



Effect of Planned Teaching Programme on Bone Mineral Density among Middle aged Men and Women

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ABSTRACT

Osteoporosis is described as low Bone Mineral Density (BMD) and a major health concern for middle aged men and women. However, osteoporosis and its' risk factors have been significantly understudied in the middle-aged populations. The study aimed to estimate the effect of Planned Teaching Programme (PTP) on BMD among middle aged men and women. With 100 samples, a quasi-experimental, post-test only design was adopted. With 25 men and 25 women with a total 50 participants in study and control group, who were randomly assigned. The knowledge, health belief related to osteoporosis and bone density was measured using the Osteoporosis Knowledge and Health Belief Scale and a BMD machine. The study group received instruction on osteoporosis prevention and self-regulated brisk walking for 45 minutes, five days a week and data was collected after 3 months. BMD score revealed that in the study group 36 % men had normal bone density compared to 26% in control group. This was slightly different for women, i.e. 34% of study group women had normal BMD and it was 30% for control group whereas 10% women had osteopenia in study group as compared to 16% in control group. About the osteoporosis incidence among study and control group, 6% women of study and 4% of control group had osteopenia compared to 2% and 6% respectively for men. The research group's knowledge and belief improved with statistical significance at $p < 0.001$, indicating that the osteoporosis prevention program was helpful in enhancing BMD and reducing osteopenia in middle-aged men as well as women.

Keywords: Osteoporosis, Osteopenia, Bone Mineral Density, middle age men and women, Planned Teaching Programme, Osteoporosis Knowledge and Health Belief Scale

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INTRODUCTION

Osteoporosis and its complication, fragility fractures, are serious public health issues that affect both developed and developing countries¹. The number of fractures in Asia exceeds the total number of fractures in all European countries combined. Southeast Asia accounts for about 17% of all fractures, with the West Pacific accounting for 29% and Europe accounting for 35%². However, the prevalence of osteoporosis and its risk factors in Asian populations have not been adequately studied.

Osteoporosis is a skeletal illness marked by decreased bone mass, structural degeneration of bone tissue, and weakened bone strength, all of which increase the risk of fracture^{3,4}. It's one of the most common metabolic illnesses, and it's a major cause of morbidity and mortality among the aged⁵. Several factors have been proposed as associated factors in bone mineral density changes in the elderly, including aging, sex, period of amenorrhea, parental history of fracture^{6,7}, dietary calcium intake, vitamin D deficiency, low Body Mass Index (BMI)⁸, reduced physical activity⁹, and thyroid function¹⁰.

In Indians, osteoporosis is the most common of four bone mineral problems. It is more common in women than in males, and it is known as the silent killer since millions of individuals are affected but are unaware of it. In both developing and developed countries, it is a big economic worry. Osteoporosis is defined as a BMD that is 2.5 standard deviations below the typical value for young healthy women, according to WHO guidelines (WHO, 2017).

People with low BMD are more likely to fracture and suffer irreversible injury. Every three seconds, an osteoporotic fracture develops in the spinal vertebrae and the femoral head or hip¹. Osteoporotic fracture can impair mobility and quality of life, and in the worst-case scenario, can result in mortality. The global incidence of osteoporotic fractures is expected to rise by 310 percent in men and 240 percent in women by 2050, significantly increasing the burden of osteoporosis in future generations².

Oestrogen levels drop dramatically in postmenopausal women, resulting in bone loss. According to the research, osteoporosis or low bone mass in the femoral neck and lumbar spine affects 54 million people in the United States alone¹¹. The high prevalence of osteoporosis and the resulting fractures is a severe medical burden that is quickly becoming a serious public health concern¹².

The purpose of the present study was to assess the effect of Planned Teaching Programme (PTP) on Bone Mineral Density among middle aged men and women with a secondary objective to prevent osteoporosis and its related morbidity as well as to improve the quality of life of middle aged people.

METHODOLOGY

Design: With the quantitative research approach, the quasi experimental, post-test only design was adopted to find out the effect of Planned Teaching Programme (PTP) on Bone Mineral Density among middle aged men and women.

Sample: The target population of the study was all the middle aged clients. The accessible population was the clients who attended the ortho clinics of the selected hospital, Chennai, India. Inclusion criteria include both men and women who were willing to participate in the study. Patients with severe osteoarthritis, fibromyalgia, having the habit of more than twice per week physical exercise such as walking, or were excluded. Fifty women and fifty men were selected in which first 25 men and 25 women were enrolled in the control group and second 25 each men and women were allotted in the study group. Women who were pregnant, overweight, postmenopausal, taking drugs that are known to affect BMD (e.g. proton pump inhibitors, glucocorticoids, antidepressants) were excluded from the study.

Tools/instruments: Assessments were performed after 3 months. There were three components in the tool: Part 1: Demographic data about the clients; Part 2: Osteoporosis knowledge questionnaire and health belief scale was used to assess the Knowledge and Health Belief regarding osteoporosis. 3: BMD machine was used to assess the bone density. The questionnaire was pretested during the pilot study. Content validity of the tool was obtained from the experts in Nursing and Orthopaedics. The internal consistency of the tool was assessed after the pilot study with Cronbach Alpha test. The reliability ('r') value of the tool was 0.79.

Intervention: For the study group, the knowledge about Osteoporosis, its risk factors, prevention and complications were taught. The preventive aspects such as have a healthy and varied diet with plenty of fresh fruits, vegetables and whole grains, calcium-rich foods, enough vitamin D with adequate sunlight exposure, avoid smoking, limiting alcohol consumption and caffeine as well as doing regular weight-bearing and strength-training activities were taught. Daily phone calls were made and a diary was maintained for each study group participant to ensure the compliance of

the exercise regime. The control group received no special treatment and was not visited in between assessment. Study group had education on prevention of osteoporosis and self-regulated brisk walking for 45 minutes, 5 days/ week for 3 months and control group led a normal life. Post assessment was conducted after 3 months of the intervention.

Ethical consideration: Official Permission from the Medical Director was obtained as well as ethical permission was obtained from the Institutional ethical committee. A written consent from the participants were collected before the study by explaining the purpose of the study, the role of the participants, confidentiality of the information and their right to withdraw from the study at any point of time of the study. The written consent from both the exercise and control group was obtained by explaining the study protocol. The control group was given education materials on osteoporosis and its' prevention at the end of the data collection for ethical reasons.

Statistical analysis: The socio demographic data, Knowledge and Health Belief regarding Osteoporosis and the bone density of the participants were analyzed using frequencies, percentage distribution and mean and standard deviation. Inferential statistics was used to find the relationship between the study variables with selected socio-demographic characteristics using Chi-square test.

RESULTS AND DISCUSSION

BMD score revealed that in the study group 36 % men had normal bone density compared to 26% in control group. This was slightly different for women, i.e.34% of study group women had normal BMD and it was 30% for control group whereas 10% women had osteopenia in study group as compared to 16% in control group (Table 1). About the osteoporosis incidence among study and control group, 6% women of study and 4% of control group had osteopenia compared to 2% and 6% respectively for men. These findings are analogous to the few studies,^{13,14,15} which showed that BMD begins to decline in men and women during early middle age and progresses into old age and leads to Osteoporosis and Osteopenia.

According to the study findings on Reference Ranges for Bone Mineral Density and Prevalence of Osteoporosis in Vietnamese Men and Women aged 50+ years, the prevalence of osteoporosis in men was 10% and in women, it was 30%¹⁵. The present study finding is in consistent with the global population studies that the women are more prone for the osteoporosis as they reach the menopausal age because of the hormonal influence. The middle age men are also equally prone for this, hence, the primary prevention activities during the early adulthood to be taken through mass media and health education strategies.

Table I: Bone Mineral Density (BMD) scores

Level of BMD	Osteoporosis		Osteopenia		Normal	
	(< -2.5) %		(-1.0 - -2.5) %		(>0) %	
	Men	Women	Men	Women	Men	Women
Study Group	2	6	12	10	36	34
Control Group	6	4	18	16	26	30

The posttest, 68% of study group men and women had adequate knowledge and 80% had inadequate knowledge in the control group. Regarding health belief 76% had high level of health belief in study group and 54% had moderate level in control group. The posttest mean score of knowledge in the study group was 19.82 ± 3.91 as compared to 9.12 ± 2.18 in control group ($t = 13.27$) which is statistically significant at $p < 0.001$. This result is consistent with the study by Brecher et al,¹⁷ which found that prevention programs increased patient knowledge of osteoporosis as well as increased calcium intake. The findings of the correlation analyses revealed that exercise status had a significant and positive relationship with BMD

($r=0.30$, $P=.01$) among men, but other variables such as calcium consumption, family history of low BMD, and any history of musculoskeletal injury had no such relationship. The study by Nahar V, Nelson K, Ford M, et al¹⁸ also reported that a moderate and statistically significant advantage of exercise on BMD. The findings of a study on Brazilian men show that therapies aimed at conserving bone mass in elderly men may be beneficial. When there is significant bone loss in the femoral neck, followed by a rapid increase in age-related fractures, population screening for osteoporosis in men may be undertaken at the beginning of the eighth decade¹⁹. Therefore, this study results conclude that osteopenia and

osteoporosis screening and preventive measures are essential for middle-aged men and women.

CONCLUSION

To minimize misperceptions and barriers associated to osteoporosis, educational strategies must be used. To prevent osteoporosis in later life, middle-aged men and women should consume nutritious meals containing enough amounts of calcium and vitamin D, as well as increase their physical activity.

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