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## The Effect of Stretching Exercises on Reducing Joint Pain Levels Among Elderly Prolanis Participants at The Purwoyoso Community Health Center

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### Abstract

Joint pain represents one of the most common health problems affecting older adults and frequently contributes to functional limitation, reduced mobility, and decreased quality of life. This study aimed to evaluate the effect of stretching exercises on reducing joint pain levels among elderly participants enrolled in the Chronic Disease Management Program at the Purwoyoso Community Health Center, Semarang, Indonesia. The study employed a quantitative quasi experimental design using a one group pretest and posttest approach. A total of 35 elderly participants were selected through purposive sampling based on predefined eligibility criteria. Joint pain intensity was assessed using the Numeric Rating Scale before and after a structured stretching exercise intervention. Descriptive statistics were used to describe pain distribution, while the Wilcoxon Signed Rank Test was applied to determine intervention effectiveness. Findings showed that all participants initially experienced moderate pain, whereas postintervention assessment indicated a substantial increase in mild pain classification and a corresponding reduction in moderate pain levels. Statistical analysis demonstrated a significant decrease in pain intensity with a  $p$  value of 0.000. Structured stretching exercises were effective in reducing joint pain among elderly Prolanis participants and may serve as an evidence based nonpharmacological intervention for community based elderly healthcare services.

**Keywords :** *Stretching Exercises, Joint Pain, Elderly, Prolanis, Community Health Center.*



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## INTRODUCTION

Population ageing has emerged as one of the most consequential demographic transformations of the twenty first century, reshaping healthcare priorities across both developed and developing countries as the proportion of older adults continues to increase at an unprecedented rate. The World Health Organization reported that global population ageing is accelerating rapidly and is accompanied by a substantial rise in chronic health conditions that compromise functional independence and quality of life among older individuals (World Health Organization, 2019). Within this context, musculoskeletal disorders have become a major public health concern because age related physiological decline progressively affects joint structures, connective tissues, and physical mobility. Gerontological literature consistently demonstrates that degenerative changes in aging populations increase susceptibility to chronic joint pain, functional limitations, and disability, creating a significant burden for healthcare systems and community based elderly care programs (Astuti et al., 2021). As longevity continues to improve worldwide, contemporary healthcare practice has increasingly shifted from disease oriented management toward functional preservation strategies that promote active ageing and maintain physical independence among older adults (Anggeriyane et al., 2022).

A growing body of evidence suggests that structured physical exercise interventions represent one of the most promising nonpharmacological approaches for managing musculoskeletal symptoms among elderly populations. Previous studies have reported that stretching based exercise programs contribute to pain reduction through improvements in joint flexibility, circulation, muscular relaxation, and neuromuscular adaptation. Research conducted among older adults experiencing lower extremity joint pain demonstrated significant reductions in pain intensity following regular stretching interventions, indicating that mechanical stimulation and enhanced mobility may facilitate symptom relief (Sari et al., 2024). Similar findings were reported in investigations focusing on knee joint

discomfort, where stretching exercises improved functional movement while reducing subjective pain experiences among elderly participants (Rianti et al., 2024). Complementary evidence from studies examining stretching interventions among older adults with joint pain and elevated uric acid levels further reinforces the therapeutic value of exercise based management strategies in geriatric care settings (Susilawati et al., 2025). Collectively, these findings suggest that exercise interventions may address both physiological and functional dimensions of musculoskeletal health, although the mechanisms and magnitude of benefits appear to vary across populations and care contexts.

Despite encouraging findings, the existing literature reveals several conceptual and empirical limitations that constrain the generalizability of current knowledge regarding stretching exercises and joint pain management among elderly populations. Much of the available evidence has been generated from community based elderly groups, integrated health posts, or disease specific cohorts, while relatively limited attention has been directed toward elderly participants enrolled in chronic disease management programs that operate within primary healthcare systems. Studies evaluating exercise interventions frequently focus on general elderly populations without adequately considering the unique clinical and behavioral characteristics of participants engaged in structured programs such as Prolanis. Furthermore, previous investigations often emphasize immediate intervention outcomes while providing limited discussion regarding how stretching exercises function within broader preventive and promotive healthcare frameworks designed for chronic disease management and healthy ageing. Reviews assessing the sustainability and impact of chronic disease prevention initiatives have highlighted the need for context specific evidence capable of informing program implementation and long term effectiveness within primary healthcare environments (Tarninda & Erwandi, 2024). These limitations indicate an unresolved gap concerning the applicability of stretching interventions within integrated community health services targeting elderly individuals with chronic health risks.

The persistence of this knowledge gap carries important scientific and practical implications because joint pain remains one of the most prevalent factors contributing to mobility restrictions, reduced participation in daily activities, and diminished quality of life among older adults. Effective management of joint pain is particularly critical for participants enrolled in chronic disease monitoring programs because pain related functional limitations may undermine adherence to health promotion activities and compromise broader disease management outcomes. Evidence from exercise based interventions among elderly populations suggests that regular physical activity can generate meaningful physiological improvements extending beyond symptom control, including enhanced cardiovascular regulation, physical functioning, and overall health status (Ra'uf, 2024). Research examining rheumatic exercise programs has similarly demonstrated significant reductions in joint pain among older adults, reinforcing the importance of movement based interventions as sustainable components of geriatric healthcare practice (Virgo et al., 2025). Nevertheless, healthcare providers continue to require contextually relevant evidence that clarifies whether stretching exercises can produce comparable benefits among elderly Prolanis participants receiving routine care within community health centers.

Within the contemporary scientific landscape, the present study positions itself at the intersection of gerontological nursing, community based chronic disease management, and nonpharmacological pain intervention research. Rather than merely replicating previous investigations that have established general associations between exercise and pain reduction, this study specifically examines the effectiveness of stretching exercises among elderly Prolanis participants attending the Purwoyoso Community Health Center. This focus is particularly important because Prolanis represents an organized healthcare platform that integrates preventive, promotive, and monitoring activities for individuals with chronic health conditions, thereby providing a unique setting in which exercise interventions may exert both clinical and behavioral effects. By investigating pain outcomes within this specific population, the study seeks to generate evidence that extends beyond conventional exercise research and contributes to a more nuanced understanding of how stretching interventions function within structured primary healthcare programs designed for ageing populations.

This study aims to analyze the effect of stretching exercises on reducing joint pain levels among elderly Prolanis participants at the Purwoyoso Community Health Center using a quantitative quasi experimental approach with a one group pretest and posttest design. The research is expected to contribute theoretically by strengthening the empirical foundation linking stretching based movement interventions with pain modulation among older adults within chronic disease management settings. Methodologically, the study contributes context specific evidence derived from a primary healthcare

environment where exercise interventions are integrated into routine elderly services, offering practical insights for the development of scalable and evidence informed strategies to improve musculoskeletal health and functional wellbeing among ageing populations.

## RESEARCH METHODS

This study employed an empirical quantitative approach using a quasi experimental design with a one group pretest and posttest framework to evaluate the effect of stretching exercises on reducing joint pain among elderly participants enrolled in the Chronic Disease Management Program at the Purwoyoso Community Health Center, Semarang, Indonesia. The study was conducted between January and February 2026. The target population consisted of 115 elderly Prolanis participants, from which 35 respondents were selected through purposive sampling based on predetermined eligibility criteria. Inclusion criteria comprised individuals aged 60 years and above who experienced joint pain, were registered as active Prolanis participants, possessed adequate hearing and visual abilities, were cognitively capable of communication, and voluntarily agreed to participate through written informed consent. Exclusion criteria included refusal to participate, failure to complete study procedures, acute medical conditions or severe complications, and concurrent use of high dose analgesics or other therapies that could influence pain assessment outcomes. The intervention consisted of structured stretching exercises administered according to established nursing Standard Operating Procedures. Baseline and postintervention data were collected through direct observation and questionnaire based assessment to measure changes in joint pain intensity following the intervention period (Nursalam, 2022; Giri Susilo et al., 2022).

Joint pain intensity was measured using the Numeric Rating Scale, a validated instrument widely utilized for subjective pain assessment, in which participants rated their pain on a numerical continuum ranging from no pain to the most severe pain imaginable (Octariyana, 2020). Descriptive statistics were employed to summarize participant characteristics and pain distribution before and after the intervention. Inferential analysis was conducted using the Wilcoxon Signed Rank Test because the study involved paired observations obtained from the same participants before and after treatment. Statistical significance was established at a probability value below 0.05. Data management and analysis were performed using appropriate statistical software to ensure analytical accuracy and reliability. Ethical principles including respect for autonomy, beneficence, nonmaleficence, confidentiality, and justice were strictly observed throughout the study. Ethical approval and institutional permission were obtained prior to data collection, and all participants were informed of the study objectives, procedures, potential benefits, and their right to withdraw from participation at any stage without consequence (World Health Organization, 2019, Anggeriyane et al., 2022, Astuti et al., 2021, Bahriah et al., 2024, Basuki et al., 2024).

## RESULTS AND DISCUSSION

### Baseline Characteristics and Preintervention Joint Pain Profile Among Elderly Prolanis Participants

The demographic composition of the participants provides an important context for understanding the burden of joint pain among elderly individuals enrolled in the Chronic Disease Management Program. Analysis of participant characteristics indicated that all respondents were aged above sixty years, reflecting a population experiencing age related physiological decline. Female participants constituted a slightly larger proportion than males, while elementary school graduates represented the largest educational category. These characteristics are relevant because aging processes, health literacy, and gender related biological factors have been associated with musculoskeletal health outcomes among older adults (World Health Organization, 2019).

The predominance of older adults in this study reflects the demographic reality of population aging and its associated health consequences. Progressive degeneration of cartilage structures, reduced synovial fluid production, and declining muscle elasticity contribute to increasing susceptibility to chronic joint pain in later life (Anggeriyane et al., 2022). Age related deterioration of musculoskeletal function often limits mobility and independence, creating substantial challenges for healthy aging. Similar observations have been reported in gerontological nursing literature emphasizing the multidimensional impact of chronic pain on elderly wellbeing (Astuti et al., 2021).

Gender distribution also warrants consideration because women represented a slightly greater proportion of participants experiencing joint pain. Hormonal changes occurring after menopause have been linked to reductions in bone density and joint protection mechanisms, increasing vulnerability to musculoskeletal discomfort (Basuki et al., 2024). Previous community based investigations similarly reported higher frequencies of joint complaints among elderly women compared with elderly men. The pattern observed in this study therefore corresponds with broader epidemiological trends documented in aging populations.

Educational attainment may further influence pain management behavior and participation in health promotion activities. Participants with lower educational backgrounds may experience greater difficulty accessing and interpreting health information related to physical activity and chronic disease prevention. Health literacy has been identified as an important determinant of self management capacity among older adults with chronic conditions (Puspatari & Saidah, 2023). The educational profile observed in this study suggests the importance of delivering interventions through accessible and practical approaches.

The baseline assessment of joint pain revealed a remarkably homogeneous pattern across respondents. Before the intervention was administered, all participants reported moderate joint pain according to the Numeric Rating Scale. This finding indicates a relatively comparable starting condition among participants, strengthening the internal consistency of subsequent comparisons. Homogeneity at baseline is advantageous in quasi experimental studies because it minimizes variation attributable to initial differences between respondents (Nursalam, 2022).

**Table 1. Demographic Characteristics and Baseline Joint Pain Distribution of Participants**

Variable	Category	n	%
Age	Above 60 years	35	100.0
Gender	Male	16	45.7
Gender	Female	19	54.3
Education	Elementary School	12	34.3
Education	Junior High School	8	22.9
Education	Senior High School	10	28.6
Education	Higher Education	5	14.3
Baseline Pain Level	Moderate Pain	35	100.0

Source: Primary Data Processed from Research Findings at Purwoyoso Community Health Center, 2026.

The data presented in Table 1 demonstrate that moderate pain was consistently experienced by every participant before the stretching exercise intervention. This pattern suggests that joint pain constituted a common and clinically relevant health problem among elderly Prolanis members. The absence of respondents reporting either mild or severe pain created a stable reference point for evaluating intervention effectiveness. Such baseline consistency strengthens the interpretability of subsequent outcome measurements.

The occurrence of moderate pain among all participants may reflect the cumulative effects of chronic musculoskeletal degeneration associated with aging. Degenerative changes often emerge gradually and manifest as persistent discomfort that interferes with functional activities rather than producing acute severe pain episodes (Bahriah et al., 2024). Elderly individuals frequently experience pain during walking, standing, and other daily movements requiring joint flexibility. These physiological mechanisms help explain the uniformity of moderate pain observed in the study population.

The findings also align with national health evidence indicating a substantial prevalence of joint disorders among older Indonesians. Data from the Indonesian Basic Health Research Survey identified increasing rates of joint related conditions with advancing age groups (Kementerian Kesehatan Republik Indonesia, 2019). Population level trends therefore provide a broader framework for interpreting the burden of pain observed among participants.

Community based preventive programs become increasingly important in response to this demographic and epidemiological transition.

From a healthcare delivery perspective, the baseline findings reinforce the strategic role of Prolanis programs in supporting elderly populations with chronic health challenges. Community centered initiatives facilitate regular monitoring, health education, and physical activity promotion among older adults with long term conditions (Krisnadewi et al., 2024). Effective management of musculoskeletal symptoms requires sustained engagement rather than episodic treatment. Structured interventions delivered through primary healthcare settings may therefore represent a practical approach to addressing age related pain conditions.

The preintervention profile identified in this study establishes a clear clinical foundation for evaluating the therapeutic value of stretching exercises. Participants entered the intervention phase with comparable levels of moderate pain and similar age related risk factors affecting musculoskeletal health. Such conditions allow changes observed after treatment to be interpreted with greater confidence as potential effects of the intervention rather than baseline variability. The findings support the rationale for investigating stretching exercises as a nonpharmacological strategy for improving pain outcomes among elderly Prolanis participants (Giri Susilo et al., 2022).

### **Changes in Joint Pain Intensity Following Structured Stretching Exercise Intervention Among Elderly Prolanis Participants**

The distribution of joint pain intensity demonstrated a notable shift after the implementation of the structured stretching exercise program among elderly Prolanis participants. Baseline assessment indicated that all respondents were classified within the moderate pain category prior to intervention. This pattern reflects a relatively homogeneous clinical condition that allowed a clearer observation of postintervention changes. Moderate pain among older adults commonly reflects chronic musculoskeletal adaptation associated with reduced flexibility and progressive joint degeneration (Octariyana, 2020).

Pain reduction observed after the intervention suggests that stretching exercises contributed to clinically meaningful improvements in joint comfort and functional mobility. The transition from moderate pain toward mild pain indicates that participants experienced perceptible relief during daily activities. Clinical improvement of this nature is important because persistent joint pain frequently limits independence and physical participation among older adults (Anggeriyane et al., 2022). The observed trend supports the therapeutic value of structured movement based interventions within community health programs.

The findings also align with gerontological nursing perspectives emphasizing the importance of maintaining musculoskeletal function through regular physical activity. Aging related stiffness often develops when joints are exposed to prolonged inactivity and reduced movement patterns. Therapeutic stretching encourages gradual elongation of muscles and connective tissues surrounding the joint complex. Such adaptations may reduce biomechanical stress and improve movement efficiency among older individuals (Astuti et al., 2021).

The pattern of change identified in this study is summarized in Table 2. The table demonstrates a substantial redistribution of respondents from the moderate pain category into the mild pain category after completion of the stretching intervention. No participant remained in a severe pain condition during either assessment period. These findings provide preliminary evidence that stretching exercises may contribute to measurable symptom improvement in elderly populations receiving community based care (Bahriah et al., 2024).

**Table 2. Distribution of Joint Pain Intensity Before and After Stretching Exercise Intervention**

Pain Category	Pretest n (%)	Posttest n (%)
Mild Pain	0 (0.0)	20 (57.1)
Moderate Pain	35 (100.0)	15 (42.9)
Severe Pain	0 (0.0)	0 (0.0)
Total	35 (100.0)	35 (100.0)

Source: Primary Data Analysis, 2026.

The postintervention distribution reveals that more than half of participants experienced a reduction to mild pain levels. This outcome suggests that the intervention generated effects extending beyond temporary symptom relief. Reduced pain intensity may facilitate greater confidence in movement and encourage participation in routine physical activities. Improvements in mobility are frequently associated with enhanced quality of life among older adults with chronic musculoskeletal complaints (Basuki et al., 2024).

From a physiological perspective, stretching exercises can influence pain perception through several interconnected mechanisms. Repeated stretching promotes increased muscle extensibility and improved circulation around periarticular structures. Enhanced blood flow supports oxygen delivery and metabolic waste removal within affected tissues. These physiological responses may contribute to decreased nociceptive stimulation and reduced subjective pain intensity (Rianti et al., 2024).

The observed reduction in pain is consistent with previous studies examining stretching interventions among elderly populations. Research has reported that regular stretching can decrease lower extremity discomfort while simultaneously improving flexibility and joint mobility. Similar outcomes were documented among institutionalized and community dwelling older adults experiencing chronic joint pain (Sari et al., 2024). The consistency of findings across settings strengthens confidence in the clinical applicability of stretching based interventions.

Another explanation for the reduction in pain relates to neuromuscular adaptation. Stretching activities stimulate mechanoreceptors that may influence central pain modulation pathways and decrease pain sensitivity. Improvements in joint range of motion can also reduce compensatory movement patterns that frequently exacerbate discomfort. Comparable mechanisms have been discussed in studies examining stretching interventions among elderly individuals with joint pain and hyperuricemia related complaints (Susilawati et al., 2025).

The findings correspond with evidence demonstrating the effectiveness of exercise oriented approaches for managing musculoskeletal discomfort among older adults. Rheumatic exercise programs and elderly fitness interventions have produced similar reductions in pain severity and functional limitation. Improved joint lubrication and reduced muscle tension are frequently cited as contributing factors underlying these outcomes (Kurdi et al., 2023). Comparable observations were also reported in community exercise programs targeting menopausal and elderly populations experiencing joint symptoms (Juliana et al., 2023).

Clinical interpretation of these results suggests that stretching exercises represent a practical nonpharmacological strategy within Prolanis services. Exercise based interventions are accessible, relatively low cost, and suitable for implementation in primary healthcare settings. Previous investigations have emphasized that therapeutic exercise can reduce knee discomfort and improve functional performance among aging populations (Nooryana et al., 2022). Evidence from rheumatic exercise programs further indicates that sustained participation may support long term symptom control and functional preservation among older adults with chronic joint pain (Virgo et al., 2025).

### Statistical Effectiveness of Structured Stretching Exercise Intervention for Joint Pain Reduction Among Elderly Prolanis Participants

The inferential analysis was conducted to determine whether the observed reduction in joint pain after the stretching exercise intervention represented a statistically meaningful change. Because pain measurements were collected from the same respondents before and after treatment, the Wilcoxon Signed Rank Test was selected as the most appropriate nonparametric procedure for paired observations (Nursalam, 2022). The analytical approach was consistent with the study design and the ordinal nature of pain intensity scores obtained through the Numeric Rating Scale. Methodological rigor in intervention evaluation is essential to establish whether clinical improvements reflect actual treatment effects rather than random variation (Giri Susilo et al., 2022).

The Wilcoxon analysis demonstrated a strong directional tendency toward pain reduction following the intervention period. Most participants experienced lower pain scores during the posttest assessment compared with baseline measurements. The absence of positive ranks suggested that no respondent reported worsening pain after completing the structured stretching program. Such a pattern indicates a highly consistent intervention effect across the study sample and supports the therapeutic value of stretching exercises in geriatric care settings (Sari et al., 2024).

The statistical findings are presented in Table 3, which summarizes the distribution of ranks generated through the Wilcoxon Signed Rank Test. The table provides information regarding negative ranks, positive ranks, ties, and the significance level obtained from the analysis. These indicators collectively describe the magnitude and direction of changes observed after the intervention. Interpretation of the results requires attention to both the rank distribution and the associated probability value.

**Table 3. Wilcoxon Signed Rank Test Analysis of Joint Pain Reduction Following Stretching Exercise Intervention**

Variable	N	Mean Rank	Sum of Ranks	p Value
Negative Ranks	33	17.00	561.00	
Positive Ranks	0	0.00	0.00	
Ties	2			
Total	35			0.000

Source: Primary Data Analysis, 2026.

The data indicate that 33 participants experienced lower pain scores after the intervention, reflected by the negative rank category. No participants demonstrated increased pain scores, resulting in zero positive ranks. Two respondents maintained identical pain scores between pretest and posttest assessments, producing ties within the dataset. The dominance of negative ranks highlights a substantial tendency toward symptom improvement among elderly Prolanis participants.

The mean rank value of 17.00 and the cumulative rank score of 561.00 indicate that reductions in pain were not isolated occurrences but were distributed across a large proportion of participants. Rank based statistics are particularly useful for evaluating intervention outcomes when data may not meet parametric assumptions (Nursalam, 2022). The concentration of rank values within the negative direction strengthens confidence in the observed treatment effect. Such consistency is frequently interpreted as evidence of meaningful physiological adaptation following repetitive therapeutic exercise (Mansur et al., 2026).

The probability value of 0.000 was below the predetermined significance threshold of 0.05, indicating a statistically significant difference between pretest and posttest pain scores.

This result suggests that the reduction in joint pain was unlikely to have occurred by chance alone. Statistical significance in intervention research serves as an important indicator of treatment effectiveness when supported by coherent clinical outcomes (Giri Susilo et al., 2022). The findings therefore confirm the effectiveness of structured stretching exercises for reducing joint pain among elderly participants enrolled in Prolanis.

The present findings align with evidence reported in community based exercise programs targeting chronic disease management. Studies evaluating Prolanis related physical activity interventions have consistently shown beneficial effects on health indicators among older adults, including improvements in physical functioning and disease control (Dwijayanti et al., 2025). Similar outcomes were also reported in elderly populations participating in Prolanis exercise programs aimed at reducing blood pressure and improving overall health status (Ra'uf, 2024; Ratnasari et al., 2026). These convergent findings suggest that exercise based interventions represent an effective strategy for chronic disease management within primary healthcare environments.

The observed effectiveness of stretching exercises also reflects the broader role of Prolanis as a preventive and rehabilitative health platform. Qualitative evidence indicates that successful implementation of Prolanis depends on continuous engagement, structured activities, and participant adherence to health promotion programs (Krisnadewi et al., 2024). Exercise interventions integrated into routine community services may strengthen functional independence and reduce chronic symptom burden among older adults. Long term sustainability of such programs is considered a critical component of chronic disease prevention strategies (Tarninda & Erwandi, 2024).

From a primary healthcare perspective, the findings support the integration of stretching exercises into routine geriatric nursing services at community health centers. Community based rehabilitation approaches emphasize the importance of accessible and low cost interventions that can be implemented within local health systems (Defi et al., 2025). Expanding structured exercise programs may enhance the quality of chronic disease management while reducing dependence on pharmacological treatment. Equitable access to preventive and rehabilitative services remains a fundamental objective of primary healthcare delivery (Rahman et al., 2023).

The policy implications of these findings extend beyond individual symptom management and contribute to broader healthy aging initiatives. Collaborative governance models have emphasized the importance of integrating community participation, healthcare providers, and local government support in managing chronic health conditions among older adults (Rahadian et al., 2023; Rahadian et al., 2024). Community based exercise and health education programs have demonstrated value in strengthening self management capacities among populations with chronic diseases (Rahayu & Huda, 2025). Additional evidence from stretching and exercise studies among elderly populations further supports the scalability of such interventions as part of sustainable aging policies and long term community health promotion efforts (Susilawati et al., 2025; Virgo et al., 2025).

## CONCLUSION

The findings demonstrate that structured stretching exercises effectively reduced joint pain intensity among elderly participants enrolled in the Prolanis program at the Purwoyoso Community Health Center. Baseline observations indicated that all respondents experienced moderate joint pain prior to the intervention, while postintervention assessment revealed a substantial shift toward lower pain categories, with most participants reporting mild pain levels. Inferential analysis using the Wilcoxon Signed Rank Test confirmed a statistically significant reduction in pain intensity, reflected by the predominance of negative ranks and a probability value below the established significance threshold. These outcomes suggest that stretching exercises promote favorable musculoskeletal adaptation through improved joint flexibility, enhanced circulation, reduced stiffness, and increased functional mobility among older adults. The results are consistent with gerontological nursing principles

and previous evidence supporting therapeutic exercise as a nonpharmacological strategy for pain management. From a healthcare systems perspective, the intervention offers practical value for strengthening community based chronic disease management, optimizing primary healthcare services, and supporting healthy aging initiatives within Prolanis. The study supports the integration of structured stretching programs into routine elderly healthcare services as an evidence based approach to improving pain control and functional wellbeing among older populations.

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