal in Islamic Boarding Schools.

Based on the pre-test and post-test questionnaires on High Cholesterol Prevention (can be seen in Graphs 1), there was an increase in students' scores in Zainul Hassan Genggong Probolinggo Islamic Boarding Schools, who participated in the activity, had an average increase in scores of 23.4, indicating an increase in participants' knowledge of High Cholesterol Prevention. Understanding the topic of High Cholesterol Prevention has made the participants have a deep understanding of the background knowledge of high cholesterol in individuals, the risk of high cholesterol, various factors, preventive methods through a healthy lifestyle such as consuming healthy foods, regular exercise, and the use of bay leaves as an alternative herbal cholesterol-lowering in the Islamic boarding school environment.

(a)

(b)

(c) 

(d) 

Picture 1. (a) Providing counseling to students of PP. Zainul Hasan Genggong; (b) Health checks for students and residents of the Islamic boarding school; (c) Providing souvenirs to partners of PP. Zainul Hasan Genggong; (d) Group photo of the UNUSA Medical Faculty community and students of Zainul Hasan Genggong Islamic Boarding Schools.

DISCUSSION

Community service activities focused on preventing high cholesterol through healthy lifestyle education and the use of bay leaves as a cholesterol-lowering herbal remedy in Islamic boarding schools (pesantren) have shown positive results. The health education provided to students has increased their understanding of the risk factors, causes, and preventive measures for hypercholesterolemia, as reflected in the increase in post-test scores compared to pre-tests. This aligns with research showing that educational interventions can significantly increase participants' understanding, from 0% to 85% after health education (Rismawati, 2024).

In addition to theoretical education, the activities included practical exercises on using bay leaves as a cholesterol-lowering herbal ingredient. Students were introduced to how bay leaves are processed, including their use as an additive in healthy foods like dim sum. Active compounds in bay leaves, such as flavonoids and saponins, are known to lower cholesterol by inhibiting fat absorption and preventing LDL oxidation. This effectiveness was demonstrated in a study that reported a decrease in cholesterol levels from 263 mg/dL to 187 mg/in after just 11 days of regular consumption of boiled bay leaves (Endriyatno et al., 2024; Tarigan & Siregar, 2024).

This educational approach, combined with herbal practices, is considered appropriate for the Islamic boarding school context, as it is readily accepted and applicable to the students' daily lives. Furthermore, health checks, such as blood pressure and blood sugar tests, and health consultations also add to the program's promotional and preventive value. Despite challenges related to the diversity of participants' responses to education and natural remedies, this integration of methods remains a comprehensive approach worthy of management and future development. Thus, this activity not only increases participants' knowledge but also encourages the formation of a healthy lifestyle based on local wisdom within the Islamic boarding school environment.

CONCLUSIONS

A community service program on high cholesterol prevention through healthy lifestyle education and the use of bay leaves at the Zainul Hasan Genggong Islamic Boarding School has been proven to increase students' knowledge and awareness of metabolic health, as reflected in improved post-test scores and enthusiastic participation. This activity demonstrated real benefits for the Islamic boarding school community and provided theoretical contributions related to herbal-based interventions and local wisdom. Further follow-up is needed in strengthen sustainable programs, such as developing Islamic boarding school health cadres and integrating healthy herbs into daily life.

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Conflict of Interests

The authors declared that no potential conflicts of interest with respect to the authorship and publication of this article.

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