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Enhancing Public Knowledge of Musculoskeletal Disorders across 12 Subdistricts in Tasikmalaya

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Abstract

Background: Musculoskeletal disorders such as hyperuricemia, osteoarthritis, osteoporosis, and rheumatoid arthritis are increase in prevalence, including in Indonesia, yet public understanding of these conditions remains insufficient.
Aims: This study aimed to evaluate the effectiveness of pharmacist-led health promotion initiatives in enhancing public knowledge regarding the etiology, symptoms, and pharmacological treatment of these four musculoskeletal conditions.
Methods: Utilizing a pre-experimental One-group pretest-posttest design, the research was conducted across twelve subdistricts in Tasikmalaya City and Tasikmalaya Regency. Participants were selected through total sampling, and data were collected using structured questionnaires administered before and after interactive educational sessions. The key success indicators were a post-test score ≥80 and/or a statistically significant difference ($p < 0.05$).
Results: The program engaged 416 participants across four interventions: hyperuricemia/gout (n=140), osteoarthritis (n=110), osteoporosis (n=101), and rheumatoid arthritis (n=65), consisting predominantly of female participants, particularly pre-elderly and elderly housewives. Educational initiatives triggered statistically significant knowledge gains across nearly all cohorts ($p < 0.05$). Overall knowledge scores improved from a baseline average of 67.37 ± 9.50 to a post-test average of 87.83 ± 4.86. By condition, significant improvements were observed across all sites for osteoarthritis, osteoporosis, and rheumatoid arthritis, while hyperuricemia interventions saw significant gains in five out of six districts (with Tamansari being the only exception, moving non-significantly from 81 to 83).
Conclusion: The health education program significantly improved community knowledge concerning musculoskeletal health and medications, which is anticipated to aid in reducing disease prevalence and improving the quality of life for patients in the region.

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INTRODUCTION

Musculoskeletal disorders (MSDs) including hyperuricemia/gout, osteoarthritis, osteoporosis, and rheumatoid arthritis continue to rise globally, and Indonesia is no exception. Global prevalence increased by 63.44% between 1990 and 2019 (Global Burden of Disease, 2023) similarly, Indonesia's prevalence was reported to surge from 18.6% in 2013 to 47.6% in 2018 (International Osteoporosis Federation, 2021; Kementerian Kesehatan RI, 2018). Furthermore, osteoarthritis, osteoporosis, and rheumatoid arthritis have shown consistent upward trends, with global prevalence estimated at 606.5 million, 200 million, and 17.9 million people, respectively, as of 2021 (Global Burden of Disease Osteoarthritis Collaborators, 2023; Steinmetz et al., 2023).

In Indonesia, these figures reached 14.3 million, 62.4 million, and 1.4 million individuals, respectively (International Osteoporosis Foundation, 2021; Pusat Data dan Teknologi Informasi

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Kemkes RI, 2019). On a more localized scale, specifically in the Tasikmalaya region, the prevalence rates are recorded at 6%, 39.5%, and 0.3% (Muzzammil et al., 2025). The etiology of these diseases is multifactorial, involving mechanical stress, aging, trauma, systemic inflammation, hormonal and nutritional deficiencies, lifestyle choices, and genetic factors (Fari & Bernetti, 2025; Ma et al., 2025; Perhimpunan Reumatologi Indonesia, 2021).

Previous studies have indicated that public knowledge in Indonesia regarding these conditions and their treatments remains very low (Kholinne et al., 2025; Wahyuni et al., 2019). This lack of awareness has serious implications, leading to poor disease prevention, a misunderstanding of treatment objectives, and the incorrect use of medications, which ultimately diminishes the patients' quality of life and places a direct strain on the national health burden (Malik et al., 2018; El Tallawy et al., 2021; Patel et al., 2025).

However, a major limitation of previous health education research in Indonesia is its heavy centralization within primary metropolitan areas, leaving a critical gap in data and intervention strategies for secondary cities and rural peripheries. Furthermore, existing literature consistently overlooks the intersection of urban-rural socio-environmental disparities within a single region. Prior interventions have relied on generalized, one-size-fits-all health campaigns that fail to account for highly localized epidemiological variations, such as the stark contrast between Tasikmalaya's exceptionally high osteoporosis rates (39.5%) and its low rheumatoid arthritis rates (0.3%) (Muzzammil et al., 2025).

To address these limitations, this study introduces a novel approach by implementing a targeted community educational program tailored specifically to the micro-demographics of 12 distinct subdistricts in Tasikmalaya. The project does not maintain exclusive partnerships, rather, collaboration is established with local administrative bodies, including the neighborhood Association, community Associations, and the local village administrative office. The unique aspect of this program lies in its dual-framework delivery system across seven high-density urban districts in Tasikmalaya City (Tamansari, Cibeureum, Tawang, Kawalu, Mangkubumi, Bungursari, Purbaratu) and five geographically dispersed rural districts in Tasikmalaya Regency (Sukaasih, Cigalontang, Leuwisari, Manonjaya, Pagerageung). By customizing the pedagogical delivery to match the distinct cultural, logistical, and literacy barriers of each specific sub-district, this study provides a highly localized intervention model never previously tested in West Java, especially Tasikmalaya region.

This structured program makes a vital contribution to strengthening public health literacy by shifting the paradigm from passive clinical management to proactive, community-level preventative care. This program actively equips residents with actionable knowledge regarding early MSD risk factor identification, critical lifestyle modifications, and safe medication practices. By fostering target-driven health literacy, the intervention directly mitigates the rampant risks of self-medication, encourages early screening behaviors, and ultimately provides a sustainable strategy to decrease the national socioeconomic and healthcare burden associated with chronic musculoskeletal diseases.

The primary objective of this study is to execute and evaluate the efficacy of an educational intervention across 12 urban and rural subdistricts in Tasikmalaya.

METHOD

To evaluate the efficacy of health education in enhancing knowledge regarding hyperuricemia (gout), osteoarthritis, osteoporosis, and rheumatoid arthritis, this study utilized a pre-experimental, one-group pretest-posttest design. This approach measures the variance in knowledge levels resulting from a pedagogical intervention by conducting distinct observations before and after the sessions within a single cohort, without a comparative control group. This design was deployed across a broad study population encompassing residents from seven districts in Tasikmalaya City (Tamansari, Cibeureum, Tawang, Kawalu, Mangkubumi, Bungursari, and Purbaratu) and five districts in Tasikmalaya Regency (Sukaasih, Cigalontang, Leuwisari, Manonjaya, and Pagerageung). To ensure comprehensive data representation, a total sampling technique was employed; the final research sample included all individuals who attended the health education sessions in their entirety, from the initial presentation to the final session.

Data collection within this sample was facilitated through three primary instruments, including a knowledge-based questionnaire, a structured lesson plan, and auxiliary educational media. The questionnaire consisted of closed-ended multiple-choice items (10 items) addressing etiology, clinical symptoms, preventive measures, and common pharmacological treatments, while the lesson plan provided a systematic framework for the speakers to deliver content clearly. To ensure the instrument's psychometric soundness, a validity and reliability test was previously conducted on a similar population outside the main research sample. Validity was assessed using Pearson's product-moment correlation ($p<0.05$). Reliability was evaluated using Cronbach's alpha (alpha>0.7), which indicates high internal consistency and measurement reliability.

To reinforce learning and improve knowledge retention, educational media such as leaflets and posters were utilized as visual aids during the intervention. The deployment of these instruments was systematically executed across three consecutive phases, including preparation, implementation, and evaluation. During the initial preparation phase, site surveys were conducted, administrative permissions were secured, and educational materials were developed. The implementation phase followed, involving the administration of the questionnaire as a pretest to establish baseline knowledge, the delivery of health education through interactive lectures, discussions, and demonstrations, and a concluding posttest to measure knowledge acquisition. Finally, the evaluation phase focused on calculating and analyzing the difference between these pre-test and post-test scores to isolate the intervention's impact. To quantify this impact, the gathered data were processed using both univariate and bivariate statistical analyses. Univariate analysis was first applied to delineate the demographic characteristics of the respondents through frequency and percentage distributions. Following this baseline characterization, bivariate analysis was conducted to assess the statistical significance of the educational intervention on knowledge improvement. For data meeting normality/homogeneity assumptions, the Paired Sample T-Test was utilized, otherwise, the Wilcoxon signed-rank test was performed if the data did not meet the normality/homogeneity assumptions. The threshold for statistical significance was firmly established at a p-value less than 0.05. The key success indicators were a post-test score ≥80 and/or a statistically significant difference. Meanwhile, there are no indicators for pre-test.

RESULTS AND DISCUSSION

Results

Hyperuricemia and Gout

The dissemination of health information regarding hyperuricemia and gout was conducted across six districts, comprising three urban areas (Cibeureum, Tamansari, Tawang) and three rural areas (Leuwisari, Pagerageung, Manonjaya), providing a representative sample of the Tasikmalaya region. Demographic data indicate that a total of 140 individuals participated in the program. The majority of participants were elderly individuals over 60 years of age (40.7%), predominantly female (91.4%), and primarily identified as housewives (72.9%) (Table 1). Evaluations conducted following the health education intervention demonstrated a statistically significant increase in knowledge ($p < 0.05$) in five of the six districts (Figure 1). The only exception was observed in the Tamansari district, where the increase was non-significant; participants there achieved a pre-test score of 81 and a post-test score of 83.

Table 1. Demographic of The Hyperuricemia/Gout Health Promotion Participants.

Characteristics	Category	Frequency (n)	Percentage (%)
Gender	Male	12	8.6%
	Female	128	91.4%
Age (years old)	26–45	38	27.1%
	46–59	45	32.2%
	>60	57	40.7%
Employment	Housewives	102	72.9%
	Entrepreneur	18	12.8%
	Retired	20	14.3%
Intervention sites	Cibeureum	20	14.3%

Characteristics	Category	Frequency (n)	Percentage (%)
	Leuwisari	15	10.7%
	Manonjaya	23	16.4%
	Pagerageung	22	15.7%
	Tamansari	20	14.3%
	Tawang	40	28.6%

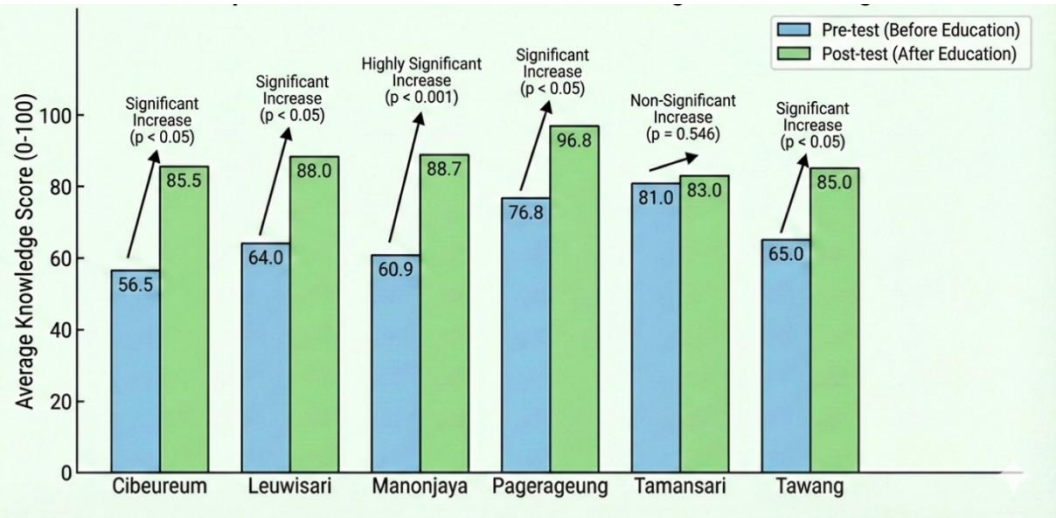

Figure 1. Hyperuricemia/Gout Education Effectiveness Result

Osteoarthritis

Health education initiatives, including the provision of pharmacological information regarding osteoarthritis (OA), were conducted across four regions within three districts: Cigalontang in the Tasikmalaya Regency, and Kawalu and Mangkubumi in Tasikmalaya City. The participant demographic for this intervention totaled 110 individuals. The sample was exclusively female (100%), predominantly consisting of middle-aged individuals between 46–59 years old (59.1%) and elderly individuals over 60 years old (40.9%), whose primary occupation was homemaking (86.4%) (Table 2). The results of the educational outreach demonstrated a statistically significant increase in knowledge regarding osteoarthritis and its management across all evaluated regions ($p < 0.05$) (Figure 2).

Table 2. Demographics of the osteoarthritis health promotion participants.

Characteristic Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	0	0%
	Female	110	100%
Age Group	Adult (26–45 years)	0	0%
	Pre-Elderly (46–59 years)	65	59.1%
	Elderly (> 60 years)	45	40.9%
Occupation	Housewives	95	86.4%
	Laborer/Farmer/Other	15	13.6%
Intervention Site	Cigalontang (Sindangwangi)	20	18.2%
	Kawalu (Kersamenak)	35	31.8%
	Kawalu (Karanganyar)	30	27.3%
	Mangkubumi	25	22.7%

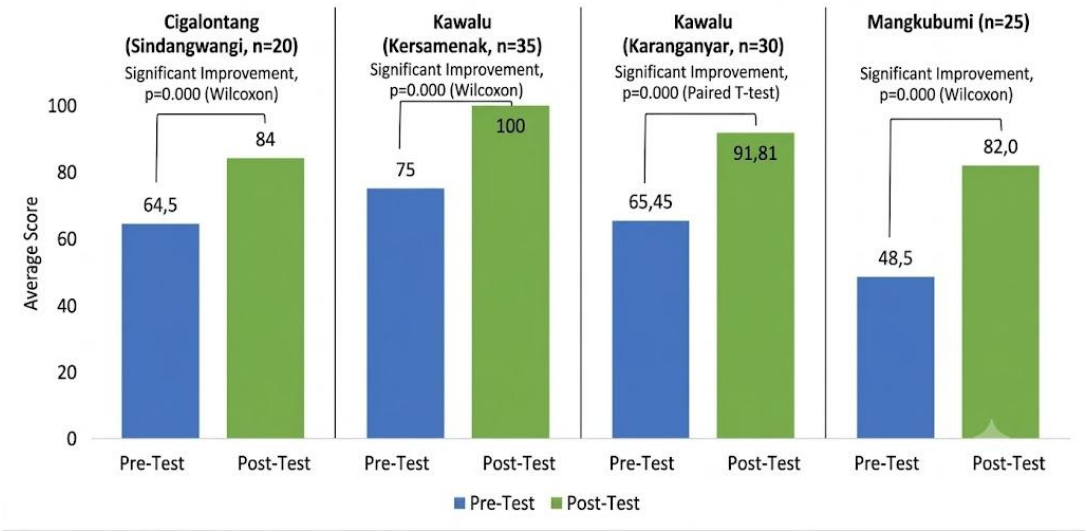

Figure 2. Osteoarthritis education effectivity result.

Osteoporosis

Health education interventions, including the dissemination of pharmacological information regarding osteoporosis, were conducted across four districts: Sukaasih (Tasikmalaya Regency), and Bungursari, Purbaratu, and Tamansari (Tasikmalaya City). A total of 101 individuals participated. The demographic data indicate that the cohort was predominantly female (98%), aged 45–59 years (55.4%), and primarily comprised of housewives (88.1%) (Table 3). Post-test results indicated a statistically significant increase in knowledge regarding osteoporosis across all regions ($p < 0.05$) (Figure 3).

Table 3. Demographic of the osteoporosis health promotion participants.

Characteristic Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	2	2%
	Female	99	98%
Age	Adults (< 45 years)	12	11.9%
	Pre-elderly (45–59 years)	56	55.4%
	Elderly (> 60 years)	33	32.7%
Occupation	Housewives	89	88.1%
	Others (Laborer/Health Volunteer/etc.)	12	11.9%
Activity Location	Bungursari	31	30.7%
	Purbaratu	20	19.8%
	Sukaasih	20	19.8%
	Tamansari	30	29.7%

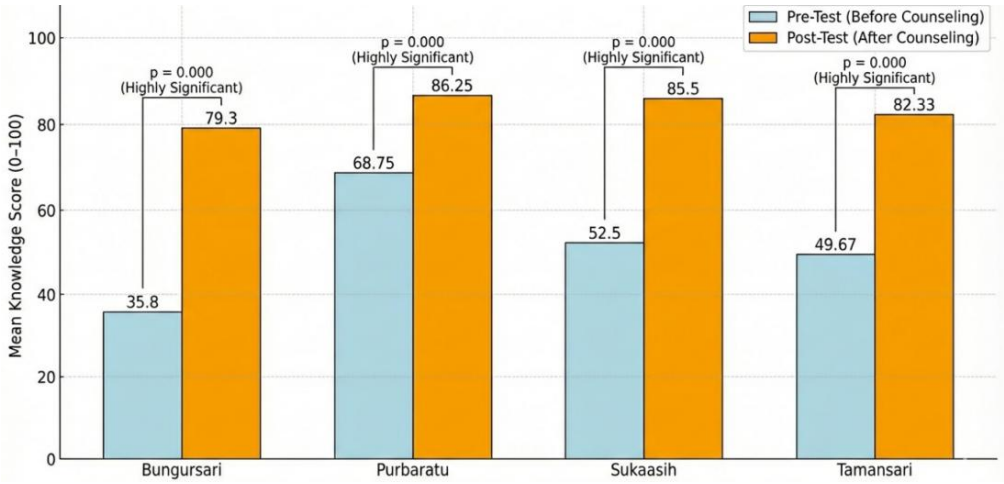

Figure 3. Osteoporosis education effectivity result

Rheumatoid Arthritis

The provision of health information and medication counseling related to rheumatoid arthritis (RA) was conducted across two regions: Kersamenak and Karanganyar within the Kawalu District of Tasikmalaya. The final profile of the 65 participants was exclusively female (100%), predominantly aged between 46 and 59 years (53.8%), and largely composed of housewives (92.30%) (Table 4). The educational intervention demonstrated a statistically significant improvement in post-test knowledge scores regarding RA ($p < 0.05$) (Figure 4).

Table 4. Demographic of the rheumatoid arthritis health promotion participants.

Characteristic Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	0	0%
	Female	65	100%
Age	Adult (26–45 years)	14	21.5%
	Pre-elderly (46–59 years)	35	53.8%
	Elderly (> 60 years)	16	24.7%
Occupation	Housewives	60	92.3%
	Laborer/Others	5	7.7%
Activity Location	Kawalu (Kersamenak)	35	53.8%
	Kawalu (Karanganyar)	30	46.2%

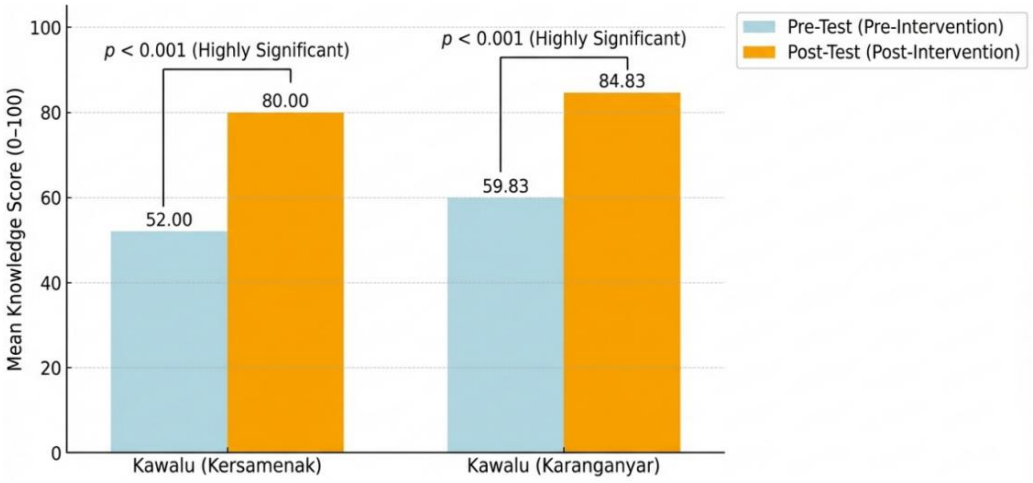

Figure 4. Rheumatoid arthritis education effectivity result.

Discussion

Hyperuricemia and Gout

Rather than treating hyperuricemia solely as a baseline physiological state where serum uric acid levels exceed 7 mg/dL in men and 6 mg/dL in women, this intervention highlights how community health literacy can directly target the behavioral drivers of the disease. Sustained elevation beyond these thresholds precipitates joint tissue crystallization and inflammatory gout (Joosten et al., 2020), fueled by metabolic overproduction and renal underexcretion (Li et al., 2020; Du et al., 2024; Timsans et al., 2024). While literature thoroughly details the non-modifiable risks, such as cellular turnover, genetic overactivity, or mutations in transporters like SLC2A9, ABCG2, and SLC22A12 (Dissanayake et al., 2020; Yanai et al., 2021; Camici et al., 2023), our intervention focused heavily on modifiable triggers. By addressing dietary patterns and fluid intake, the program directly challenges the progression toward secondary pathological outcomes like chronic renal damage, nephrolithiasis, and cardiovascular disease (Jung et al., 2020; Yang et al., 2025).

The significant knowledge expansion observed across five districts demonstrates high educational effectiveness, showing that complex metabolic pathways can be successfully translated for public audiences. When compared to recent Indonesian studies, such as the community-based health education programs conducted by Putra et al. (2025) in Surabaya, our findings closely mirror the sharp upward trajectories in community awareness. Putra et al. (2025) similarly observed that localized, interactive screening and education sessions elevated adequate public knowledge from 68.7% (pre-test) to 84.3% (post-test).

The demographic skew toward housewives driven by the morning timing of the sessions unlocked a powerful community lever. Since housewives typically dictate family nutrition, improving their literacy regarding high-purine targets (e.g., offal, melinjo crackers) allows preventative habits to be integrated directly into daily household meals. This approach is clinically vital for postmenopausal attendees; the age-related decline in estrogen impairs renal uric acid clearance, causing their risk profiles to rapidly mirror those of men (Cota et al., 2023; Teramura et al., 2023; Chou et al., 2024), a trend further compounded by age-related declines in glomerular filtration rates (Skoczyńska et al., 2020; Ruiz-García et al., 2024).

In contrast to the other districts, Tamansari exhibited a non-significant knowledge shift (pre-test 81 to post-test 83). Rather than indicating program failure, this demonstrates a classic ceiling effect. The community possessed a highly sophisticated baseline understanding of gout prior to the intervention, meaning future initiatives in this district should pivot from basic introductory education to advanced, autonomous self-management tracking. This specific phenomenon aligns with domestic findings by Harjana et al (2026), who noted that urban cohorts in Indonesia with pre-existing baseline knowledge do not benefit from basic awareness models; instead, future initiatives in high-baseline districts like Tamansari should pivot from basic introductory education to advanced, autonomous self-management tracking and cadre-led quality-of-life programs to yield significant health outcomes.

Osteoarthritis

Osteoarthritis (OA) is a progressive arthritic condition characterized by articular cartilage degradation, subchondral bone thickening, osteophyte development, and chronic synovial inflammation (He et al., 2020; Coaccioli et al., 2022; Wang et al., 2022). While the physiological cascade involves complex immune pathways, where damage-associated molecular patterns (DAMPs) activate local macrophages, neutrophils, and adaptive T and B cell autoantibody loops (Lambert et al., 2021), the core objective of this public health intervention was to shift participants from passive sufferers to active self-managers. This is crucial because the chronic immobility and sleep disturbances associated with OA significantly elevate long-term secondary cardiovascular risks (Lambert et al., 2021). Our findings are consistent with wider Indonesian epidemiological data, which indicates that over 11.5% of the domestic population suffers from OA, with numbers surging dramatically past the age of 40 (Kementerian Kesehatan Republik Indonesia, 2018).

The uniform, statistically significant knowledge increases achieved across Cigalontang, Kawalu, and Mangkubumi confirm that structured public education is highly effective at empowering at-risk groups. The participant demographics in these regions align tightly with known epidemiological risk factors, specifically targeting individuals over 40 and women, who

carry a disproportionate burden of the disease (Wang et al., 2022). When compared to domestic self-medication (*swamedikasi*) and community cadre workshops executed in other regions of Indonesia, our educational methodology achieved a comparable leap in post-test competency. These comparative studies confirm that interactive, community-led musculoskeletal sessions trigger far greater self-efficacy and home-based exercise compliance than standard clinical advice leaflets alone (Setiadi et al., 2019).

By critically interpreting these outcomes against previous literature, our findings validate community-based health education as a viable means of enhancing long-term medication adherence and joint-protection behaviors. Internalizing these lifestyle adjustments is a necessary prerequisite to altering the biomechanical joint stresses and obesity-related risks that accelerate cartilage breakdown (Wang et al., 2022).

Osteoporosis

Osteoporosis stems from a cellular imbalance where bone-resorbing osteoclast activity outpaces bone-forming osteoblast matrix synthesis (Liang et al., 2022). This pathology is frequently driven by postmenopausal estrogen deficiencies that upregulate RANKL expression and downregulate OPG (Smit et al., 2024), age-related androgen declines in men, secondary systemic disorders (Almeida et al., 2017), or senile drops in absolute osteoblast pools (Qadir et al., 2020). However, many of the lifestyle and environmental amplifiers of this imbalance, such as physical inactivity, nutritional calcium/Vitamin D deficiencies, tobacco use, alcohol consumption, or prolonged use of bone-depleting medications like glucocorticoids are entirely preventable (LeBoff et al., 2022; Niebuur et al., 2023; Smit et al., 2024).

The educational effectiveness of this program was demonstrated by the robust participant engagement and significant knowledge gains across Sukaasih, Bungursari, Purbaratu, and Tamansari. By aligning our outreach with these specific biological windows of vulnerability (predominantly pre-elderly and elderly females), the intervention successfully addressed the exact population requiring preventive lifestyle strategies. The outcomes indicate that targeted community education can bridge the gap between complex bone biology and real-world compliance, laying a foundation for reduced regional fracture rates and sustained functional independence.

Our success in these subdistricts strongly corroborates the findings of similar Indonesian *Posbindu* (integrated health post) interventions, which demonstrated that combining bone density screening with structured health education yields a major leap in preventive lifestyle choices (Sitanggang et al., 2021). Moreover, elderly Indonesian women frequently present with low baseline bone density alongside complete unawareness of their risk profile (Sitanggang et al., 2021). By directly contrasting our results against these domestic baseline trends, our program confirms that localized health literacy campaigns effectively dismantle the "silent" misconception of bone density loss, establishing a reliable foundation for reduced regional fracture rates and sustained functional independence across aging communities.

Rheumatoid Arthritis

Rheumatoid arthritis (RA) represents a complex, systemic autoimmune disorder where environmental triggers like tobacco smoke interact with specific genetic risks (such as the HLA-DRB1 genotype) to promote protein citrullination and pathogenic ACPA formation (Ishikawa and Terao, 2020; Jahid et al., 2023). Left unmanaged, the resulting joint destruction and systemic inflammation elevate mortality rates by 1.4 to 2.0-fold via severe cardiovascular and respiratory comorbidities (Wu et al., 2022). Given the rising longitudinal trends of RA within Indonesia, early public health literacy is increasingly critical (Suryana et al., 2024).

The sharp, post-intervention knowledge increases among housewives in the Kawalu District illustrate the unique power of household-centered public health interventions. Rather than focusing heavily on unalterable genetic risks, the educational curriculum achieved success by emphasizing modifiable environmental factors. Equipping housewives with RA literacy creates an immediate secondary preventive loop as central health managers, these women are uniquely positioned to spearhead household smoking cessation campaigns (removing a primary trigger for ACPA formation) and implement anti-inflammatory dietary changes.

Our intervention's outcomes stand out favorably when compared to macro-level observations from the Indonesian Rheumatology Association (Perhimpunan Reumatologi Indonesia, 2021). The national registry frequently highlights that the low remission rate (~24.5%) of RA in Indonesia is primarily driven by massive delays in early detection and a severe lack of community-level literacy (Perhimpunan Reumatologi Indonesia, 2021). By achieving statistically significant knowledge gains through direct community interaction, our program successfully bypassed the institutional delays noted in clinical-only frameworks, proving that localized educational interventions are expected to drive earlier clinical screenings and may improve long-term adherence to complex disease-modifying therapies within the wider community.

Implications

The findings of this study yield critical public health implications, demonstrating that a uniform public health curriculum is inherently inefficient due to baseline differences like the ceiling effect observed in Tamansari. Consequently, public health agencies should utilize baseline screenings to stratify communities, deploying introductory awareness campaigns in low-literacy zones while directing advanced self-management and behavioral-modification programs to high-baseline areas. Furthermore, utilizing localized community schedules to educate housewives provides a highly scalable, low-cost mechanism for cascading these preventive healthcare measures into the broader family unit, effectively multiplying the impact of a single educational session. Ultimately, by successfully linking complex pathophysiological mechanisms to daily habits, such as purine management and joint-protection techniques, this intervention demonstrates that structured community education can actively pivot public behavior away from reactive clinical treatments and toward proactive, self-led prevention.

Research Contribution

This study contributes significantly to the literature by providing a highly granular, district-by-district evaluation of musculoskeletal and metabolic health literacy in suburban and rural Indonesian communities. While macro-level public health studies frequently overlook localized variations, this research clearly documents how adjacent districts can exhibit vastly different educational needs and baseline capacities. Additionally, it offers a valuable empirical model for optimizing community trial enrollment by strategically aligning health interventions with local domestic and occupational schedules. Finally, by providing documented evidence of educational ceiling effects in regional health literacy studies, this work serves as an important reference point for future researchers designing community-based randomized controlled trials.

Limitations

Several limitations must be acknowledged when interpreting these outcomes, beginning with the evaluation's complete reliance on immediate pre- and post-test questionnaires to determine knowledge acquisition, which introduces potential response bias and cannot verify long-term knowledge retention. Furthermore, because data collection concluded immediately following the educational sessions, this study suffers from an absence of longitudinal and clinical tracking, meaning it cannot confirm if the observed health literacy gains successfully translated into long-term behavioral changes or improved clinical outcomes such as actual reductions in serum uric acid levels or lower fracture incidences over time. Finally, the study is subject to selection bias due to the morning scheduling of the sessions to accommodate local community availability, which caused the participant pool to skew heavily toward women and elderly demographics, thereby underrepresenting working-age males and younger cohorts who may possess entirely different baseline health literacy profiles.

Suggestions

Based on these insights, future research and public health initiatives should first incorporate longitudinal follow-up assessments to evaluate long-term knowledge retention and track actual behavioral adherence over an extended timeline. To definitively validate the health outcomes of the educational program, future studies should also pair questionnaire data with objective clinical biomarkers, such as monitoring longitudinal serum uric acid levels, tracking bone

mineral density changes, or documenting regional joint-related clinic visits. Additionally, researchers should diversify delivery formats and timing by developing hybrid delivery frameworks, such as evening webinars, weekend workshops, or mobile health application toolkits to overcome current selection biases and actively engage working-age populations and men. Lastly, public health organizers should develop tiered curriculums that adopt a two-tiered framework, a basic introductory track focusing on early symptom identification for low-baseline districts, and an advanced behavioral workshop tract for high-baseline districts to optimize regional resource allocation.

CONCLUSION

Health promotion initiatives focusing on musculoskeletal health and medications across twelve subdistricts (seven in Tasikmalaya City and five in Tasikmalaya Regency) demonstrated a significant improvement in knowledge regarding musculoskeletal disorders, specifically hyperuricemia (gout), osteoarthritis, osteoporosis, and rheumatoid arthritis. The program is expected to contribute to improving preventive behaviors and supporting better musculoskeletal health outcomes.

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AUTHOR CONTRIBUTION STATEMENT

YPS conceived and designed the study. YPS, AP and IA performed the health promotion education and collected the data. YPS developed the analytical tools and analyzed the data. YPS, AP and IA wrote the draft of the manuscript. All authors contributed to data interpretation, critically revised the manuscript for important intellectual content, and approved the final version for submission.

AI DISCLOSURE STATEMENT

The authors used Gemini for language editing and figures. The authors reviewed and edited the output as needed and take full responsibility for the content of the publication.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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