

Research Article

A comparative study of Bone Mineral Density in lactating and non-lactating mothers

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Abstract

Osteoporosis is a global health problem leading to fractures in both men and women. The etiology of osteoporosis may be multifactorial and lactation is recognized as one of the factors causing bone resorption and to bring about changes in calcium metabolism varying with the amount of breast milk produced, diet and duration of lactation. Studies have shown that Bone mineral density (BMD) is significantly reduced in the first 6 months of lactation. Fragility fractures are common during lactation. In the present study the mean age (29.9years) and parity (2.45) of lactating mothers was higher as compared to non-lactating mothers mean age (22.85years) and parity (1.6) which indicates that lactating mothers were breast feeding for longer duration which probably could lead to loss of bone mass and hypoestrogenemia. The BMD by DEXA measured T score to be on the negative side indicating bone loss.

Keywords: Lactation, Osteoporosis, BMD, DEXA

1. Introduction

Osteoporosis is a global health problem leading to fractures in both men and women¹. The etiology of osteoporosis may be multifactorial and lactation is recognized as one of the factors causing bone resorption and to bring about changes in calcium metabolism varying with amount of breast milk produced, diet and duration of lactation. Lactation leads to changes in maternal calcium homeostasis resulting in decreased bone mineral density (BMD)². Studies have shown that bone mineral density (BMD) is significantly reduced in the first 6 months of lactation. Fragility fractures are common during lactation but women subsequently increase their BMD confirming that BMD increases after weaning^{3,4,5}. Some studies have established that BMD decreases by 5-10% during lactation where bone loss is more in trabecular and axial bones⁶⁻¹⁴. Studies have also been done to see the speed of recovery from bone loss after weaning and found that recovery is complete but the speed may vary with the site of bone loss¹⁵. The aim of the present study is to see the difference in bone loss between lactating and non-lactating mothers.

2. Material & Methods

A cross-sectional study was done involving 40 women in the reproductive age group (15 – 35 yr) and were divided into 2 groups. All the participants were selected from among the women visiting the Obstetrics and Gynaecology department of a Medical College Hospital in Hyderabad. Group I consisted of 20 women who were lactating and group II consisted of 20 women who were not lactating and whose BMD was measured at least 6 months after stopping breast feeding. Mean age of mothers in both the groups and their parity status was determined. Bone mineral density (BMD) was measured using DEXA (Dual energy X-ray absorptiometry) scan to assess the severity of bone loss in calcaneus where early signs of bone loss can be detected routinely. The results were reported as 'T' score and 'Z' scores. The 'T' score compares the peak BMD of a healthy 30 year old adult with that of the subject whereas 'Z' score compares the BMD of the subject with age matched normal individual. T score of '0' and between +1 and -1 is normal. If it is between -1 to -2.5, it indicates low bone mass and a score below -2.5 indicates osteoporosis. The more negative the number, the greater is the risk of osteoporosis. An informed consent was taken from all the study participants and the Institutes Ethics Committee permission was obtained.

3. Results

Results were tabulated and analysed using percentages. Significance was given by P < 0.05. The mean age of lactating women (group I) was 29.9 years and that of non-lactating mothers (group II) was 22.85 years. Lactating mothers had more than 3 children whereas non-lactating mothers had less than 3 children. Parity status of the mothers was also determined as given in table 1.

Table 1: Mean age and parity of lactating and non-lactating mothers

	Group I – lactating mothers	Group II – Non-lactating mothers
Mean age (years)	29.9 ± 4.44	22.85 ± 3.86
Parity	2.45 ± 1.19	1.6 ± 0.82

Table 2: BMD scores of lactating and non-lactating mothers

BMD	Group I	Group II	P value
T score	-0.945 ±1.060	0.05 ±0.803	Significant <0.05
Z score	-0.853 ±1.072	0.05 ±0.571	Significant <0.05

Table 3: Percentages of women with and without bone involvement

Bone involvement	Group I		Group II	
	Number	%	Number	%
% Normal	9	45	19	95
Osteopenia	3	15	1	5
Near osteopenia	7	35	0	0
Osteoporosis	1	5	0	0

The chi square value calculated between the groups was 12.071 -df³ - with a variation. The variation between the groups was statistically significant with p<0.05.

3. Discussion

Lactating mothers had more children and higher mean age than non-lactating mothers in the present study. This indicates that they were breast feeding for a longer duration due to which they experienced a prolonged period of amenorrhea. Ordinarily, maternal bone mass is well maintained during pregnancy due to high estrogen levels which exerts a tonic suppressive effect on bone remodeling and maintains a balance between osteoclastic and osteoblastic activity. But, due to prolonged lactation, there occurs a period of lactational amenorrhea during which time bone loss is probably mediated by parathormone-related peptide (PTHrP) and hypoestrogenemia resulting in loss of calcium in the breast milk causing bone remodeling with increased osteoclastic activity².

Age is an important factor contributing to bone loss and age adjustment is necessary to establish a relation between lactation and BMD¹⁶. However, in the present study though the mean age of lactating mothers was significantly higher than that of non lactating mothers bone loss is not attributed to age as both groups were below 30 years and bone loss at this age is relatively very low. Hence, bone loss is attributed to lactation alone.

Normal BMD scores were less in lactating mothers and the number of women who with osteoporosis were significantly more in lactating group when compared to non-lactating group indicating that bone loss is more during lactation which is in accordance with studies done earlier. The 'T' score by DEXA, which compares the BMD of a subject with that of a healthy 30 year old woman was in negative range in lactating mothers showing that lactation may lead to bone loss. The 'Z' score was also significantly low for group I mothers when compared to group II, non lactating mothers. This indicates that group I has severe bone loss which was independent of age. Hence, bone loss is attributed to lactation. Lactating mothers were probably breast feeding for longer duration which could lead to loss of calcium, hypoestrogenemia and hence bone loss¹⁷.

The limitations of the present study are the low number of subjects enrolled in the study, factors like any change in diet from pregnancy to lactation, level of physical activity and length of time between pregnancies were not noted. These factors would help in assessing the BMD status more accurately.

4. Conclusion

Duration of breast feeding seems to be an important risk factor for osteoporosis. However, lactation should be continued by mothers due to its tremendous positive benefits. Care maybe taken by monitoring their serum calcium levels and bone loss by DEXA so that they can be supplemented appropriately to prevent osteoporosis in future.

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