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Original Article

Early Detection and Education about Scoliosis in Mojosongo 5 Public Elementary School of Surakarta, Central Java Indonesia

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Abstract: *Scoliosis is a spinal deformity that commonly occurs in school-aged children and often remains undetected at an early stage. This community service program aimed to increase students' knowledge and conduct early detection of scoliosis through education and simple screening. The methods included interactive health education using visual media, demonstrations of correct posture, stretching exercises, and examination with the Adam's Forward Bend Test among 120 sixth-grade students at SD Negeri Mojosongo 5 Surakarta. The results showed a significant improvement in students' understanding, where the percentage of good comprehension increased from 20% to 60%, while the moderate category decreased from 50% to 35% and the poor category from 30% to 5%. This indicates that interactive health education with visual aids is effective in raising students' awareness of scoliosis. In addition, the screening successfully identified early indications of scoliosis in some students, who were then recommended for further medical evaluation.*

These findings support the literature emphasizing the importance of early scoliosis detection during the growth spurt period to prevent progression of spinal deformities (Cheng et al., 2015; Konieczny et al., 2013). Simple screening methods proved practical and effective, as reported by Coelho et al. (2013), while exercise-based interventions align with the SOSORT guidelines (Negrini et al., 2018). Therefore, an integrated school-based education program can serve as a sustainable preventive strategy to improve students' awareness and spinal health.

Keywords: *Scoliosis, Health Education, Early Detection, Elementary School Students.*

I. INTRODUCTION

Scoliosis refers to a series of disorders caused by changes in the spine and the surrounding soft tissue, with pain as the main symptom. Back pain has become a common problem for most of the population nowadays. Factors influencing this issue include lifestyle, improper and prolonged sitting posture, as well as a lack of body movement or being stationary. The core of this problem includes mechanical disturbances in the spinal structure, poor posture, and sudden body movements (Kasumovic M, 2013).

Back pain, also known as radicular pain, lumbar pain or low back pain, is a complaint that is often encountered in clinical practice (Hudaya, 2009). According to the International Association for the Study of Pain (IASP) in 2009, back pain affects 30-50% of the general population each year. 15% of the general population will experience chronic neck pain (> 3 months) at some point in their lives. 11-14% of working individuals each year will experience limitations in activity due to back pain. The peak prevalence occurs in early puberty, and women are more frequently affected than men. Risk factors include repetitive work, prolonged lumbar flexion, high psychological stress due to work, smoking, and back problems.

Complaints in the spinal area are common during work, such as sitting for too long and being static, maintaining a hunched back position for extended periods, and performing repetitive twisting movements of the spine. These issues can affect work time, reduce work productivity, decrease alertness, increase the risk of accidents, and if the complaints reach a critical stage, they will require recovery costs (Permatasari et al, 2018). One of the complaints of scoliosis that is frequently experienced by students in SD Negeri Mojosongo 5, Surakarta City, is that these students learn while seated and hunched over for long periods and being static. Such a work posture leads to complaints of pain in the back area. Scoliosis can occur during various activities but carries risks as it causes muscle tension or spasms along the spinal area, leading to limited movement in the lumbar region. The scoliosis can occur during various activities, but it carries risks as it causes muscle tension or spasms in the area along the spine, leading to limited movement in the lumbar region, thereby reducing lumbar function and disrupting daily activities.

II. METHOD

The community service activity was held at SD Negeri Mojosongo 5 Surakarta with a total of 120 sixth-grade students, carried out using a comprehensive and effective method, namely:

- Preparation and Planning Coordination with the school to determine the schedule and technical execution of the activities. Development of educational material that is appropriate for the understanding level of elementary school students. Development of a simple screening instrument for early detection of scoliosis.
- Training for School Health Cadres Training for UKS teachers and Physical Education teachers on basic techniques for scoliosis examination. The examination used the Adam's Forward Bend Test method and a simple scoliometer.
- Scoliosis Screening: The implementation of initial examinations (screening) for all students, with priority given to 6th-grade students. The use of Adam's Forward Bend Test to identify back asymmetry. Documentation of screening results using standard formats and follow-ups for detected cases. Referrals to health facilities for students identified with signs of scoliosis
- Interactive Education: Health education about scoliosis using engaging methods. Demonstration of proper body posture while sitting, standing, and carrying school bags. Practice of back muscle strengthening exercises and appropriate stretching for children. Distribution of educational media in the form of posters, leaflets, and booklets about scoliosis.
- Modification of the School Environment: Assessment of the classroom ergonomics (desks, chairs, and layout). Recommendations for adjustments to facilities to support healthy body posture. Implementation of "posture break movements" during long class hours.
- Monitoring and Evaluation: The implementation of regular follow-up checks which can be carried out by health teachers or physical education teachers. Evaluation of changes in students' knowledge, attitudes, and behaviors related to spinal health. Measurement of program effectiveness through established indicators. Reporting the results of activities and follow-ups to relevant stakeholders.These methods are implemented with participatory and sustainable principles, with the main goal of increasing the school community's awareness of the importance of early detection and prevention of scoliosis in school-aged children.

III. RESULT AND DISCUSSION

The activity was carried out in several stages on July 15, 2025, July 19, 2025, and August 1, 2025. The implementation of the activity took place in the school field by providing health education about scoliosis. The dissemination of the information involved students, teachers, and school officials. The activity began with triggering questions to understand the extent of the students' knowledge about scoliosis. Then, an introduction to scoliosis was provided, including its definition, causes, as well as the signs and symptoms that need to be watched out for. The educator presented the material using an interactive lecture method, utilizing posters and teaching aids to help students better understand the information given.

Figure 1 : Counseling for SDN V Mojosongo students.

Next, a question and answer session and a simple demonstration on how to detect scoliosis early were conducted, such as posture checks and observations of the spine's shape. Participants were given the opportunity to practice directly under the guidance of the counselor. Demonstrations of correct posture while sitting, standing, and carrying a school bag were shown. Practice sessions for back muscle strengthening and appropriate stretching for children were held. Educational materials such as posters, leaflets, and booklets about scoliosis were distributed. With this method, it is hoped that students will increase their knowledge and awareness of the importance of early detection and prevention of scoliosis from a young age.

Figure 2 : The Process of Counselling and Scoliosis Examination

The interpretation of the data from the activities shows a significant increase in students' understanding of scoliosis after educational interventions were provided. Before the counseling, only 20% of students had a good level of understanding, while the majority were in the sufficient category (50%) and poor (30%). After the education, there was a surge in the good understanding category reaching 60%, accompanied by a decrease in the sufficient category to 35% and the poor category down to only 5%. This emphasizes that education-based interventions through interactive counseling can effectively enhance students' knowledge.

Table 1 : Student Understanding Level

Category	Before Education (%)	After Education (%)
Good	20	60
Sufficient	50	35
Poor	30	5

(Primary Data, 2025)

Education has a significant positive impact on increasing students' knowledge about scoliosis. This improvement is in line with the research by Negrini et al. (2018) which emphasizes the importance of educational and rehabilitation interventions in the efforts to prevent and manage scoliosis during growth years. School-age children are a vulnerable group because they are in a growth spurt phase where spinal abnormalities can develop more rapidly. With education on proper posture, early signs of scoliosis, and simple stretching exercises, students become more capable of recognizing and preventing risk factors early on.

In addition to increasing knowledge, the screening activities also provide additional benefits by detecting signs of scoliosis in some students. This indicates the relevance of implementing similar programs continuously in school environments, as recommended by Konieczny et al. (2013), who stated that early detection is key in preventing the progression of adolescent idiopathic scoliosis. Therefore, this community service not only succeeded in increasing knowledge but also had a practical impact by identifying potential cases of scoliosis that require follow-up examination.

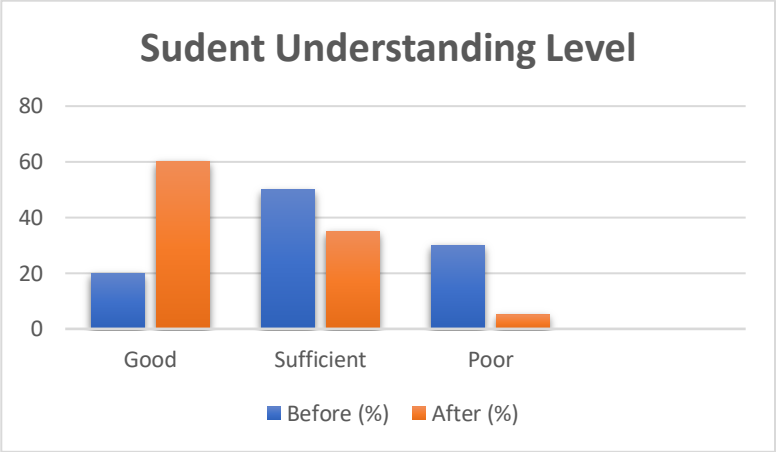
The results of the activities show a significant increase in understanding after the educational process. Before the education, most students were in the adequate and inadequate categories, indicating that their initial knowledge was still limited. After being provided with educational materials, the majority of students moved to the good category. The interactive counseling method proved to be effective as it involved students directly in the learning process. Additionally, the use of visual media and teaching aids helped students understand the material more easily. The scoliosis screening also

successfully identified several students with early indications of scoliosis. These findings highlight the importance of early detection activities in schools to prevent complications in the future.

Community service in the health sector often focuses on education and empowering the community, especially for conditions that can be detected and prevented early, such as scoliosis in school-aged children. Early detection of scoliosis in elementary school is very important because it occurs during a rapid growth phase (growth spurt), where spinal curvature can develop more quickly. Early intervention can prevent the progression of the disorder and long-term complications. Preventive measures and corrections at a young age usually yield better results. Children are still in the stage of developing posture habits.

Community service programs for early detection and prevention of scoliosis in elementary schools may include several key components, namely mass screening using the Adam's Forward Bend Test method, education on proper posture for teachers, students, and parents, training health cadres for ongoing monitoring, implementation of physical activity programs that support spinal health, modification of the learning environment to support good ergonomics.

Chart 1 : Student Understanding Level



The results of the students' improved understanding from this educational activity support the findings of Cheng et al. (2015), which state that adolescent idiopathic scoliosis is a condition that occurs quite frequently during school age and is often not detected early. Providing accurate information can help students understand the early symptoms, allowing them and their parents to be more vigilant about changes in body posture. This increased knowledge is expected to serve as a foundation for students to maintain good posture habits in their daily lives.

Furthermore, the effectiveness of simple screening methods such as Adam's Forward Bend Test used in this activity aligns with the findings of Coelho et al. (2013) which emphasize that postural examination methods using a scoliometer can be a practical means of detecting indications of scoliosis in school-aged children. With early detection through mass screening in schools, scoliosis cases can be identified more quickly, thus minimizing the risk of progressive spinal disorders. This is in accordance with the recommendations of Konieczny et al. (2013) which highlight the need for regular examinations in children and adolescents.

In addition, the increase in students' knowledge accompanied by the habituation of simple physical exercises is relevant to the study by Romano et al. (2012) which shows that targeted physical exercise can help prevent the progression of adolescent idiopathic scoliosis. The stretching and strengthening exercises for the back muscles introduced in this activity are a preliminary step that aligns with the SOSORT guidelines (Negrini et al., 2018), where early educational interventions and exercise have been shown to contribute to spinal health. Thus, this community service provides dual benefits in the form of increased awareness and practical skills for students in maintaining their postural health. A collaborative approach involving healthcare workers, schools, families, and communities will maximize the impact of the program and ensure its sustainability. In this community service, science and technology are used to educate students on maintaining posture in daily activities.

IV. CONCLUSION

The early detection and education activities about scoliosis at Mojosongo 5 Public Elementary School in Surakarta successfully increased students' awareness and understanding significantly. This activity also provided additional benefits in the form of health screenings that can serve as a reference for follow-up actions for students indicated with scoliosis. The

recommendation from this activity is the need for periodic scoliosis education and screening programs to be conducted in elementary schools, involving health personnel, teachers, and parents.

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B. CONFLICT OF INTERESTS

- The authors declare no conflict of interest in the implementation or reporting of this community service activity.

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