

## RELATIONSHIP OF OSTEOPOROSIS WITH SOCIO-ECONOMIC STATUS, PHYSICAL ACTIVITY AND PUERPERAL CALCIUM SUPPLEMENTATION

U.K. GHOSH ● SANGETA ROY ● D. SHARMA ● S.C. GAUR ● G. GANGULI

### SUMMARY

Forty one symptomatic osteoporotic women complaining of low backache between 35 - 65 years of age were studied for the role of socioeconomic status, degree of work done and calcium supplementation during lactation on subsequent development of osteoporosis. The bone loss in women starts much before menopause at around the age of 35 years. The symptom of low backache starts with the onset of bone loss and is not dependent upon the duration or severity of osteoporosis. Women from low socioeconomic status, with sedentary habit and deprived of calcium supplementation during lactation develop osteoporosis at an early age.

### INTRODUCTION

Recent studies have shown that though oestrogen deprivation plays a role in the development of osteoporosis, evidences are accumulating which show that parameters other than estrogen also have a role in modifying the bone mass in women. Prevention of bone loss in women therefore should be an important aim in order to

minimise fractures in older women, since, there is no effective method of replacing the bone already lost and it is easier to maintain bone mass than to restore it.

With this aim in view the present study was undertaken to determine when bone loss starts in women and the role of socioeconomic status, degree of work done daily and calcium supplementation in lactation in the subsequent development of osteoporosis.

**MATERIAL AND METHOD**

This study was undertaken in 51 women. Forty one women complaining only of backache in the age group of 35 - 65 years formed the study group. Ten asymptomatic healthy fertile women in the age group of 25 - 30 years served as controls for comparison.

Women with disorders and/or therapy which may affect bone metabolism were excluded from the study. Each woman was subjected to detailed history and thorough examination.

Degree of work done daily was assessed

according to Kamat et al (1977).

Bone loss was assessed by taking a lateral view x-ray of Lumbar spine at L-3 and was graded according to Smith et al (1960).

All statistical analysis was done using M - stat. software.

**OBSERVATION**

All the cases in the study group complained of backache for a variable duration of 1 - 20 years. Radiological evaluation by Smith index shows that the study group had the evidence of early to marked bone loss (Table I). There was no evidence of

**Table I**  
**SHOWING BONE LOSS IN STUDY GROUP OF**  
**CASES AS ASSESSED BY SMITH INDEX**

Smith Index	No. of cases	%
I (Early bone loss)	17	41.46%
II (Moderate bone loss)	22	53.66
III (Marked bone loss)	2	4.44

**Table II**  
**SHOWING RELATION BETWEEN SOCIOECONOMIC STATUS**  
**AND MEAN DURATION OF BACKACHE.**

S.E. Status	No. of cases	Mean Duration of Backache (Years)
Lower (L + LM)	25	4.61
Middle (M)	13	2.16
Upper (UM + U)	3	2.75

bone loss in the control group. No significant correlation was observed between duration of backache and bone loss. ( $p > 0.05$ ).

duration of backache with socio-economic status, calcium supplementation during lactation and degree of work done daily are shown in Tables II, III, IV.

**Table III**  
**SHOWING RELATIONSHIP BETWEEN LACTATIONAL CALCIUM SUPPLEMENTATION AND MEAN DURATION OF BACKACHE.**

Lactational calcium Supplementation	No. of Cases	Parity	Mean duration of Backache (Ys)
Present	29	3.9	2.8
Absent	12	3.9	3.5

**Table IV**  
**SHOWING RELATIONSHIP BETWEEN DEGREE OF WORK AND MEAN DURATION OF BACKACHE**

Degree of work done daily	No. of cases	Mean duration of backache (years)
Sedantary	12	3.77
Moderate	23	2.62
Hard	6	1.75

Twenty one out of 41 (56.1%) women did moderate degree of work daily; 29.27% were sedentary workers and 14.63% were hard manual workers. Majority (92.7%) of cases belonged to lower, lower middle and middle socio-economic groups taken together. Thirty percent women did not take any form of calcium supplementation during lactation. The relationship of mean

#### **DISCUSSION**

In the present study we have assessed the trabecular bone loss (by Smith index) in preference to cortical bone loss as trabecular bone forms structural frame work of bone. Also, studies have shown that trabecular bone is more sensitive to change in bone turnover than the cortical bone (Nilas & Christiansen,

1988, Marcus et al 1983).

The radiological evidence of bone loss in study group of women, which comprises of both pre and post menopausal women show that bone loss start occurring in women well before they attain menopause resulting in the onset of osteoporosis. The backache therefore can be considered as the earliest symptom of osteoporosis. Mazes (1982) is of the opinion that trabecular bone loss begins during young adulthood (20 - 40 ys) and proceeds at a uniform rate of 6 - 8% per decade. He failed to show a greater loss of trabecular bone after the menopause. Reggs et al (1986) state that neither the total bone mass nor the bone density decline with age in premenopausal women.

The present study did not show any correlation between backache and Smith index, which shows that symptom of backache starts with the onset of trabecular bone loss. Also, back ache due to osteoporosis is not dependent on the duration or severity of bone loss.

When socioeconomic status and osteoporosis are considered in relation to one other, it is seen that women of low socioeconomic status developed osteoporosis earlier as compared to the women from middle or higher socio economic status (Table II). The trabecular network of bone is mainly composed of protein. Women of low socioeconomic status suffer chronically from protein

malnutrition since their birth. This deficient state of protein status in these women may be responsible for early bone loss. Further Albright et al as early as 1940 described osteoporosis as a disorder of protein metabolism, which is reflected in abnormal trabeculae formation where the calcium metabolism remains normal.

This study also brings out the facts that sedentary women develop osteoporosis much earlier as compared to their sibling doing moderate or hard manual work. Similarly, women who had some form of calcium supplementation during lactation had a deferred onset of osteoporosis than women who did not have any form of calcium supplementation during lactation. Marcus et al (1985) observed that increased exercise may attenuate some of the deleterious effects of bone loss. Nordin and Polley (1987) have suggested that bone formation is stimulated by increasing the mechanical load on the residual bone in a manner suggestive of Frost's Mechanostat. Haeney (1982) suggested that interaction exists between oestrogens and calcium intake/absorption, such that an increased calcium intake is hypothetically necessary to maintain calcium balance in low oestrogen status. A larger study is needed to evaluate the interaction between calcium intake in lactation and bone mass.

## REFERENCE

1. Albright F, Bloomberg E, Smith P H : *Am. physicians* 55, 298, 1940.
2. Heaney R P : *Clin. Invest. Med.* 5, 147, 1982.
3. Kamat SR, Sharma BS, Raju VRK, Venkatraman C, Bhavsar R C, Kulkarni S T, Malhotra M S : *Indian J. of API* : 25, 531, 1977.
4. Marcus R, Kosek J, Pfefferbaum A & Horning S : *Calcific Tissue International* 35, 406, 1983.
5. Marcus R, Cann C, Madrig P, Minkoff J : *Ann Int. Med.* 172, 159, 1985.
6. Mizes R B : *Clinical Orthopaedics and Rel. Res.* 165, 239, 1982.
7. Nordin B E C, Polley K J *Calcific Tissue Int.* 41 (suppl) 1987.
8. Nilas L & Christiansen C : *Eur. J. Clin. Invest.* 18, 529, 1988.
9. Riggs B L, Heinz W, Wahner L, Melton J, Richelson L S, Judd A L, Offord K P : *J. Clin. Invest.* 77, 1487, 1986.
10. Smith R W, Eyler W R, Raymond C M : *Amn. Int. Med.* 52, 773, 1960