

ASSESSMENT OF LIFESTYLE RELATED RISK FACTORS OF OSTEOPOROSIS IN POST MENOPAUSAL AGE

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Abstract: This study deals about the associated demographic and lifestyle risk factors of osteoporosis among post menopausal women. For this purpose 500 women of 50-70 age group were selected using bone mineral density test with T score standard deviation at (or) below 2.5 and greater than 1.0 as osteoporotic and non osteoporotic respectively 250 of each group. They were studied for some demographic characteristics and life style pattern. No difference in demographic characteristics of osteoporotic and non osteoporotic post menopausal women was found with regards to age and marital status while a significant association of education, occupation, caste and income was observed with the occurrence of osteoporosis. Furthermore, the lifestyle features like consumption of alcohol, smoking, tobacco chewing, exposure to sunlight and its duration found not different statistically among the groups, while the amount and type of exercise and consumption of aerated drinks etc. found different statistically among the groups. So, study suggests that through proper living conditions and lifestyle the problem of growing incidences of osteoporosis in aging women can be curtailed up to certain extent.

Key Words: Osteoporosis, lifestyle, Post Menopause.

Introduction: Osteoporosis is an important public health problem in older adults and normally seen in postmenopausal women, which not only give rise to morbidity but also markedly diminishes the quality of life in this population. This condition occurs when bones begin to lose some of their essential elements i.e. calcium. As a result, bones lose, their strength become fragile, and break easily. In extreme cases, even a sneeze or sudden movement may be enough to break a bone. The female sex hormone estrogen plays an important role in maintaining bone strength. The drop in estrogen level that occurs at menopause results in increased bone loss.

Post menopausal women are more likely to develop osteoporosis, a condition characterized by weakened bones that fracture easily. The drop in estrogen level that occurs at menopause results in increased bone loss. Consequently, changes in appetite may occur due to menopausal factors such as gustatory changes as well as physiological and psychological changes such as depression, joint pain and inability to work. As a result, the nutritional status of post menopausal women may be impaired specifically with regard to micro nutrients. It is now widely recognized that the cause of osteoporosis are multi factorial in nature and that there are wide variation in incidence across different

Results:

population. Thus the aim of this study was to investigate the risk factors of osteoporosis in post menopausal elderly women. This may provide us some more important information and will help us in prevention of osteoporosis.

Methodology: The study was preceded with the selection of 50- 65 aged post menopausal women with osteoporosis and without osteoporosis. The sample was chosen by purposive sampling method. 250 osteoporotic women were selected through Bone Mineral Density (BMD) screening test. The osteoporotic group identified as woman with T-score < -2.5 SD in BMD Ultrasound according to WHO criteria. The non-osteoporotic group comprised of 250 women with normal bone mineral density that is having T score > 1 SD of BMD.

These subject women were studied for:

Demographic characteristics- Age, education, occupation, caste, income group were collected through questionnaire method.

Lifestyle pattern- Physical activity, exercise, chewing tobacco and aerated drinks were collected through questionnaire method.

Statistical Analysis: Significance of difference in frequency distribution in groups has been found out using chi-square test.

Osteoporotic n=250	Mean	Min	Max	SD
Non Osteoporotic n=250	56.3	52.6	68.5	4.7
	55.2	50.2	66.9	5.2

'Z' Value - 0.11, P value - 0.915

Table 1 reveals that the mean age of osteoporotic post menopausal women as well as of non-osteoporotic post menopausal women were 55.3 years. Non-significant difference was observed between the two groups in their age group with a 'Z' value of 0.11 ($P > 0.05$), which explains that the post menopausal women selected in both the groups

were of the same age on which various parameters were recorded. The range of age amongst subjects was 50 yrs to 69 yrs.

Table 2: Distribution of osteoporotic and non osteoporotic post menopausal women based on education

Education	Osteoporotic n= 250		Non Osteoporotic n= 250	
	No.	%	No.	%
10 th	20	8.0	11	4.4
12 th	41	16.4	52	20.8
Graduate	125	50.0	163	65.2
Post Graduate	64	25.6	24	9.6

‘Chi’ Value -10.84, df = 3, P value - 0.012

Table 2 reveals that 8.0 %, 16.4 %, 50.0 % and 25.6 % of osteoporotic post-menopausal women had studied up to 10th standard, 12th standard, graduate and post-graduate level compared to 4.4 %, 20.8 %, 65.2 % and 9.6 % in non-osteoporotic post menopausal women respectively. Significant difference was observed between the two groups in their percentages (P < 0.05), which implies that the frequency of education between both the two groups was different.

Table 3: Distribution of osteoporotic and non osteoporotic post menopausal women based on occupation

Occupation	Osteoporotic n= 250		Non Osteoporotic n= 250	
	No.	%	No.	%
Non working	43	17.2	108	43.2
Working	207	82.8	142	56.8

‘Chi’ Value-16.03, df - 1, P Value - 0.00

Table 3 reveals that 17.2 % and 82.8 % of post-menopausal women were non-working and working in osteoporotic group compared to 43.2 % and 56.8 % in non-osteoporotic group respectively. Significant difference was observed between the two groups in their percentages (P < 0.05), which implies that frequency of occurrence of the post menopausal women in both the groups was different.

Table 4: Distribution of Osteoporotic and non Osteoporotic post menopausal women based on caste

Caste	Osteoporotic n= 250		Non Osteoporotic n=250	
	No.	%	No.	%
Bhardwaj	152	60.8	156	44.6
Gupta	53	21.2	27	7.7
Jain	23	9.2	9	2.6
Muslim	1	0.4	90	25.7
Sikh	21	8.4	68	19.4

‘Chi’ Value-41.4, df - 4, P Value - 0.00

Table 4 reveals that 60.8 %, 21.2 %, 9.2 %, 0.4 % and 8.4 % of post-menopausal women were Bhardwaj, Gupta, Jain, Muslim and Sikh in osteoporotic group compared to 44.6 %, 7.7 %, 2.6 %, 25.7 % and 19.4 % in non-osteoporotic group respectively. In this study, it was found that Bhardwaj, followed by Gupta and Jain, were more affected to osteoporotic condition in their post-menopausal age compared to Muslim and Sikh, who were less affected by osteoporosis. This can be due to their eating habits and dietary pattern. Significant difference was observed between the two groups in their percentages (P < 0.05), which implies that the frequency of occurrence of the post menopausal women in both the groups was different.

Income status	Osteoporotic n= 250		Non Osteoporotic n= 250	
	No.	%	No.	%
HIG	52	20.8	51	20.4
MIG	62	24.8	114	45.6
LIG	136	54.4	85	34.0

'Chi' Value-10.86, df - 2, P Value - 0.004

Table -5 reveals that 20.8 %, 24.8 % and 54.4 % of post-menopausal women were of HIG, MIG and LIG in osteoporotic group as compared to 20.4 %, 45.6 % and 34.0% in non-osteoporotic group respectively. In this study, it was found that income status had played a significant role in affecting the osteoporotic condition in post-menopausal women. Significant difference was observed between the two groups in their percentages ($P < 0.05$), which implies that frequency of occurrence of the post menopausal women in both the groups was different.

Life Style Pattern	Indices	Osteoporotic n= 250	Non-osteoporotic n= 250	Chi-Value (λ^2)	P value
Exercise	No	84.4	48.0	29.6	0.000
	Yes	15.6	52.0		
Type of exercise	Walk	9.6	30.0	0.2	0.654
	Yoga	6.0	22.0		
Alcohol	No	98.8	96	1.55	0.213
	Yes	1.2	4		
Aerated drinks	No	44.4	64.8	8.39	0.003
	Yes	55.6	35.2		
Exposure to sunlight	No	56.0	62.4	0.85	0.356
	Yes	44.0	37.6		
Morning Sunlight exposure time	6 to 9.	24.0	25.2	3.3	0.093
	9 - 12 noon	16.0	12.0		
	12 to 3 p.m.	4.0	0.4		

Table -6 reveals that 15.6 % of osteoporotic post-menopausal women were doing exercise and 84.4% were not doing exercise whereas 52.0 % of non-osteoporotic post menopausal women were doing exercise and 48.0% were not doing exercise. It was observed that 1.2 % of osteoporotic post-menopausal women were taking alcohol and 98.8% were not taking alcohol whereas 4.0% non osteoporotic post menopausal women were taking alcohol and 96.0% were not taking whereas, 100 % were not having the habit of smoking and tobacco chewing in the both groups. It was also found that 55.6 % of osteoporotic post-menopausal women were taking aerated drinks and 44.4% were not taking whereas 35.2% of non osteoporotic post menopausal women were taking aerated drinks and 64.8% were not taking

whereas, 44.0 % of osteoporotic post-menopausal women were exposed to sunlight and 56% were not exposed to sunlight whereas 37.6 % of non-osteoporotic post menopausal women were exposed to sunlight and 62.4% were not exposed. It was also observed that 24.0 %, 16.0 % and 4.0 % of post-menopausal women were exposed to sunlight from 6 a.m. to 9 a.m., 9 a.m. to 12 noon, 12 noon to 3 p.m. in osteoporotic post menopausal women as compared to 25.2%, 12.0% and 0.4% in non-osteoporotic post menopausal women respectively. Table further reveals significant difference ($P < 0.05$) between the two groups in their percentage distribution for exercise, type of exercise and consumption of aerated drinks respectively, which implies that frequency of occurrence of the post menopausal women in both the

groups is different. Non-significant difference ($P > 0.05$) was observed for alcohol, smoking, tobacco chewing,

Discussion:

Primary osteoporosis results from estrogen deprivation and constitutes 95% of all cases. Exposure of estrogen for longer time is associated with lower risk of osteoporosis. D Kritz-Silverstein *et.al* [7] reported the relationship of early age at menopause and number of reproductive years with bone mineral density in post menopausal women. Women who had early menopausal and those with the fewest reproductive years had significantly lower bone density at all sites. The number of reproductive years may be more helpful than age at menopause in identifying women at increased risk of osteoporosis. Aging is a major factor that will affect the bone mass in post menopausal women. B E Christopher Nordin *et.al.* [2] reported that calcium absorption decreases with age, as age progresses; a decrease in calcium absorption is seen. This decrease could be due to a decline in either the active calcium transport or diffusion component of the calcium absorption system. However in this study no difference in age was found in osteoporotic and non- osteoporotic post menopausal women.

Ozeraitiene *et al.*, [8] examined the relationship between bone mineral density and age, nutritional status in elderly women. They found that age and nutritional status had a significant influence on bone mineral density. It was found that women's age and anthropometric data, reflecting fat reserves in the body, were significantly related to low bone mineral density.

Education and occupation are the major indicators of overall health. Education of women have an effect on the lifestyle, nutrition and economic status i.e., people from well to do families have more facilities for continuing their education and have better nutritional facilities and health status. Education level is one of the most important demographic factors that found associated with osteoporosis in post menopausal women. In the present study, non- osteoporotic post menopausal women had better educational status than osteoporotic post menopausal women. Similar results were also found by Varena *et al.*, [10]. They observed that the prevalence of osteoporosis and related risk factors might be influenced by the level of education. This study showed the difference in the prevalence of osteoporosis among educational classes and the protective role played by increasing formal education.

In this study, it was found that working women were more affected to osteoporotic condition in their post-menopausal age, may be due to their eating habits and dietary pattern. It is advisable that working women must take care in their dietary pattern and rest at regular intervals will help to reduce the occurrence of osteoporotic conditions in them.

Similarly vegetarianism has shown as a risk factor for osteoporosis in post menopausal women of the caste of Bhardwaj, Gupta and Jain. Vegetarian diet may be more beneficial than animal protein diet in many respects but

exposure to sunlight and its duration in their life style pattern of post menopausal women in the both groups.

they may also contribute to a lower life time exposure to estrogen, which could increase the risk of osteoporotic fracture in vulnerable individuals. In present study, protective role of non vegetarian food has been observed, which implies that adequate protein intake is important for optimal bone health as observed in the Muslim and Sikh post menopausal women. Hence, it is advisable that affected communities must take care in their dietary pattern, which will help to reduce the occurrence of osteoporotic conditions in them.

The other possibility is the effect of economic status on education level. People from well-to-do families have more facilities for continuing their education and also have better nutritional and health status during childhood which increases their bone mass. In present study, economic status has shown significant positive effect and probability of higher BMD levels effect can be due to higher education level. Islam M.Z. *et al.*, [4] observed similar findings i.e., the influence of socio-economic status on dietary intake of calcium in menopausal women. The dietary intake of calcium was influenced by physiological status in high income group. This study showed the mean dietary calcium intake was significantly higher in all sub groups of HIG compared with sub groups of LIG.

Regular exercise (the right type and the right amount) is beneficial for minimizing progressive bone loss during ageing. Yoga may not directly strengthen bone, but it is still beneficial for the elderly in the sense it improves the strength of legs and torso muscles and improves balance, both of which may help to reduce the risk of falls, a major cause of hip fracture. In present study, post menopausal women with no regular exercise were in more risk of osteoporosis, which was a significant difference too. Halioua *et al.*, [3] reported similar findings i.e. the physical activity and exercises will help in enhancing the adult skeleton mass and bone density and reduce the occurrence of osteoporosis in the post-menopausal women. In contrast Rajya Korpelainen *et.al* [9] observed the effect of exercise on bone loss comes mainly from studies in voluntary post menopausal women, and no population based, long term interventions have been performed. The purpose of this population based, randomized, controlled trial was to determine the effect of long term impact exercise on bone mass at various skeletal sites in elderly women with low bone mineral density (BMD) at the radius and hip. This study shows exercise had no effect on BMD, while there was a positive effect on BMI as the trochanter exercise may prevent selected fractures in elderly women with low bone mass. Bonaiuti S.*et.al* [1] deduce that the effectiveness of exercise for preventing bone loss in women with post menopausal osteoporosis and concluded that exercise therapy, in particular weight bearing exercise, appears to be effective in increasing bone density at the lumbar spine and hip in

post menopausal women. Aerobics, weight bearing and resistance exercise are all effective in increasing the BMD of the spine in post menopausal women. Walking is also effective on the hip. Cigarette smoking is a risk factor for vertebral, forearm and hip fracture. In present study non significant result was observed because none of the groups were smoking. Hence, it does not show any effect on osteoporosis. In contrast John Llewlyn *et al.*, [5] reported women, who smoke one pack of cigarettes each day, by the time of menopause, have an average deficit of 5 to 10% in bone density, which is sufficient to increase the risk of osteoporosis and fracture.

Non significant result was observed in tobacco chewing because none of the group was chewing tobacco. Hence, it does not show any effect on osteoporosis.

Also this study suggests that in osteoporotic post menopausal women, consumption of aerated beverages was more. It indicated that aerated beverages consumption may have adverse effect on bone mineral density. Probably, cola contains caffeine and phosphoric acid, which may adversely affect bones. Similarly

Katherine L.*et.al* [6] observed that the consumption of cola is associated with lower BMD. BMD was measured at the spine and 3 hip sites in 1413 women and 1125 men. Cola intake was associated with significantly lower ($P < 0.001-0.05$) BMD at each hip site, but not spine, in women but not in men. Similar results were seen for diet cola and, although weaker, for decaffeinated cola. No significant relations between non-cola carbonated beverage consumption and BMD were observed. Total phosphorus intake was not significantly higher in daily cola consumers than in non consumers. Intake of cola, but not of other carbonated soft drinks, is associated with low BMD in women.

Optimum exercise, type of exercise, less consumption of aerated drinks, no alcohol intake, no tobacco chewing, no smoking are the major indicators of good fitness. Probably protective role of exercises and type of exercises provide good calories burning with exposure to sunlight for optimal bone health and vitamin D in the elderly women and reduce the incidence of osteoporotic condition in them.

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