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Empowering Older Adults Physical Independence via Ergonomic Education and Integrated Physical Therapy Services in Pakem, Sleman

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Abstract

The aging process leads to a decline in musculoskeletal function, resulting in an increased risk of mobility impairment, pain, and reduced independence among older adults in performing daily living activities. This condition necessitates health promotion and preventive initiatives through community-based education and healthcare services. This community engagement activity aimed to enhance older adults' access to ergonomic education, health consultations, and integrated physical therapy services to support physical independence. The activity was conducted in May 2026 at TLC Bethesda, Pakem, Sleman, Special Region of Yogyakarta, involving 200 older adults aged 60–74 years. The program comprised ergonomic workshops and demonstrations, health consultations, and tailored physical therapy services based on participants' needs. Program evaluation was performed using a satisfaction questionnaire completed by 172 participants and analyzed descriptively. Initial screening revealed that the most frequently reported complaint was knee pain (41.0%), followed by back pain (23.0%), concurrent knee and back pain (12.0%), and shoulder/neck pain (10.5%). The evaluation demonstrated an overall satisfaction score of 3.54 ± 0.38 (88.50%), falling into the "highly satisfied" category. The integrated ergonomic education and physical therapy program was successfully executed according to plan and achieved high acceptance among participants. Similar community-based initiatives are recommended to be implemented sustainably, supported by enhancements in service infrastructure and objective outcome measures to evaluate long-term impacts on older adults' knowledge and functional capacity.

Keywords: *older adults, ergonomics, community physiotherapy, physical independence, community engagement*

INTRODUCTION

The global demographic transition toward an aging population represents both a significant milestone in public health advancement and a complex socio-medical challenge. According to the World Health Organization (WHO, 2023), improvements in healthcare access, medical technology, and socioeconomic conditions have substantially increased global life expectancy, leading to a rapid growth in the proportion of older adults worldwide, including in developing nations such as Indonesia. While extended longevity reflects social development, it simultaneously demands robust health strategies to preserve functional independence, delay biological frailties, and maintain health-related quality of life among aging populations (WHO, 2023). As individuals age, they undergo progressive, irreversible physiological changes across multiple body systems, with the musculoskeletal system being particularly susceptible to age-related degenerative transformations. Primary physiological manifestations include sarcopenia characterized by the loss of skeletal muscle mass, motor unit

deterioration, and diminished muscle strength alongside decreased articular cartilage thickness, reduced ligamentous elasticity, diminished bone mineral density, and impaired neuromuscular postural control (Kandayah et al., 2023). These structural and neuro-functional alterations collectively diminish joint mechanical stability, alter biomechanical load distribution, and compromise dynamic balance. Consequently, older adults face a heightened vulnerability to chronic musculoskeletal pain, joint stiffness, motion restrictions, and functional mobility deficits (Değer et al., 2019). Musculoskeletal disorders constitute one of the primary contributors to physical disability, loss of autonomy, and social isolation among older individuals globally (Beaudart et al., 2023).

Degenerative conditions commonly present as localized or multi-site pain, predominantly affecting weight-bearing and high-stress mechanical regions such as the knee joints, lumbar spine, cervical spine, and shoulder complex (Li et al., 2023). These painful conditions significantly restrict basic and instrumental activities of daily living (ADLs and IADLs), including walking, sit-to-stand transfers, stair negotiation, bending, lifting, and executing household chores (Li et al., 2023). Unmanaged musculoskeletal pain often precipitates a debilitating cycle of physical inactivity, fear of movement (kinesiophobia), progressive muscle atrophy, heightened fall risk, loss of personal autonomy, and an increased burden on family caregivers and formal healthcare systems. To mitigate these adverse trajectories, health promotion and disease prevention strategies are essential components of healthy aging frameworks. A vital non-pharmacological approach involves educating older adults on the principles of biomechanics and ergonomics tailored to daily life (Ong et al., 2021).

Ergonomic education focuses on optimizing joint alignment, regulating mechanical loading, and refining movement patterns during daily tasks such as lifting, sweeping, sitting, and resting. By adopting sound ergonomic postures, older adults can effectively minimize joint shear stress, prevent spinal overloading, reduce soft tissue strain, and conserve energy during physical exertion. In conjunction with preventive education, community-based physical therapy services play a pivotal role in early functional assessment, movement disorder screening, and targeted rehabilitation intervention (Kim et al., 2023). Community-based physiotherapy bridges the gap between tertiary clinical environments and localized primary care, offering accessible, low-barrier, and culturally sensitive interventions directly within community settings. Integrating ergonomic workshops with on-site physical therapy consultations creates a comprehensive health delivery model that combines primary prevention (education) with secondary and tertiary management (early detection, advice, and direct therapeutic intervention). In the context of higher education institutions in Indonesia, community engagement initiatives represent a direct fulfillment of the Tridharma Perguruan Tinggi (the Three Pillars of Higher Education: Education, Research, and Community Service). Through community-based health promotion, academic institutions transcend traditional theoretical dissemination, acting as active agents of social empowerment and public health improvement (Suprpto et al., 2024).

These initiatives foster direct knowledge translation, empowering vulnerable populations with actionable health literacy and immediate access to professional physical therapy care. Commemorating National Older Adults Day in 2026, the Bachelor of Physiotherapy Program at STIKES Bethesda Yakkum organized an integrated community engagement program incorporating ergonomic education, health consultations, and direct physical therapy services for older adults residing in Pakem, Sleman, Special Region of Yogyakarta. Baseline registration screening revealed a high prevalence of musculoskeletal complaints among attendees, particularly knee and lower back pain, necessitating a structured multi-tiered intervention encompassing health promotion, primary prevention, and localized rehabilitation. The primary objective of this community engagement program was to improve older adults' access to ergonomic education, health screening consultations, and integrated physical therapy care to support physical independence in daily living. Furthermore, this article aims to comprehensively document program implementation, outline participant demographic profiles and musculoskeletal complaint patterns, and evaluate participant satisfaction to inform the development of future community-based healthy aging strategies.

METHOD

This community engagement program was executed to commemorate National Older Adults Day 2026, employing a comprehensive, community-based framework that integrated health promotion, primary prevention, and localized rehabilitative care. The initiative was formally organized and carried out by the faculty members and students of the Bachelor of Physiotherapy Program at STIKES Bethesda Yakkum. The single-day outreach event was conducted on May 2026, at the TLC Bethesda facility, located on Jalan Kaliurang Km 21, Pakem, Sleman Regency, Special Region of

Yogyakarta.

The target demographic comprised community-dwelling older adults aged 60–74 years residing in the Pakem District and its surrounding areas. A total of 200 older adults participated in this health initiative, consisting of 63 male and 137 female participants. Based on the registration data, a significant majority of the participants were retirees, with educational backgrounds predominantly composed of high school graduates (SMA), diploma holders (D3), and bachelor's degree graduates (S1). Prior to the commencement of the main activities, participants completed a structured registration form that captured basic personal identities and chief health complaints. This baseline screening served as the fundamental diagnostic basis for subsequent clinical consultations and targeted physical therapy interventions.

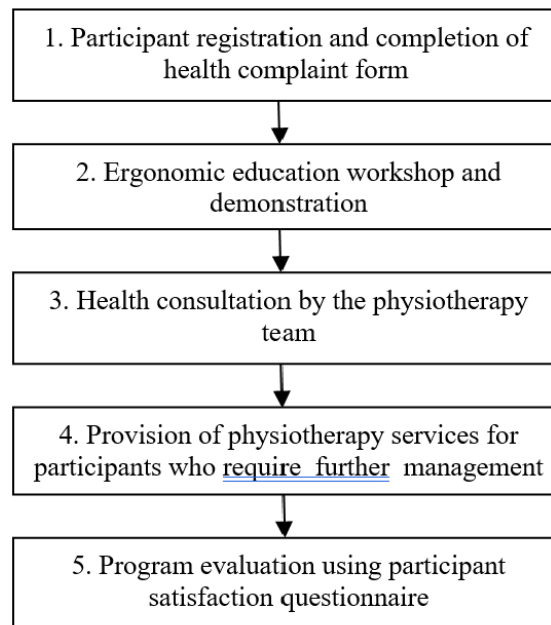


Figure 1. Workflow of the Community Engagement Program

The execution of the community engagement program commenced with participant registration and the distribution of educational materials in the form of printed leaflets. Subsequently, participants attended an interactive workshop and practical demonstration covering the fundamental principles of ergonomics in activities of daily living (ADLs). The curriculum presented key biomechanical techniques, including proper postures for sitting, standing, transitioning between positions (sit-to-stand transfers), lifting heavy objects, and performing common household chores designed to reduce mechanical loading and strain on the musculoskeletal system. The educational content was delivered through a dynamic combination of didactic lectures, real-time demonstrations, and guided audience practices, allowing participants to observe and physically replicate the recommended movement patterns. Following the educational session, participants participated in individual health consultations conducted by the physical therapy clinical team. These consultations focused on identifying movement dysfunctions, postural deviations, mobility limitations, and specific functional restrictions impacting participants' daily tasks. Based on consultation outcomes, participants who required direct intervention received personalized, on-site physical therapy services tailored to their identified musculoskeletal complaints. Program evaluation was conducted using a structured participant satisfaction questionnaire across four key operational dimensions: Instructor/facilitator communication and competence, Clarity of educational content and ease of practical application, Facility availability and environmental comfort, and Overall satisfaction and perceived health impact. Out of the 200 enrolled participants, 172 individuals (86.0% response rate) completed the evaluation instrument.

The collected data were analyzed descriptively, utilizing frequency distributions, relative percentages, means, and standard deviations to delineate participant demographic characteristics, baseline complaint profiles, and overall program satisfaction levels. The entire initiative was implemented by the faculty members and clinical students of the Bachelor of Physiotherapy Program at STIKES Bethesda Yakkum, adhering strictly to an educational, participatory, and needs-based

community health model. This integrative approach aimed to enhance health literacy, broaden localized access to professional physiotherapy services, and promote older adult empowerment to sustain physical independence through daily ergonomic application.

RESULTS AND DISCUSSION

The community engagement activity was attended by 200 older adults residing in Pakem District and its surrounding areas. All participants fell within the age range of 60–74 years. Categorized by age groups, the majority of participants belonged to the 60–65 age bracket ($n = 102$, 51.0%), followed by the 66–70 age group ($n = 65$, 32.5%), and the 71–74 age group ($n = 33$, 16.5%). In terms of gender distribution, female participants predominated, accounting for 137 individuals (68.5%), whereas male participants comprised 63 individuals (31.5%). Based on registration records, most participants were retirees, with educational backgrounds primarily dominated by high school (SMA), diploma (D3), and bachelor's degree (S1) graduates

Table 1. Characteristics of Program Participants ($n = 200$)

Characteristics	n	%
Age Group		
60-65 years	102	51.0%
66-70 years	65	32.5%
71-74 years	33	16.5%
Gender		
Male	63	31.5%
Female	137	68.5%

These demographic characteristics demonstrate that the outreach successfully reached the intended target population older adults who are inherently vulnerable to age-related functional decline and musculoskeletal degeneration. The female predominance observed in this activity aligns with global healthcare participation trends, where older women frequently demonstrate higher health-seeking behaviors and greater engagement in community-based preventive programs compared to men. Initial health screening data obtained from the registration intake forms indicated that a vast majority of participants presented with pre-existing musculoskeletal complaints. The most frequently reported chief complaint was isolated knee pain, accounting for 82 participants (41.0%), followed by lower back pain ($n = 46$, 23.0%), concurrent knee and lower back pain ($n = 24$, 12.0%), and shoulder and neck pain ($n = 21$, 10.5%). A minority of 27 participants (13.5%) reported no active pain symptoms during initial intake.

Table 2. Distribution of Participant Complaints Based on Registration Screening ($n = 200$)

Health Complaint	n	%
Knee pain	82	41.0%
Low back pain	46	23.0%
Concurrent knee and back pain	24	12.0%
Shoulder and neck pain	21	10.5%
No pain complaints	27	13.5%

The overwhelming prevalence of weight-bearing joint disorders specifically affecting the knees and lumbar spine highlights that chronic musculoskeletal impairment remains a major public health concern among community-dwelling older adults in the target area. These baseline screening findings formed the clinical rationale for tailoring the ergonomic educational modules and physical therapy interventions. Implementing a need-based community service model is essential to ensure that preventive and therapeutic interventions directly address the community's primary health burdens, thereby optimizing functional outcomes and program utility. The community engagement program commenced with participant registration and the systematic distribution of educational leaflets, which served as portable, visually structured health information media detailing ergonomic principles for daily activities. Following registration, participants attended an interactive workshop and practical demonstration session designed to educate older adults on biomechanically safe movement patterns. The curriculum focused on essential functional postures, including optimal techniques for sitting, standing, transitioning between positions (sit-to-stand transfers), lifting heavy objects, and

performing routine domestic activities (such as sweeping, hoeing, and carrying groceries) with minimal mechanical burden on the musculoskeletal framework. To optimize motor learning and health literacy retention, the session employed an interactive pedagogical approach combining didactic presentations, live instructor-led demonstrations, and guided audience return-demonstrations. This multi-sensory teaching modality provided participants with the opportunity to visually observe proper body mechanics and immediately practice the recommended postural adjustments under direct professional feedback.



Figure 2. Educational Media Distributed During the Outreach Activity

Following the educational session, participants underwent individual health consultations conducted by the physical therapy clinical team. The consultations focused on evaluating chief musculoskeletal complaints, movement system dysfunctions, postural deviations, joint range-of-motion limitations, and functional barriers encountered during daily living activities. Participants identified with active pain symptoms or significant functional limitations received targeted, on-site physical therapy interventions customized to their specific clinical conditions and functional needs. The execution of this integrated model combining health education, individual consultations, and immediate therapeutic intervention allowed participants to gain key health literacy while receiving direct, high-quality clinical care. This multi-tiered delivery model successfully operationalized health promotion, primary prevention, and secondary rehabilitation within a unified, community-based framework



Figure 3. Educational Workshop and Practical Demonstration Facilitated by the Speaker

Program outcome and service delivery quality were evaluated using a structured satisfaction questionnaire completed by 172 participants, representing an 86.0% response rate from the total 200 enrolled individuals. Overall satisfaction across all domains reached an aggregate mean score of 3.54 ± 0.38 (88.50%), placing the program in the "highly satisfied" category.

Table 3. Results of Participant Satisfaction Evaluation (n = 172)

Evaluation Dimension	Mean $\pm$ SD	Percentage	Category
Instructor/Facilitator	3.65 $\pm$ 0.42	91.25%	Highly Satisfied
Material and Practical Ease	3.50 $\pm$ 0.51	87.50%	Highly Satisfied
Facilities and Comfort	3.20 $\pm$ 0.68	80.00%	Satisfied
General Satisfaction and Impact	3.80 $\pm$ 0.35	95.00%	Highly Satisfied
Total Overall	3.54 $\pm$ 0.38	88.50%	Highly Satisfied

The highest mean score was obtained in the "General Satisfaction and Impact" dimension (3.80 ± 0.35 ; 95.00%), reflecting a strong positive perception among participants regarding the overall value, relevance, and community utility of the initiative. Similarly, the elevated rating for the "Instructor/Facilitator" dimension (3.65 ± 0.42 ; 91.25%) demonstrates that the instructional methods, interpersonal communication, visual demonstrations, and clinical assistance provided by the team were exceptionally well received by the older adult audience. Conversely, the "Facilities and Comfort" dimension received the lowest mean score among all evaluated domains (3.20 ± 0.68 ; 80.00%), although it remained firmly within the "satisfied" benchmark. This finding highlights identifiable avenues for logistical optimization in future iterations, specifically regarding expanding treatment area capacity, increasing the number of physical therapy examination plinths, and streamlining participant intake workflow to enhance operational comfort during high-volume community screenings.

Overall, the high satisfaction ratings indicate that a community-based care model integrating ergonomic education, health consultations, and direct physical therapy services is highly acceptable to older adults. However, it is important to acknowledge that this evaluation primarily measures participant satisfaction and perceived acceptability. The current metrics do not directly measure objective pre-to-post knowledge acquisition, behavioral modifications in daily body mechanics, or quantitative functional mobility improvements, as these outcome parameters were beyond the scope of this baseline initiative. Consequently, future community outreach programs should incorporate pre- and post-intervention outcome measures to comprehensively evaluate the longitudinal efficacy of ergonomic interventions on health literacy and functional capacity among older adults.

CONCLUSION

The community engagement initiative delivering integrated ergonomic education and physical therapy services in commemoration of National Older Adults Day 2026 was successfully executed in alignment with its planned objectives. The program successfully reached 200 community-dwelling older adults aged 60–74 years in Pakem, Sleman, with a demographic baseline predominantly composed of females and retirees. Initial screening logs revealed that a high proportion of participants presented with chronic musculoskeletal complaints primarily localized knee and lower back pain confirming that the educational content and therapeutic interventions were directly aligned with the essential health needs of the target population. The implementation model integrating interactive ergonomic workshops, individual health consultations, and direct physical therapy care effectively expanded healthcare access for older adults, providing valuable health literacy, clinical guidance, and therapeutic management within a single community-based platform. Outcome evaluation among 172 respondents demonstrated an overall satisfaction rating of 3.54 ± 0.38 (88.50%), placing the intervention in the "highly satisfied" performance category and confirming strong community acceptance. Although the current evaluation framework did not quantitatively capture pre- and post-intervention changes in knowledge retention, behavioral ergonomic adoption, or functional physical capacity, the findings demonstrate that community-based physical therapy integrated with ergonomic education holds substantial potential as a sustainable empowerment strategy. Such models effectively support physical independence among aging populations while bridging critical gaps in primary health service delivery. For future program iterations and related research, it is recommended to incorporate objective, validated pre- and post-test assessment tools (such as visual analog scale for pain, functional reach tests, or timed up and go tests) to quantitatively measure the direct impact of ergonomic interventions on pain and functional mobility. Optimize service delivery infrastructure by expanding treatment area capacities and increasing therapeutic equipment to further enhance participant comfort and flow during high-volume community health screenings.

DECLARATION OF GENERATIVE AI

The authors declare that no generative AI or AI-assisted technologies were used in the writing process of this manuscript.

CONFLICTING INTEREST STATEMENT

The authors states that there is no conflict of interest in the publication of this article.

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