

Prevent Osteoporosis Early: Nutrition Education and Yoga-Based Physical Exercise for Women Aged 30+ In the Dawuhan Housing Community, Purbalingga

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ABSTRACT

Osteoporosis merupakan penyakit degeneratif yang menjadi masalah serius, terutama pada wanita usia ≥ 30 tahun. Faktor risikonya meliputi rendahnya asupan kalsium, kurang aktivitas fisik, dan gaya hidup sedentari. Observasi di Asosiasi Wanita Dawuhan, Kecamatan Padamara, Kabupaten Purbalingga menunjukkan rendahnya kesadaran, konsumsi kalsium, dan kebiasaan olahraga anggota. Sebagai respons, dilakukan program pengabdian masyarakat untuk pencegahan dini melalui edukasi promotif-preventif. Metode meliputi konseling nutrisi seimbang, latihan fisik berbasis yoga, serta tes pra dan pasca. Kegiatan mencakup edukasi faktor risiko, pelatihan membaca label gizi dan memilih makanan tinggi kalsium, serta praktik yoga untuk kesehatan tulang, dengan melibatkan dosen, mahasiswa, ahli gizi/fisioterapis, dan instruktur olahraga. Hasil menunjukkan peningkatan signifikan pengetahuan dan motivasi peserta dalam menjaga nutrisi dan aktivitas fisik. Program ini efektif memberdayakan perempuan menjaga kesehatan tulang dan berpotensi menjadi model berkelanjutan pencegahan osteoporosis di komunitas.

Osteoporosis is a degenerative disease that is a serious problem, especially in women aged 30 years and above. Risk factors include low calcium intake, lack of physical activity, and a sedentary lifestyle. Observations at the Dawuhan Women's Association in Padamara District, Purbalingga Regency, revealed low awareness, calcium consumption, and exercise habits among members. In response, a community service program for early prevention through promotive-preventive education was implemented. Methods included balanced nutritional counseling, yoga-based physical exercise, and pre- and post-tests. Activities included education on risk factors, training in reading nutrition labels and selecting calcium-rich foods, and yoga practices for bone health, involving lecturers, students, nutritionists/physiotherapists, and sports instructors. Results showed a significant increase in participants' knowledge and motivation in maintaining nutrition and physical activity. This program effectively empowers women to maintain bone health and has the potential to become a sustainable model for osteoporosis prevention in the community.



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INTRODUCTION

Osteoporosis is a degenerative disease characterized by decreased bone density, making bones fragile and susceptible to fractures. This condition commonly affects women over the age of 30 due to hormonal changes, inadequate calcium and vitamin D intake, and a sedentary lifestyle. According to the

World Health Organization (WHO), one in three women over the age of 50 will experience fractures due to osteoporosis. This emphasizes the importance of early promotive and preventive efforts starting at the age of 30 to reduce the risk of osteoporosis in later life.

Bone health is often neglected because the symptoms of bone loss are not immediately visible. Many women are unaware that peak bone mass is typically reached at around 30 years old, after which bone density gradually decreases each year. Low calcium intake, limited sun exposure, and a sedentary lifestyle are major contributing factors to this decline. Therefore, education about proper nutrition and physical exercise plays a vital role in raising awareness and promoting healthier behaviors among women.

The community partner for this program is the Dawuhan Women's Association, located in Padamara District, Purbalingga Regency, Central Java. The association consists of 20 active members aged 30 to 65 years, most of whom are housewives and micro-entrepreneurs, including eyelash extension workers, handicraft makers, and market vendors. Their regular social gatherings, such as monthly arisan activities, present an excellent opportunity for knowledge and skill transfer related to health promotion.

Based on the results of preliminary observations and interviews, it was found that most members of the association did not yet understand the dangers and prevention of osteoporosis. Their daily dietary habits reflected low calcium intake and poor nutritional balance, while regular physical activity was rarely practiced. Furthermore, no specific health programs had been conducted to support bone health, and the existing group exercise activities were unstructured and irregularly implemented. These findings indicate the need for promotive and preventive interventions aimed at improving bone health literacy and providing practical nutrition and exercise skills that can be easily applied in daily life.

Nutrition education combined with yoga-based physical exercise was chosen as the main strategy due to its accessibility, practicality, and evidence-based benefits. Yoga has been proven to enhance muscle strength, balance, and bone density in adult women. Therefore, this community service activity aims to improve bone health literacy through nutrition education and yoga training, while empowering members of the Dawuhan Women's Association to adopt healthy lifestyles and become agents of change in osteoporosis prevention within their community.

METHOD

This community service program was implemented using a participatory and community empowerment approach, placing the community as an active subject throughout all stages of the activity. This approach aligns with the program's main goal to improve health literacy and promote behavioral changes through direct involvement of the target community. The partner of this program was the Dawuhan Women's Association located in Padamara District, Purbalingga Regency, consisting of 20 active members, most of whom are housewives and micro-entrepreneurs. The program focused on osteoporosis prevention through nutrition education and yoga-based physical training for women aged 30 years and above, combining educational activities, practical demonstrations, and continuous mentoring.

The program began with a preparation and coordination phase, during which the implementation team conducted an initial survey to analyze participants' knowledge, attitudes, and behaviors regarding bone health. The results revealed that most participants lacked understanding of osteoporosis prevention, had low calcium intake, and rarely engaged in physical activity. These findings were used to design a contextually relevant intervention. The team then coordinated with the association's management to prepare educational materials, including a *bone health nutrition booklet*, *osteoporosis leaflet*, and a *10-minute yoga video*. Evaluation tools such as pre-test and post-test questionnaires were also developed to assess the participants' knowledge improvement.

The socialization phase, held in June 2025 with 20 participants, introduced the program's objectives, benefits, and stages of implementation, while also forming a community coordinator group responsible for assisting in organizing the activities. This phase strengthened participants' commitment and collective ownership of the program, which is essential for ensuring sustainability.

The core stage of implementation, conducted in July 2025 at the Owabong Tourism Area in Purbalingga, consisted of three major sessions: osteoporosis education, nutrition education, and yoga training. The educational sessions were conducted interactively using visual aids and simulations to enhance understanding of bone structure, risk factors, and prevention strategies. The nutrition education

introduced participants to calcium- and vitamin D-rich food sources, provided practice in reading food labels, and discussed simple daily meal plans. The yoga session, guided by a certified instructor with a health background, included basic postures such as *mountain pose*, *tree pose*, *chair pose*, and *bridge pose* to strengthen muscles, improve balance, and enhance flexibility.

Throughout the activities, participants received direct guidance from the facilitators to ensure safe and correct practice. Evaluation was carried out both quantitatively and qualitatively through pre- and post-tests as well as reflective discussions. The results showed an average knowledge increase of 20.2%, indicating a significant improvement in participants' understanding and motivation to adopt healthier lifestyles.

As a follow-up, the Dawuhan Women's Yoga Group was established, conducting weekly yoga sessions led by community coordinators under the supervision of the service team. This continuation ensures that the benefits of the program are sustained and embedded in daily community practices. The implementation of this activity is consistent with Wallerstein's (2006) community empowerment model, which emphasizes active participation, capacity building, and health literacy enhancement as the foundation for sustainable community-based health promotion.

RESULTS AND DISCUSSION

The community service activity was implemented according to the schedule outlined in the proposal, achieving 80% of the targeted progress by August 2025. The first stage was the preparation phase, which included several key activities:

1. Initial coordination with the Dawuhan Women's Association as the community partner,
2. field surveys to determine the activity location, participants, and schedule,
3. development of educational media in the form of a bone health nutrition booklet, an osteoporosis leaflet, and a 10-minute yoga video for osteoporosis prevention, and
4. preparation of pre-test and post-test instruments to evaluate participants' knowledge improvement.

The second stage involved socialization activities, conducted in June 2025 for women in the Dawuhan Housing Community. This stage included:

1. program introduction attended by 20 participants,
2. explanation of the objectives, benefits, and implementation plan for the education and training sessions, and
3. establishment of a community coordinator group to assist with the organization of regular yoga exercises.

The third stage was the education and training phase, carried out in July 2025 at the Owabong Tourism Area. The main activities consisted of three sessions:

1. osteoporosis education, presenting materials on risk factors, signs, symptoms, and prevention strategies;
2. nutrition education on dietary patterns to prevent osteoporosis; and
3. yoga training for osteoporosis prevention.



Figure 1. Osteoporosis Education and Yoga Training

The results of the pre-test and post-test on osteoporosis and nutrition education, as well as yoga training, are presented below:

Table 1. Pre-test and Post-test Results of Participants' Knowledge

No	Age	Education	Occupation	Experience Accessing Osteoporosis Information	Pre-test	Post-test
1	42	University	Civil Servant	Yes	70	75
2	43	University	Housewife	Yes	68	70
3	38	University	Housewife	No	59	71
			Private	No		
4	34	Bachelor	Employee		59	68
		Junior High	Housewife	No		
5	52	School			58	70
		Senior High	Housewife	No		
6	45	School			57	70
		Junior High	Private	No		
7	40	School	Employee		57	70
		University	Private	Yes		
8	33		Employee		69	70
		University	Private	Yes		
9	44		Employee		69	70
		Senior High	Private			
10	47	School	Employee	No	55	70
		Senior High	Private			
11	42	School	Employee	Yes	67	70
		Junior High				
12	55	School	Housewife	No	55	70
		Senior High	Private			
13	33	School	Employee	Yes	69	72
		Junior High	Private	No		
14	55	School	Employee		57	70
		Junior High	Housewife	No		
15	65	School			55	70
		Senior High	Housewife	No		
16	44	School			56	71
		Junior High	Housewife	No		
17	40	School			57	72
		Senior High	Housewife	No		
18	40	School			57	72
19	41	University	Civil Servant	Yes	69	72
		Junior High				
20	44	School	Housewife	No	57	70

Based on the table above, 20 respondents participated in the community service program, with ages ranging from 33 to 65 years, representing early to middle adult women. Most respondents had a college-level education and worked as housewives or civil servants. This age group corresponds to the phase in which bone mass naturally begins to decline due to hormonal changes, particularly as women approach perimenopause. Therefore, educational interventions on nutrition and physical activity are particularly relevant for this population segment.

Among the 20 respondents, 71.4% (15 participants) had previously accessed information about osteoporosis through social media, healthcare providers, or family experiences, while 28.6% (5 participants) had never received such information before. This finding indicates that although most participants had some prior awareness, their understanding of osteoporosis prevention was still limited. Low levels of bone health literacy can hinder preventive behavior, as noted by Chin et al. (2023), who found that poor bone health literacy is directly associated with inadequate osteoporosis prevention practices among adult women.

The evaluation results showed a clear improvement in participants' knowledge after the educational and yoga intervention. The average increase in knowledge was 20.2%, covering understanding of the causes, prevention strategies, and the importance of regular exercise. This finding aligns with Yunita & Wahyuni (2022), who reported that education-based interventions combining nutrition and physical activity significantly enhance women's knowledge and motivation to prevent osteoporosis.

The yoga training was carried out in three sessions and successfully increased participants' awareness of the importance of regular physical activity. Many participants reported feeling more relaxed, energized, and motivated after attending the sessions. These outcomes are consistent with the research of Chopra et al. (2021), which demonstrated that regular yoga practice improves flexibility, balance, and reduces the risk of falls among middle-aged women.

Overall, this program achieved its intended goals of enhancing participants' knowledge, attitudes, and behaviors related to osteoporosis prevention, while fostering empowerment and health awareness within the Dawuhan community.

CONCLUSION

The community service program titled "Prevent Osteoporosis Early: Nutrition Education and Yoga-Based Physical Exercise for Women Aged 30+ in the Dawuhan Housing Community, Purbalingga" successfully increased participants' knowledge and awareness regarding osteoporosis prevention. Through a combination of nutrition education and yoga-based physical training, participants experienced a 20.2% improvement in understanding the importance of maintaining bone health, consuming calcium-rich foods, and engaging in regular physical activity. The establishment of a community-based yoga group also ensured the sustainability of these healthy practices. This program demonstrates that participatory and empowerment-based approaches can effectively enhance women's health literacy and encourage long-term lifestyle changes to prevent osteoporosis. Future community service initiatives can build upon this model by expanding outreach to other communities and integrating digital education media to further promote bone health awareness.

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