



Improving Public and Environmental Health Through Rheumatoid Screening and Education on Environment Pathogenic Fungal Contamination

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ABSTRACT

People working in agricultural environments with high humidity levels are at greater risk of exposure to pathogenic fungi, which can trigger infections of the skin, nails, and respiratory tract, especially in individuals with weakened immune systems. On the other hand, the elderly are vulnerable to health decline, including autoimmune diseases such as rheumatoid arthritis (RA), which can cause joint inflammation, tissue damage, and progressive disability. This community service activity aims to increase public knowledge about the dangers of pathogenic fungal contamination and to conduct early detection of RA through Rheumatoid Factor (RF) testing. Education was delivered interactively using lectures, discussions, and visual media, accompanied by pre- and post-tests, as well as RF testing using the latex agglutination method. This community service activity was attended by 33 participants. Results showed an increase in knowledge from 58% to 91% after the education, with all 33 RF test participants receiving non-reactive results. This program demonstrates that the combination of education and simple testing can increase public preventive awareness and is suitable for adaptation in other areas with similar risk characteristics.

Keywords: Health Education; Pathogenic Fungi; Rheumatoid Arthritis; Early Detection; Sumbersono.

INTRODUCTION

Sumbersono Village has a fairly large area and consists of four hamlets, namely Sumbersono, Sumbersari, Selorejo, and Pekingan. In Pekingan Hamlet, most of the residents work as farmers producing horticultural crops for daily needs and as a source of income. Often, farmers' activities interact with humid environments, soil, and decaying plant debris, which can increase the risk of exposure to pathogenic fungi that can cause serious infections, especially in individuals with weak immune systems, where inhalation of fungal spores or colonization of the skin can result in lung tissue invasion, tissue damage, and the appearance of significant clinical symptoms (Eduard et al., 2001). According to world health organization (WHO, 2022) fungal infections are a global health problem whose significance is increasingly recognized. WHO has even designated 19 pathogenic fungi as priorities due to high mortality rates, increasing incidence of resistance, and limited available therapies.

The declining health of older adults impacts their quality of life. As they age, they experience a decline in bodily function and balance, as well as the emergence of various disorders, one of which is autoimmune disease (Kiik et al., 2018). This autoimmune disease is characterized by chronic inflammation of the joints of the hands and feet,

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accompanied by symptoms of anemia, fatigue, and depression. This inflammation causes loss of joint function, leading to bone damage and progressive disability (Soryatmodjo et al., 2021).

Rheumatoid arthritis (RA) is a chronic condition characterized by inflammation of the synovial joints, typically affecting the small joints. In more advanced stages, the disease can affect other joints and various body tissues. One method used to diagnose rheumatoid arthritis is the Rheumatoid Factor (RF) test. Based on research data (Riskednas, 2018), The prevalence of joint disease in the Indonesian population aged ≥ 15 years was recorded at 7.3%, while in East Java Province the prevalence reached 6.72%. This prevalence indicates that joint disease remains a significant public health problem, both at the national and provincial levels. The distribution of cases by age group shows an increase with age, with the highest prevalence found in the age group ≥ 75 years at 18.95%, while the lowest prevalence was found in the age group 15–24 years at only 1.23%. In addition, there are quite clear differences based on gender, with a higher prevalence in women (8.46%) than in men (6.13%). This indicates that age and gender are important determinants of the incidence of joint disease and need to be taken into consideration in prevention and treatment efforts.

This Community Service activity is expected to improve community health and well-being through Rheumatoid Factor testing for early detection of rheumatoid arthritis and education regarding pathogenic fungal contamination in the community. This activity was made possible thanks to the support of Universitas Nahdlatul Ulama Surabaya and the Sumbersono Village Government, given that most residents are farmers and are still unaware of the risks of autoimmune diseases and exposure to pathogenic fungi.

LITERATURE OR CONCEPTUAL REVIEW

Rheumatoid Factor (RF) is an immunoglobulin that reacts with IgG molecules. As the name suggests, RF is primarily used to diagnose and monitor Rheumatoid Arthritis (RA). All patients with RA exhibit antibodies against IgG, called RF or antiglobulin. RA itself is a chronic systemic disease characterized by low-grade inflammation of connective tissue. In adults, RA is a symmetric inflammatory polyarthritis characterized by synovial proliferation and bone and cartilage destruction. The most common manifestation of this disease is joint involvement, which is generally persistent and progressive (Harti & Yuliana, 2012).

Rheumatoid factor (RF) is not only found in rheumatoid arthritis. RF can describe both autoimmune and non-autoimmune conditions. RF is found in 4% of young, healthy individuals and the elderly (Newkirk, 2002). The presence of RF is undetectable without an immunogenic stimulus. The presence of RF indicates a variety of antigenic stimuli, such as lipopolysaccharides, bacterial toxins, or viruses (Tiwari et al., 2025). RF positivity and negativeness will affect the severity of the patient's condition. Patients who are seropositive for RF will experience more severe conditions and knee erosions than patients who are seronegative for RF (Scott et al., 2003).

MATERIALS AND METHODS

The activity was carried out on July 11, 2025, at the Peking Hamlet Hall, Sumbersono Village, Dlanggu District, Mojokerto Regency. The series of activities began with a preparatory stage, which included coordination with village officials, the preparation of educational materials regarding the dangers of pathogenic fungal contamination along with sources of contamination, impacts on health, and preventive measures both on agricultural land and residential environments. In addition, equipment and materials for Rheumatoid Factor (RF) examinations were also prepared, including latex agglutination reagents, and a systematic process was established from opening to health

assistance. The main target group is the elderly group (lansia) who have a higher risk of degenerative diseases, including rheumatoid arthritis.

The implementation phase began with the delivery of interactive health education materials using visual media to increase public understanding of the risks of pathogenic fungal contamination and its prevention. Following the educational session, an RF test was conducted through venous blood sampling, which was then analyzed at the Universitas Nahdlatul Ulama Surabaya Laboratory using the latex agglutination method. The test results were interpreted qualitatively based on reagent indicators, with interpretations being positive (+) or negative (-). The activity concluded with health counseling regarding joint conditions and the risk of rheumatoid arthritis. Participants with positive results received preventive education and recommendations for further examination at a health facility.

Evaluation of the program's success was conducted through descriptive analysis of test data, participation levels, participant enthusiasm during the activity, and positive responses to the educational materials presented.

RESULTS AND DISCUSSION

Participants in this Community Service program were residents of Peking Hamlet, Sumbersono Village Mojokerto Regency. The data on respondents who participated in this activity is listed in the following table 1:

Table 1. Respondent Demography

No	Cathagories	Frequency
1.	Gender	
	Male	4
	Female	29
Total		33
2.	Age	
	Age range between 30-50 year old	8
	Age range between 51-70 year old	20
	Age range between 71-80 year old	5
Total		33

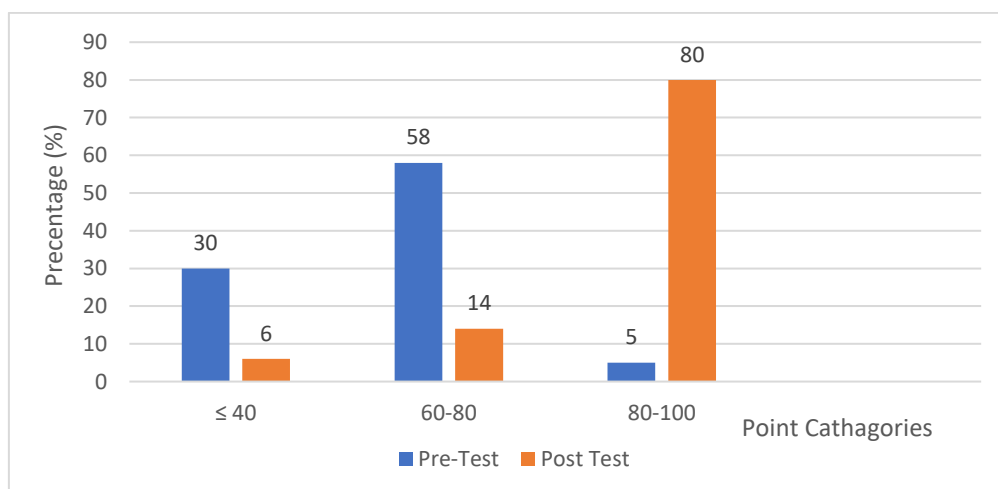


Figure 1. Pre- and Post Test Result from Education Activity

For evaluation of education activity, respondent were facing five question to answer before education of pathogenic fungal begins and after education activity. Figure 1 illustrate the evaluation

on education of pathogenic fungal. Activity then continue to rheumatoid factor examination. The result were tabulated in table 2.

Table 2. Rheumatoid Factor Test Result

No	Sample	Test Result
1	S1	Non Reactive
2	S2	Non Reactive
3	S3	Non Reactive
4	S4	Non Reactive
5	S5	Non Reactive
6	S6	Non Reactive
7	S7	Non Reactive
8	S8	Non Reactive
9	S9	Non Reactive
10	S10	Non Reactive
11	S11	Non Reactive
12	S12	Non Reactive
13	S13	Non Reactive
14	S14	Non Reactive
15	S15	Non Reactive
16	S16	Non Reactive
17	S17	Non Reactive
18	S18	Non Reactive
19	S19	Non Reactive
20	S20	Non Reactive
21	S21	Non Reactive
22	S22	Non Reactive
23	S23	Non Reactive
24	S24	Non Reactive
25	S25	Non Reactive
26	S26	Non Reactive
27	S27	Non Reactive
28	S28	Non Reactive
29	S29	Non Reactive
30	S30	Non Reactive
31	S31	Non Reactive
32	S32	Non Reactive
33	S33	Non Reactive

DISCUSSION

This activity, attended by 33 participants, aims to facilitate early detection of rheumatoid arthritis through rheumatoid factor (RF) testing and increase public awareness of the dangers of pathogenic fungal contamination in the environment. Education was provided through interactive lectures, discussions, and posters, covering the types of pathogenic fungi, their health impacts, and preventative measures.

Based on the pre-test results, 58% of respondents scored in the 60–80 range, while 30% were in the ≤ 40 category, and only 5% achieved a score of 80–100 (Figure 1). This indicates that most respondents lack knowledge about pathogenic fungi in the environment. This occurs because fungal infections of the skin, nails, or feet usually do not cause serious symptoms such as fever, dizziness, or nausea that can interfere with daily activities. Therefore, sufferers are often unaware that they have a fungal infection (Kumar & Rao, 2018). It is important to provide education about pathogenic fungal diseases so that people better understand that changes in the appearance of nails, skin, or hair can be a sign of infection (Izzudin et al., 2023).

Meanwhile, the post-test results showed a significant improvement, with (80%) participants achieving a score of 80–100, (14%) in the 60–80 range, and only (6%) achieving a score ≤ 40 . This shows that the interactive education delivered and supported by visual media effectively helped participants understand the material. Participants also appeared enthusiastic during the discussion, indicating that they were starting to realize the importance of maintaining cleanliness and recognizing the early signs of fungal infections, even if they do not cause severe symptoms.

RF testing is performed to identify antibodies associated with rheumatoid arthritis, a long-term autoimmune disease that can cause inflammation in the joints (Thomas, 2023). Based on the results of the research, Rheumatoid Factor (RF) testing on 33 samples yielded negative results (Table 2). Although all participants had nonreactive (negative) results, this test remains important as an initial step in detection, as rheumatoid arthritis can develop slowly (Longère et al., 2021). It is recommended to provide further education on how to live a healthy life, consume balanced nutrition, exercise regularly, and have regular health checks to prevent the development of this disease in the future (Schäfer & Keyßer, 2022).

The success of this program was demonstrated through active community engagement, high attendance rates, and positive responses to the materials presented. Collaboration between the implementation team, local government, and the community also enhanced the initiative's sustainability. This model can be implemented in other villages with similar conditions to increase community independence in caring for their own health and the environment.

CONCLUSIONS

Community service activities in Peking Hamlet, Sumbersono Village, Mojokerto Regency, successfully increased residents' knowledge about the dangers of pathogenic fungi and the importance of early detection of rheumatoid arthritis, despite non-reactive Rheumatoid Factor tests. Community enthusiasm and strong cooperation were key to the program's success. It is recommended to continue regular education and expand similar health screenings to other areas to strengthen awareness and prevent disease.

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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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