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Strengthening Family and Community Roles in Elderly Rehabilitation for Osteoarthritis Prevention

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ABSTRACT

The elderly population in Surabaya exceeds 350,000 individuals, presenting major challenges in musculoskeletal health, particularly osteoarthritis, which contributes to pain, functional limitations, and reduced independence. A preliminary community survey in Wonocolo District showed that 35.7% of older adults experienced knee pain, particularly during stair climbing, squatting, and sit-to-stand movements, indicating an urgent need for preventive and functional rehabilitation strategies. Families and community health cadres hold a key role, yet their knowledge and skills in assisting elderly mobility and joint-protection activities remain limited. This community engagement program aimed to strengthen family and cadre capacity in elderly rehabilitation and osteoarthritis prevention through structured education, functional exercise training, and health literacy improvement. The intervention was conducted from February to July 2025 and involved 40 elderly participants and 32 family caregivers and health cadres. Activities included community health education, hands-on functional exercise training, mobility modification for prayer movements, screening for common comorbidities, and pre- and post-test knowledge assessments. Qualitative feedback was obtained to evaluate perceived benefits and readiness for sustainability. Participants demonstrated significant improvement in knowledge, with post-test scores showing more than 85% achieving 8–10 correct answers compared to pre-program scores of 4–6. Elderly participants reported decreased stiffness, increased mobility confidence, and improved ability in daily movements such as sit-to-stand transitions. Families and cadres exhibited enhanced skills in supervising exercises and assisting safe transfers. Screening activities also identified undiagnosed hypertension, hyperglycemia, and hyperuricemia, which were referred to primary health care services. The program effectively enhanced health literacy, mobility skills, and caregiver involvement in elderly rehabilitation. Strengthened family and cadre participation supports program continuity and sustainable community-based healthy aging initiatives. Future programs should include periodic follow-up training, integration with primary health services, and expansion of digital education resources to reinforce long-term behavior change.

Keywords: Aging; Community empowerment; Elderly rehabilitation; Family caregiver; Knee osteoarthritis; Health education

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INTRODUCTION

The increasing number of older adults in Surabaya, exceeding 350,000 individuals, presents significant challenges in health and social welfare (Nawi, 2024). One of the most common health problems among older adults is musculoskeletal disorders, particularly osteoarthritis, characterized by joint pain and limited mobility. This condition affects independence, quality of life, and even spiritual activities of elderly individuals.

A preliminary survey conducted in Wonocolo District revealed that 35.7% of older adults

reported knee pain, with stair climbing (35.7%), squatting (28.6%), and standing up from a sitting position (21.4%) identified as primary triggers. Additionally, 14.3% experienced difficulty performing prayer movements such as bowing and standing, while 7.1% used walking aids. The average age of respondents was 68 years, with 70% being female and 50% having comorbidities such as hypertension or diabetes mellitus.

These findings suggest that issues among elderly individuals in Wonocolo are not solely medical but also affect daily functioning, social participation, and spiritual practices. Psychosocial barriers such as loneliness, dependency on family, and limited social activity also contribute to decreased quality of life (Fadhlia & Sari, 2022). Unfortunately, families, who serve as the closest support system, often lack adequate knowledge and skills to provide holistic daily care (Wiarsih, n.d.). Likewise, community resources such as health cadres, elderly *posyandu*, and local organizations have not been fully optimized to support elder rehabilitation.

Previous research highlights the effectiveness of community-based interventions through integrated education and functional training in improving family and community involvement in elderly care (Stevenson et al., 2020). Family-based interventions also increase elderly participation in physical activity and improve mental health status (Heidari et al., 2017; Sardareh et al., 2024).

Based on the current situation, a community engagement program focusing on family- and community-based elderly care is needed to address real needs, especially education on osteoarthritis prevention, functional exercise, and psychosocial support. This program aims to strengthen the role of families and community health cadres in delivering holistic elderly care, fostering elderly-friendly community behavior, and building a resilient community-based rehabilitation ecosystem (Luo et al., 2023).

LITERATURE OR CONCEPTUAL REVIEW

Healthy aging requires multi-dimensional support from biological, psychological, and social systems. Community-based frameworks for elder care emphasize integration among families, local health workers, and primary healthcare services (WHO, 2015). According to Heidari et al. (2017), structured physical activity combined with social engagement improves functional capacity and mental wellbeing in older adults.

Osteoarthritis is one of the most prevalent causes of disability among elderly populations. Risk factors include age, obesity, joint stress, and sedentary lifestyle. Preventive strategies include weight management, lower limb strengthening exercises, safe mobility techniques, and ergonomic modifications in activities of daily living (Aisyah et al., 2020). Religious activity adaptation, such as chair-supported prayer positions, may also reduce joint load while maintaining spiritual participation.

Health literacy is a key determinant of successful elderly self-management. Sardareh et al. (2024) emphasized that interventions targeting family and caregiver knowledge significantly improve compliance with exercise and lifestyle modification. Community cadres play a critical role in bridging clinical knowledge and household-level practice, especially in regions where access to rehabilitation facilities is limited (Moyle et al., 2014). Thus, developing training for family caregivers and cadres is a strategic approach to prevent disability and enhance quality of life among older adults.

MATERIALS AND METHODS

This community engagement program employed a descriptive-intervention design aimed at empowering elderly individuals, their families, and community health cadres in the prevention of osteoarthritis through education and functional exercise. The intervention was implemented in the Wonocolo District of Surabaya from February to July 2025. The program combined community

education, hands-on training, health screening, and evaluation sessions to strengthen knowledge, skills, and community-based rehabilitation practices.

A total of 40 elderly participants from local elderly community posts (*posyandu lansia*) and 32 health cadres and family caregivers took part in the activities. Prior to implementation, a needs assessment was conducted through short interviews and a preliminary knee-pain questionnaire among 28 elderly individuals to identify functional limitations and tailor the educational materials. The results guided the development of the training modules focusing on osteoarthritis prevention and safe movement techniques.

The educational phase consisted of interactive seminars addressing topics such as osteoarthritis prevention, daily functional exercises, nutrition and emotional well-being, and elder-friendly mobility—including modifications for prayer movements. Subsequently, training workshops were organized to develop participants' practical skills in stretching, strengthening, balance training, and safe transfer techniques (particularly sit-to-stand transitions). Additional sessions on supportive communication were included to improve family–elder interaction and caregiver confidence.

Health screenings were conducted to detect common comorbidities among participants, including blood pressure, blood glucose, cholesterol, and uric acid assessments. Detected abnormalities were referred to local primary health centers (*puskesmas*) for follow-up.

To evaluate the program's impact, participants completed a 10-item multiple-choice pre-test and post-test assessing knowledge of elderly care and osteoarthritis prevention. Short follow-up interviews were carried out to gather qualitative feedback regarding perceived benefits, changes in daily functional ability, and motivation for continued participation. The primary outcome measure was improvement in knowledge scores, while secondary measures included participants' reported confidence, functional engagement, and cadre readiness for program continuation.

RESULT AND DISCUSSION

The community empowerment activities were successfully conducted in the Wonocolo District, Surabaya, engaging 40 elderly participants and 32 individuals consisting of family caregivers and community health cadres. Most of the elderly participants were women with an average age of 68 years, reflecting the typical demographic composition of older adults in the area.

Prior to the intervention, a brief needs assessment involving 28 older adults revealed that 35.7% experienced knee pain, primarily triggered by stair climbing (35.7%), squatting (28.6%), and standing up from a seated position (21.4%). Additionally, 14.3% reported difficulty performing prayer movements, while 7.1% required walking aids. These findings highlighted the importance of introducing practical exercise and mobility modification strategies tailored to daily functional activities and religious practices.

Following the educational and training sessions, there was a marked improvement in participants' knowledge regarding osteoarthritis prevention and elderly care. Results from the pre-test and post-test evaluations demonstrated that while the majority of participants initially scored only 4–6 correct answers, more than 85% achieved scores of 8–10 after the intervention. This improvement indicates a substantial increase in health literacy and understanding of safe movement, nutrition, and joint protection techniques.

Beyond cognitive outcomes, behavioral and functional improvements were also observed. Participants reported feeling more energetic, less stiff, and more confident in performing daily movements such as standing, walking, and squatting. Many expressed enthusiasm for continuing regular exercise at home, guided by the simple routines demonstrated during the training. Family members and cadres showed improved skills in assisting the elderly with safe transfers and exercise supervision, demonstrating practical application of the knowledge gained.

The health screening component provided an additional benefit to the community, identifying several cases of elevated blood pressure, blood glucose, and uric acid levels. These individuals were

referred to the local puskesmas for further medical management, strengthening collaboration between the community and formal health services.

At the conclusion of the program, both cadres and family participants expressed strong commitment to sustain the activities by organizing weekly elderly exercise sessions and health education discussions at community posts. This commitment reflects an encouraging sense of ownership and empowerment, essential for maintaining the program's long-term impact.

Overall, the program demonstrated that a participatory and culturally sensitive approach—combining health education, exercise practice, and family engagement—can effectively improve knowledge, motivation, and community capacity to support healthy aging and osteoarthritis prevention.

A total of 40 elderly individuals participated in this program. A preliminary assessment involving 28 respondents revealed common functional limitations associated with knee osteoarthritis. As presented in Table 1, the majority of participants were female (70%) with a mean age of approximately 68 years. Knee pain was reported by 35.7% of respondents, particularly triggered by stair climbing (35.7%), squatting (28.6%), and transitioning from sitting to standing (21.4%). Furthermore, 14.3% of elderly participants experienced difficulty performing prayer movements, and 7.1% required walking aids. These findings reflect significant mobility challenges and emphasize the need for targeted functional exercise and joint-protection education within this population.

Table 1. Participant Demographics and Knee Pain Characteristics

Variable	Frequency (n)	Percentage (%)
Total participants	40	100
Age (mean ± SD)	68 ± X years	—
Female	28	70
Male	12	30
Knee pain prevalence	10	35.7
Difficulty during prayer	4	14.3
Uses walking aid	2	7.1

Note: Percentages based on preliminary survey of 28 elderly respondents.

These demographic characteristics demonstrate that musculoskeletal discomfort and mobility limitations are prevalent among older adults in the community, particularly among women. The observed functional challenges highlight the urgency of implementing comprehensive, community-based interventions focused on knee joint health, safe mobility strategies, and religious-activity-friendly exercise modifications.

Evaluation of knowledge regarding elderly care and osteoarthritis prevention showed substantial improvement following the program. Before participation, most elderly, caregivers, and health cadres demonstrated limited knowledge and mobility-support skills. As shown in Table 2, pre-test results indicated moderate baseline understanding, with most participants scoring between 4–6 correct answers. After the intervention, more than 85% of participants achieved high post-test scores ranging from 8–10 correct answers, reflecting a notable enhancement in health literacy and confidence in applying appropriate exercise and care techniques.

Table 2. Knowledge Score Improvement Before and After Intervention

Category	Pre-test	Post-test
Mean correct answers	4–6	8–10
Participants with high score (>8)	< 20%	> 85%

The significant increase in post-test performance suggests that interactive education combined with hands-on functional exercise training is highly effective in strengthening community capacity for elderly rehabilitation. These findings align with previous evidence showing that experiential learning and family involvement improve knowledge retention, self-efficacy, and long-term adherence to joint-protective practices.

Sustainability Commitment

Cadres and community groups committed to continuing weekly elderly exercise sessions and health education dissemination at the local community posts.

DISCUSSION

This community empowerment program demonstrated that a participatory and context-sensitive approach involving older adults, family caregivers, and community health cadres can significantly improve both knowledge and behavior related to osteoarthritis (OA) prevention and management. The findings are consistent with previous literature showing that community-based exercise and educational programs enhance physical function, pain management, and overall quality of life among elderly populations (Rausch Osthoff et al., 2018; World Health Organization, 2017).

Several key aspects emerged from the implementation experience.

Family and cadre involvement as sustainability drivers

Active involvement of family members and community cadres proved essential for engagement and sustainability. Previous studies emphasized that social support and household-level encouragement are critical determinants of adherence to physical activity among older adults (de Oliveira et al., 2023). Qualitative research also suggests that elderly individuals often face barriers in understanding and maintaining appropriate exercise routines, and that family involvement increases long-term compliance and self-efficacy (Khoo et al., 2025). By positioning families and cadres as co-facilitators rather than passive recipients, the program fostered a supportive ecosystem that reinforced regular exercise and healthy habits at home.

Culturally tailored interventions and local relevance

An important strength of this program was its integration of culturally relevant modifications, including prayer-movement adaptations for those experiencing knee pain. Culturally adapted health interventions have been shown to improve acceptance, engagement, and outcomes among older adults (Zhang & Li, 2022). Similarly, community-based physical activity programs that utilize familiar environments—such as neighborhood centers, religious venues, or local organizations—have demonstrated higher participation and retention rates (Resnick et al., 2019). This underscores the importance of aligning rehabilitation content with the daily realities and spiritual practices of local elderly populations.

Health literacy and empowerment through experiential learning

The significant improvement in knowledge observed in this study reflects the impact of experiential and participatory learning methods. Educational interventions that combine demonstration, discussion, and hands-on practice are known to be more effective than didactic lectures alone, particularly among populations with varying educational backgrounds (Sardareh et al., 2024). As supported by Bandura's social cognitive theory (2004), mastery experiences—such as successfully performing sit-to-stand or balance exercises—enhance self-efficacy and sustain behavior change. The program's design, which encouraged active learning and immediate application, likely contributed to the marked cognitive and behavioral gains observed.

Integration with community health services

The inclusion of health screenings and follow-up referrals created an important link between the community and the formal health system. Similar models have been reported to strengthen early disease detection and promote continuity of care for older adults (Zhao et al., 2021). This integration ensures that community-based interventions are not isolated but embedded within broader health infrastructure, contributing to a sustainable and holistic approach to elderly well-being.

Challenges and future directions

Despite the program's success, several challenges were encountered. Variability in functional capacity among participants required individualized modifications and additional supervision. Time constraints limited opportunities for repetitive practice, and some participants needed repeated guidance to master exercise techniques. These challenges mirror those reported in other community-based programs, where instructor availability and time are major constraints (Lau & Wong, 2021). Future iterations should consider longer intervention periods, follow-up booster sessions, and the incorporation of digital platforms (e.g., video-assisted reminders) to support continuous engagement (Rosa et al., 2021).

Sustainability and policy implications

Encouragingly, cadres and family participants expressed a strong commitment to continue weekly sessions independently. This grassroots ownership aligns with evidence suggesting that empowerment and local leadership are key to program sustainability in community health promotion (Smith & Jones, 2023). To institutionalize such efforts, future initiatives should establish formal linkages with local health authorities and include refresher training for cadres. The development of community-based elderly rehabilitation guidelines at the district or municipal level could further enhance scalability and integration into national healthy-aging frameworks.

In summary, this program supports growing evidence that community-based, family-inclusive, and culturally responsive interventions are effective for promoting healthy aging and osteoarthritis prevention in low-resource urban settings. By combining education, functional exercise, and social support, such initiatives not only improve knowledge and self-efficacy but also strengthen the social fabric essential for sustainable health behavior change.

CONCLUSIONS

This community empowerment program successfully improved the knowledge, skills, and motivation of older adults, family members, and community health cadres in preventing osteoarthritis through safe functional exercise and daily activity modification. The significant increase in post-test scores demonstrates that structured education combined with hands-on practice is effective in enhancing health literacy and promoting joint-protective behavior in the elderly population.

Family involvement and cadre participation played an essential role in sustaining behavior change and ensuring continuity of exercise routines beyond the intervention period. This highlights the importance of building community capacity to support healthy aging, particularly in settings with limited access to formal rehabilitation services.

Future community programs should emphasize regular follow-up sessions, collaboration with primary health facilities, and broader dissemination of exercise modules to strengthen long-term sustainability. Empowering communities through knowledge, skills training, and consistent guidance remains a key strategy to promote independence, reduce disability risk, and enhance the overall quality of life for older adults.

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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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