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Physiotherapy Services: Core Stability Exercises are Essential for Reducing Lower Back Pain (LBP) in the Elderly

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ABSTRACT

Background: *Low back pain (LBP) is a common health problem among the elderly, often interfering with daily activities and reducing quality of life. Aging affects the spine's structure and function, increasing the risk of LBP. Non-pharmacological interventions such as core stability exercises have shown potential in reducing pain and improving function. This training program improved the knowledge and skills of both health cadres and older adults, making it a useful non-pharmacological therapy to enhance quality of life.*

Methods: *This community service program was conducted in Tohudan Village, Karanganyar, Central Java, from February to July 2023, involving elderly individuals experiencing LBP and local health cadres. The intervention included educational sessions, training in core stability exercises, and evaluations of participants' knowledge and skills. The exercises taught included diaphragmatic breathing, raising limbs, bridging, and quadruped positions. The evaluation was conducted through structured qualitative interviews with participants and cadres.*

Results: *The program showed positive outcomes, with increased understanding and skill among health cadres and elderly participants in performing core stability exercises. Interviews with participants and cadres supported these findings—participants reported reduced pain and improved ability to perform daily activities after regular exercise, while cadres felt more confident in guiding others to perform correctly and maintaining programme continuity.*

Conclusion: *Core stability exercise is an effective non-pharmacological intervention to reduce low back pain and improve the quality of life among the elderly. Training community health cadres ensures sustainable impact, enabling continued support for elderly individuals suffering from LBP. Further referrals to health facilities are recommended if symptoms persist.*

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INTRODUCTION

Lower back pain in the elderly is one of the most common musculoskeletal problems, primarily due to the aging process that affects the spinal structures, including discs, joints, and supporting tissues (1). As age increases, there is a decrease in the elasticity and mechanical function of the spine, which increases the risk of pain. In addition, conditions such as osteoporosis, osteoarthritis, and decreased muscle mass are

often factors that exacerbate pain complaints in the elderly and negatively impact their quality of life. Therefore, the treatment of Lower Back Pain (LBP) in the elderly needs to be carried out carefully by considering the physical condition and potential side effects of therapy (2).

LBP results from pathological processes involving tissues or organs in or around the back. The condition has multiple etiologies and presents with varying clinical symptoms. Pain can range from a dull discomfort to sharp, stabbing sensations. Elderly individuals may also experience joint stiffness, especially in the morning, and muscle weakness affecting body stability (3). Age-related neuromuscular function decline worsens the condition and increases the risk of limited mobility and falls (4).

The severity of pain is usually closely related to the level of disability, potentially causing major difficulties in daily activities, including basic movement and maintaining an upright posture (5). The age-standardized prevalence of LBP has decreased by 11.06% since 1990, but the number of affected individuals has increased from approximately 386.7 million to 628.8 million people in 2021 (6)(7). WHO data identifies LBP as a leading cause of disability worldwide, with an estimated global prevalence of 7.2% (8). Furthermore, WHO estimates that 4 out of 5 people will experience LBP in their lifetime. In Indonesia, prevalence estimates range from 7.6% to 37% (5).

One recommended intervention for the elderly is core stability exercise. According to (9), it is a systematic effort to enhance control of body position and movement, especially in the pelvic and leg areas. It aims to optimize body motion performance and facilitate force transfer and control across body segments in integrated kinetic chains. The optimal core function supports posture improvement, coordination, energy efficiency, and injury prevention. The core muscles are central to functional limb movement and act as the power center in physical activities (10).

These exercises help prevent back injuries, strengthen muscles without causing pain, stretch muscles, and prevent imbalances. Common exercises include diaphragmatic breathing, raising one arm, raising one leg, combined maneuvers, bridging, and quadruped positions (11). Tohudan Village has shown a notable indication of increased complaints related to low back pain, particularly among the elderly population.

Many residents report experiencing chronic or recurring back pain, which is believed to be associated with aging, poor posture, physical inactivity, and a lack of knowledge regarding proper body mechanics (12). These observations highlight the urgent need for preventive and rehabilitative efforts at the community level, especially through the empowerment of local health workers (13). Outcomes showed improvement in health cadres' and community members' understanding and skills in practicing core stability exercises to relieve LBP.

METHODS

The core stability exercise training was carried out at the elderly health post in Tohudan, Colomadu, Karanganyar, Central Java. The program began with educational counseling sessions focused on LBP and core stability exercises. The implementation took place from February to July 2023. Elderly individuals who met inclusion criteria were selected as the target of the service.

The programme began with a preparatory phase involving field observations and intensive communication with partner institutions to align programme objectives. The team prepared proposals and obtained the necessary permits from relevant parties, as well as coordinating internally regarding implementation and equipment requirements.

Meetings were held with Posyandu cadres to ensure a common understanding of the objectives and methods of the activities, as well as to set a schedule agreed upon with the elderly residents. Final preparations included adjusting research aspects and confirming the implementation time so that all parties were ready when the activities began.

The implementation phase was led by the principal investigator and the community service team and began with a counselling session followed by four educational meetings on LBP and core stability exercises for the elderly. Health cadres and community members were trained on how to recognise the symptoms of LBP and how to perform and supervise the exercises correctly. The educational material consisted of demonstrations of movements (e.g. diaphragmatic breathing, lifting limbs, bridging, quadruped position) accompanied by teaching materials distributed by the researchers, as well as additional leaflets for exercise guidance at home.

Evaluation was conducted continuously through LBP examinations on the first day carried out by researchers with the assistance of cadres, two guided exercise sessions on the second day, and follow-up meetings that included reinforcement of the material and final evaluation at the fourth meeting. The evaluation assessed participants' understanding, exercise implementation skills, and the presence of LBP complaints after the intervention. The evaluation results were formative and were used to recommend follow-up in the form of repeating sessions, training cadres as ongoing facilitators, and providing concise materials so that the exercises could be maintained at the community level (14).

RESULTS

The community service programme was implemented in Tohudan Village, Karanganyar, Central Java, from February to July 2023. The preparatory stage began with field observations and intensive communication between the implementation team and partner institutions to align objectives and adapt the approach to local conditions. The team prepared proposals, obtained permits, and coordinated internally regarding logistics and equipment needs. Preliminary meetings with Posyandu cadres aimed to align understanding of the objectives, materials, and intervention methods and to set a practical schedule for the elderly.

The implementation phase was led by the implementation team together with local Posyandu cadres and began with a counselling session introducing the concept of LBP and the importance of core stability. The intervention was conducted in four sessions covering theoretical instruction, movement demonstrations, group exercises, and question-and-answer sessions. The practical material included diaphragmatic breathing, limb raises, bridging, and quadruped positions, which were modified according to the participants' abilities and space limitations at the Posyandu. The implementation team provided sample teaching materials and guidance leaflets so that participants could continue exercising independently at home.

Evaluation was conducted in layers and included a simple LBP examination on the first day carried out by the implementation team with the assistance of cadres, two guided exercise sessions on the second day to practise skills, and a fourth meeting that served as material reinforcement and final evaluation of understanding, skills, and residual complaints. In addition to observing the practice, semi-structured interviews were conducted with participants to explore their experiences, changes in symptoms, supporting factors, and barriers to continuing the exercises.

The interview results reinforced the observational findings; one participant stated:

"Previously, I thought that back pain could not be treated because of my age. After being taught abdominal and back exercises, the pain decreased, and I became more confident in moving." (P03, 70 years old).

Another participant reported:

"When the exercises were guided by the cadre, the movements felt safe and easy to follow. Two weeks after regularly exercising at home, I rarely feel stiffness in my waist." (P07, 68 years old)

From the cadres' perspective, one acknowledgement stated:

"Our cadres are trained in how to guide — that's important. With our assistance, we see that participants become more confident and are not afraid of doing the movements wrong.' (Cadre 02, 45 years old).

The role of Posyandu cadres proved to be central throughout the process, from facilitating the implementation of the exercises to reminding participants of the schedule and assisting them outside of formal sessions. The findings of the formative evaluation (practice observation and interviews) formed the basis for follow-up recommendations, including strengthening the capacity of cadres as sustainable facilitators, providing concise materials in the form of leaflets/flipcharts for practice at home, modifying exercises according to space limitations and abilities, and scheduling booster sessions to maintain the effect of the intervention at the community level.



Figure 1. Documentation of Community Service Activities

DISCUSSION

The implementation of core stability exercise education for elderly individuals with low back pain aligns with recent research highlighting the effectiveness of non-pharmacological interventions in improving functional mobility and reducing pain. Studies have shown that consistent core strengthening significantly enhances spinal

stability and quality of life in older adults. The activity also demonstrated positive implications, including increased awareness, active participation, and improved self-management of symptoms among participants (15).

The integration of core stability exercises into the Posyandu routine for the elderly should be prioritised to ensure sustainability and the formation of healthy habits at the community level. It is recommended that booster sessions be scheduled every 4–8 weeks to reinforce participants' skills and prevent recurrence of LBP complaints. To support implementation, Posyandu cadres must be empowered through training as sustainable facilitators so that local assistance can run without full dependence on external teams. In addition, the provision of concise materials — such as leaflets, flipcharts, or short videos — containing exercise instructions (diaphragmatic breathing, limb lifting, bridging, and quadruped) will make it easier for participants to do independent exercises at home and reinforce the transfer of learning from group sessions (15,16).

The implementation of the program needs to consider the physical limitations and individual abilities of elderly participants so that the interventions provided remain safe and effective. Therefore, the form of exercise must be modified, for example, with movements in a sitting position or using support aids, so that all participants can follow along without increasing the risk of injury. These adjustments to the movements also aim to increase the comfort and confidence of the elderly when participating in activities. With an adaptive approach, participant participation and sustained involvement are expected to increase (15).

Exercise requires a simple monitoring mechanism to improve compliance and evaluate the development of participants' physical functions. Monitoring can be done through daily exercise records by participants and or brief weekly checks by health cadres. This strategy allows for early detection of implementation barriers while providing continuous feedback. The combination of a booster schedule, cadre training, provision of supporting materials, movement modifications, and routine monitoring is expected to create a program that is sustainable, effective, and responsive to the needs of older adults at the Posyandu level (17–19)

In addition to the clinical benefits of reducing pain and improving spinal stability, the implementation of core stability exercise education also contributes significantly to improving the quality of life of the elderly. Improved functional capacity allows the elderly to perform daily activities more independently, increases their self-confidence, and reduces their dependence on family and health services. Regular participation in structured physical exercise also has a positive impact on psychosocial well-being, such as reduced anxiety about pain, increased motivation to remain active, and strengthened social interactions in the Posyandu environment. Overall, this approach not only supports physical health but also promotes healthier and more meaningful aging through a holistic improvement in the quality of life of the elderly (18).

However, the implementation of the program still faces several challenges that need attention. These challenges include limited participant attendance due to health conditions, differences in physical abilities between individuals, and the need for ongoing motivation to ensure participants consistently attend activities. These variations in physical condition and level of participation cause participants' responses to the intervention to be inconsistent. If not managed properly, these factors have the potential to hinder the optimization of the overall program results.

To strengthen the implementation of the program in the future, a more structured and sustainable development strategy is needed. This strategy includes increasing the

frequency of follow-up sessions, providing exercise modifications tailored to the conditions and abilities of participants, and strengthening training for health cadres. Optimal involvement of cadres is expected to support the continuous mentoring of participants at the community level. Through these efforts, the program is expected to run continuously while increasing the scalability of interventions in the context of community empowerment.

CONCLUSIONS AND SUGGESTIONS

This community service activity provided training to address LBP among the elderly through core stability exercise interventions for health cadres in Tohudan Village, Colomadu District, Karanganyar Regency, during August–November 2022. Results showed that health cadres were able to follow the exercises under physiotherapist supervision and demonstrated improved health outcomes and increased understanding and skills in conducting core stability exercises when experiencing LBP. As a result, both health cadres and community members can train family or neighbors with similar complaints. If symptoms persist, it is advised to visit nearby health facilities for further treatment.

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DECLARATION OF USE OF AI IN SCIENTIFIC WRITING

AI tools were used solely for grammar and language editing. The authors take full responsibility for the content and integrity of the manuscript.

CONFLICT OF INTERESTS

The author declares that there is no conflict of interest in this community service activity.

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