



Empowerment of *Santri* in Preventing Acute Respiratory Infections (ARI) through Education on Immune System Resilience and Herbal Processing

Bambang Edi Suwito^{1*}, Handayani¹, Titin Sholih1h Agustin¹, Tirta Akbar Putra Setiawan¹, Shabrina Raudina Edyatika Putri¹, Elqisha Avatry Maul¹, Raditya Ahmad Aviciena¹, Ahmad Istan Andriansyah¹, Farhan Zidany Firdaus¹, Aslin Nuroniyah Azzahra¹, Atha Zaky Imansyah¹, Jella Berliani¹, Rosda Rodhiyan²

Published online: 17 December 2025

ABSTRACT

Acute Respiratory Infection (ARI) remains a significant public health issue, especially in communal environments like *pesantren* (Islamic boarding schools). This condition is exacerbated by the limited knowledge of *santri* (students) on how to effectively boost their immune system independently and the minimal use of local herbal resources. This community service activity aims to empower *santri* at Pondok Pesantren Hidayatullah Al-Muhajirin, Bangkalan, Madura, through comprehensive education on ARI prevention. The program involved 20 female *santri* and was implemented through a series of activities, including counseling, practical training in herbal processing, and the initiation of a Family Medicinal Plant (TOGA) garden. Evaluation results show a significant increase in knowledge, proven by an average post-test score increase of 6.5% and a shift in knowledge classification to the "Good" category (from 75% to 95%). Furthermore, the program successfully formed a group of *santri* cadres responsible for managing the TOGA garden, establishing a model for sustainability. Overall, this program not only successfully increased the individual capacity of the *santri* but also created a sustainable, community-based support system, which can serve as an important foundation for health improvement in the *pesantren* environment

Keywords: Community Service; Acute Respiratory Infection (ARI); *Santri* Empowerment; Health Education; Herbal Plants

INTRODUCTION

The problem of Acute Respiratory Infection (ARI) continues to dominate the public health landscape in Indonesia. National data consistently place ARI as one of the diseases with the highest prevalence, carrying significant morbidity and mortality impacts. *Pesantren* environments, characterized by population density and intense interaction, facilitate pathogen transmission, thereby placing the *santri* at very high risk. Initial observations identified two main issues: the minimal knowledge among *santri* regarding independent ways to boost body immunity and the suboptimal utilization of local herbal plant potential for prevention.

ARI is a disease with high morbidity and mortality rates in Indonesia. ARI is the largest cause of death in post-neonatal and toddlers in Indonesia (Permanasari, et al., 2024). This condition creates a critical gap between the need for strong preventive health practices and their implementation. Effective ARI prevention efforts require a holistic approach involving individuals and the community. The implementation of Clean

¹ Faculty of Medicine, Nahdlatul Ulama University

² Research and Community Service Unit, Faculty of Medicine, Nahdlatul Ulama University

^{*}) *corresponding author*

Bambang Edi Suwito
Email: bamsedi@unusa.ac.id

and Healthy Lifestyle (PHBS) is a fundamental strategy that *santri* must master, encompassing daily habits such as handwashing, maintaining nutrition, and exercising.

The community empowerment approach forms the theoretical foundation of this service. Theories promoted by Freire (1970) and Rappaport (1987) highlight that sustainable behavioral change can be achieved through increased critical awareness and skill development. In this context, the utilization of herbal plants as rich local resources with immunomodulatory properties becomes a vital element. Although scientific studies have confirmed the benefits of herbs like ginger and turmeric, practical knowledge about their processing is not yet widespread in *pesantren* environments.

Pondok Pesantren Hidayatullah Al-Muhajirin, located in Buduran Village, Bangkalan Regency, Madura, was established in 1973. The *pesantren* has grown rapidly, attracting *santri* from within the country and abroad. Besides focusing on traditional religious education (*kitab salaf*), the *pesantren* also emphasizes character education and applicative skills to prepare *santri* to adapt in society. Research proves that herbal tea is very effective in preventing ARI. Most subjects experienced ARI before consuming herbal tea, but almost all subjects no longer experienced ARI after consuming it regularly. This indicates that *santri* can utilize herbal tea as an easy way to boost immunity and protect toddlers from ARI (Ruliati, 2022).

Studies show that routinely consuming herbal tea every day for one month is effective in improving the health of toddlers—including increased immune resistance and appetite—a crucial benefit during the COVID-19 pandemic. This positive effect stems from the significant potential of natural substances in herbal tea, which act as antioxidants and play a role as immune boosters (Ningsih et al., 2020).

As part of efforts to improve health quality, Pondok Pesantren Hidayatullah Al-Muhajirin has had a Pesantren Health Post (*Pos Kesehatan Pesantren* - Poskestren) initiated by the Faculty of Medicine, Nahdlatul Ulama University Surabaya (Unusa) since December 2022. This Poskestren plays a strategic role in providing health education, conducting *santri* cadre training in health, and implementing various activities to improve the health of the *santri* and the surrounding community. The Poskestren's operations are under the supervision of the local community health center (*puskesmas*), ensuring that health programs run effectively and sustainably.

Therefore, this service was designed to address this gap. The main goal is to empower *santri* at Pondok Pesantren Hidayatullah Al-Muhajirin with the knowledge and skills needed to enhance body immunity and process local herbs as part of the ARI prevention strategy. This program is expected to contribute to the improvement of the health and self-reliance of the *pesantren* community.

MATERIALS AND METHODS

This section comprehensively explains the methodology used in this community service activity, which was designed to address problems related to the minimal knowledge and skills of *santri* in ARI prevention. The method applied prioritizes a participatory and community empowerment approach.

Location, Time, and Target Population

This service activity was carried out at Pondok Pesantren Hidayatullah Al-Muhajirin, located in Lower Paserean Hamlet, Buduran Village, Arosbaya District, Bangkalan Regency, Madura. The selection of this location was based on the *pesantren's* characteristic of high density, making it an environment vulnerable to the spread of ARI. The program was implemented on Saturday, May 03, 2025.

The target population in this program was all female *santri* pursuing education at Pondok Pesantren Hidayatullah Al-Muhajirin. Specifically, the program involved around 20 *santri* as the main participants. Strategic partners in the program's implementation were the *pesantren* management and the Pesantren Health Post (Poskestren) which has been operating in the *pesantren*

environment since December 2022. The Poskestren functions as a center for collaboration and program sustainability.

Implementation Procedure and Community Involvement

The implementation procedure for this service is divided into three main integrated stages:

1. **Preparation Stage:** The initial stage focused on needs analysis and coordination with partners. We conducted intensive discussions with the *pesantren* management and Poskestren to ensure the program was relevant to the *santri's* conditions and needs. Additionally, an education module was prepared, covering material on Clean and Healthy Lifestyle (PHBS) and the utilization of Family Medicinal Plants (TOGA) for ARI prevention. Logistic preparation, such as procuring training materials and tools, was also conducted at this stage.
2. **Program Implementation Stage:** The community engagement approach was the core of program implementation. The main activities carried out were:
 - **Interactive Education and Training:** Providing counseling on effective ways to boost body immunity and respiratory health. This material was followed by practical training on the identification and processing of local herbal plants (such as ginger, turmeric, and galangal) into simple, consumable remedies.
 - **Independent Practice:** Together with the *santri*, we initiated the development of a mini Family Medicinal Plant (TOGA) garden in the *pesantren* area. This activity aimed to provide direct experience to the *santri* in planting, caring for, and harvesting herbal plants.
 - **Santri Cadre Training (*Kaderisasi*):** To ensure program sustainability, a Training of Trainer (ToT) was carried out for selected *santri* who are part of the Poskestren. These *santri* cadres were trained to become agents of change who can pass on the knowledge and skills to other *santri* in the future.
3. **Monitoring and Evaluation Stage:** Program evaluation was carried out periodically. Monitoring was conducted to observe the active participation of the *santri* in every training and mentoring session. Evaluation was performed by measuring the predetermined main outcomes.

Main Outcomes Measured

To measure the effectiveness and success of the program, the main outcomes measured from the target population were as follows:

1. **Knowledge Improvement:** Measuring the increase in *santri* understanding about ARI prevention methods, PHBS, and the benefits of herbal plants. Measurement was conducted using pre-test (before the program) and post-test (after the program) instruments.
2. **Skill Improvement:** Measuring the practical ability of *santri* in processing herbal plants into simple remedies. Measurement was conducted through direct observation during the training and mentoring sessions in the TOGA garden.

RESULTS AND DISCUSSION

The results of this community service activity show a significant increase in the *santri's* knowledge about the importance of maintaining body immunity as an effort to prevent ARI. This increase is proven by higher post-test scores compared to the pre-test, reflecting the effectiveness of the education provided. Furthermore, the *santri* successfully mastered practical skills in identifying and processing herbal plants. This ability was realized in the production of simple herbal remedies that can be utilized to boost the immune system.

Practical Implementation and Community Impact

The tangible impact of this program is the formation of a group of *santri* cadres responsible for the management and utilization of the Family Medicinal Plant (TOGA) garden within the *pesantren* environment. This group, formed through the Training of Trainer (ToT) process, is now capable of disseminating knowledge about herbs and ARI prevention to other *santri*. The formation of a simple business unit, managed by *santri* and/or administrators, has the potential to become a sustainability model. The products generated, such as herbal remedies, can be used as educational and health promotion media in the *pesantren* environment.

Relevance to Service Goals

This service activity successfully achieved its goal, which is to empower *santri* to possess adequate knowledge and skills in maintaining body immunity and processing local herbs as part of the ARI prevention strategy. The distribution of educational posters about herbal benefits and PHBS also proved effective in reaching a wider audience, strengthening collective awareness. Overall, this program not only successfully increased the individual capacity of the *santri* but also created a sustainable support system at the community level through cadre training and the utilization of local resources.

Based on the results of the pre-test and post-test regarding entrepreneurship mentoring training for adolescents through direct questionnaires, there was an increase in scores among the *santri* participating in this activity. The percentage increase in the average score was 6.5. This illustrates an increase in the *santri's* knowledge regarding the material delivered in the community service activity at PP Hidayatullah Al-Muhajirin Bangkalan, Madura.

Table 1. Distribution of respondent characteristics

Characteristic	Frequency (f)	Percentage (%)
Gender		
Male	7	35
Female	13	65
Age		
14 years	3	15
15 years	3	15
16 years	6	30
17 years	6	30
18 years	2	10
Grade		
Grade IX	7	35
Grade X	3	15
Grade XI	10	50
Total	20	100

Source: Authors' own creation

The distribution results of the respondent characteristics in our community service activity are presented in Table 1. This community service activity involved 20 adolescent *santri* at Pondok Pesantren Hidayatullah Al-Muhajirin, Bangkalan, Madura. Based on the demographic characteristics of the participants listed in Table 1, the majority of participants were female, with a percentage of 65% (13 people), while male participants totaled 35% (7 people). The age range of participants was dominated by the 16 and 17-year-old groups, each contributing 30% of the total population. Distribution by grade shows that participants from Grade XI had the highest number, namely 50% (10 people). The distribution results of the *santri's* knowledge regarding the topic of *santri* empowerment in ARI prevention through immunity education and herbal processing in the community service activity are presented in Table 2.

Table 2. Distribution of questionnaire score results

Score Classification	Pre-test (f)	Pre-test (%)	Post-test (f)	Post-test (%)
Good	15	75	19	95
Enough (Sufficient)	4	20	0	0
Less (Poor)	1	5	1	5
Total	20	100	20	100

Source: Authors' own creation

Evaluation results indicate a significant increase in participant knowledge. The average post-test score increased by 6.5% compared to the pre-test, proving the effectiveness of the material delivered. This increase in knowledge is expected to be an initial capital for *santri* to prevent ARI by utilizing herbal processing both at the *pesantren* and at their respective homes.

Although the percentage increase appears moderate, this is a positive initial indicator that the program successfully created a strong foundation of knowledge. This increase in knowledge is expected to be an initial capital for *santri* to innovate and develop the utilization of herbal plants and TOGA management, in line with the community service goals. Additionally, the participation of *santri* with diverse educational backgrounds (Grades IX, X, and XI) allows for the exchange of rich ideas and experiences, enriching the learning process for all participants.

This is in line with the research results conducted by Shofiyan (2025) which showed that providing PHBS education intervention through powerpoint slides, simulation, and X-banner media can increase knowledge, attitude, and behavior, which is shown by significant results. Herbs act as immunomodulators, meaning these substances have the ability to stimulate, suppress, or modulate various elements in the immune system, both innate and adaptive immunity. Various studies show that these herbal compounds directly influence immune cells, antibody and cytokine production, and play a role in important biological processes such as cell apoptosis and handling autoimmune diseases (Rinanto et al., 2021).

Overall, this program successfully achieved its goal of increasing the *santri's* understanding of the concept of TOGA utilization. Active participation from participants, especially from the dominant age and grade groups, was a supporting factor for this success. Nevertheless, further evaluation is needed to measure the long-term impact and actual implementation of the knowledge gained.

Figures

The following is documentation during the education delivery activity:



Figure 1 (a) education material delivery; (b) female *santri* enthusiastically listening to the material

Source: Committee documentation (2025)

CONCLUSIONS

This community service activity successfully and significantly increased the *santri's* knowledge and skills in ARI prevention, as evidenced by the increase in the average post-test score of 6.5% and the shift in the participants' knowledge classification to the "Good" category (from 75% to 95%). The program also demonstrated a clear practical impact with the formation of a group of *santri* cadres through the Training of Trainer (ToT) who are now able to manage and disseminate knowledge about herbs and the use of the Family Medicinal Plant (TOGA) garden. Thus, the program not only achieved its goal of individually empowering the *santri* but also created a strong foundation for sustainability at the *pesantren* community level.

To ensure program sustainability and strengthen community involvement, several recommendations can be considered. First, strengthening the role of the Pesantren Health Post (Poskestren) as a center for health education and self-development needs to be intensified. Poskestren can function as a hub for routine activities such as herbal processing workshops and periodic health checks managed by the *santri* cadres. Second, integrating the program into the *pesantren* curriculum can ensure this knowledge and these skills become part of formal education. This will guarantee the systematic transfer of knowledge to the next generation of *santri*.

Furthermore, to expand the impact, it is recommended to develop a herbal-based social entrepreneurship program managed by the *santri*. The simple business unit that has been formed can be scaled up to produce health products from local herbs. This will not only increase the *pesantren's* economic self-reliance but also function as an effective health promotion medium to the wider community. Through this approach, the service program will transform from a one-time intervention into a sustainable community engagement model, creating continuous social and economic impact

Acknowledgments

We extend our highest gratitude and appreciation to Pondok Pesantren Hidayatullah Al-Muhajirin for the collaboration and facilities provided, enabling the implementing team to carry out this community service program. The contribution from the *pesantren*, especially the active participation of the *santri*, was a crucial factor supporting the success of the program.

Our appreciation is also conveyed to Universitas Nahdlatul Ulama Surabaya (UNUSA) for the institutional support that facilitated the implementation of this activity. Specifically, we thank the Research and Community Service Institute (LPPM) UNUSA for the financial support through the grant scheme, which was the main foundation for the execution of the entire program series. This support not only enabled the realization of the program but also affirmed the institution's commitment to the practice of the Tri Dharma of Higher Education.

Conflict of Interests

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

REFERENCES

- Jannah, H., Dharmawibawa, I.D., Harisanti, B.M., Muliadi, A., & Primawati, S.N. (2020). Pemberdayaan Kesehatan Mandiri Santri Melalui Teknologi Budidaya Toga Berbasis Peningkatan Imun Tubuh di Pondok Pesantren Aliyah Nurul Islam Sekarbela. [Santri Self-Reliance Health Empowerment through TOGA Cultivation Technology Based on Immune

System Enhancement at Aliyah Nurul Islam Sekarbela Islamic Boarding School]. *Lambung Inovasi: Jurnal Pengabdian kepada Masyarakat*.

- Permanasari, E.D., Nugrahaeni, F., Rahmadini, N., Zakka, G.Q. Chandra, A., & Bella, C.A. (2024). Sosialisasi dan Edukasi Penyakit Infeksi Saluran Pernapasan di Kecamatan Menteng, DKI Jakarta. [Socialization and Education on Respiratory Tract Infection in Menteng Sub-district, DKI Jakarta]. *Mejuajua: Jurnal Pengabdian pada Masyarakat*, 4(1), 108-114.
- Puspitasari, F., Setiawan, D., Savitri, R., Hadi, S., Sari, O.M., & Mardiaty, N. (2024). Edukasi Ramuan Herbal untuk Mengatasi Gejala ISPA pada Kelompok Asuhan Mandiri Kesehatan Tradisional di Kelurahan Teluk Tiram Banjarmasin. [Herbal Remedy Education to Overcome ARI Symptoms in the Traditional Health Self-Care Group in Teluk Tiram Banjarmasin Village]. *Jurnal Nusantara Berbakti*.
- Pratimasari, D., Andriani, D., Ratri, R.A., Ardiana, N., Julianingtyas, V., & Setyawati, E.K. (2023). Pendampingan Pembuatan Seduhan Rimpang Jahe dan Kunyit Pereda ISPA serta Edukasi Kestabilan Sediaan di Desa Mancasan Baki Sukoharjo. [Assistance in Making Ginger and Turmeric Rhizome Infusion for ARI Relief and Education on Preparation Stability in Mancasan Baki Sukoharjo Village]. *Batuah: Jurnal Pengabdian Kepada Masyarakat*, 3(2), 51-57. <https://doi.org/10.33654/batuah.v3i2.2271>
- Ningsih, A. W., Nisak, A., & ... (2020). Pengolahan Minuman Teh Herbal Peningkat Imunitas dengan Komposisi Jahe-Kunyit-Temulawak Di Desa Jembul Kecamatan Jatirejo Kabupaten Mojokerto. [Processing of Herbal Tea Beverage for Immunity Enhancement with Ginger-Turmeric-Temulawak Composition in Jembul Village, Jatirejo Sub-district, Mojokerto Regency]. *Senam*, 288–295. <https://ocs.machung.ac.id/index.php/senam/article/view/32>
- Sari, D.R.T., Maria, U.A., Eliyawati, Lailatus, S., Mega, A.S.D., Pahirah, Riyatul, F. & Fadilatul, A. (2024). Pelatihan Pembuatan Suplemen Herbal Immunomodulator pada Santri Putri Pondok Pesantren Salafiyah Syafi'iyah Sukorejo. [Training on Making Herbal Immunomodulator Supplements for Female Santri at Salafiyah Syafi'iyah Sukorejo Islamic Boarding School]. *As-Sidanah : Jurnal Pengabdian Masyarakat*, 6(1), 89-99.
- Shofiyan, M., Sri Fauziyah, & Rizki Anisa. (2025). Efektivitas Promosi PHBS dan Higiene Diri terhadap Pengetahuan, Sikap dan Perilaku Pencegahan ISPA. [Effectiveness of PHBS and Personal Hygiene Promotion on Knowledge, Attitude, and Behavior of ARI Prevention]. *Jurnal Kedokteran Komunitas*, 13(1). <https://jim.unisma.ac.id/index.php/jkkfk/article/view/27993>
- Suhardiman, A., Patonah, Marlioni, L., Purwaniati, Maulana, M., (2024). Edukasi Kesehatan dan Pemanfaatan Herbal untuk Pencegahan Infeksi Saluran Pernapasan Akut pada Siswa SMP. [Health Education and Herbal Utilization for Acute Respiratory Infection Prevention in Junior High School Students]. *Edukasi Masyarakat Sehat Sejahtera (EMaSS) : Jurnal Pengabdian kepada Masyarakat*, 6(2), 30-35.
- Rinanto, Y., Masrurroh, L., & Herbal, T. (2021). Pendampingan Pembuatan Teh Herbal Sebagai Immunostimulator. [Assistance in Making Herbal Tea as an Immunostimulator]. *Prosiding Seminar Nasional Kesehatan (Senkes)*, 1372–1376.
- Ruliati, Aini, I., Novitasari, S., (2022). Pengaruh Konsumsi Teh Herbal terhadap Kejadian ISPA pada Anak Balita di Musim Pandemi Corona. [The Effect of Herbal Tea Consumption on the Incidence of ARI in Toddlers During the Corona Pandemic Season]. *Midwifery*, 8(1), 71-81. <https://doi.org/10.21070/midwifery.v8i1.1640>

This page has been intentionally left blank