



"COMPARATIVE STUDY OF PERIMENOPAUSAL AND POSTMENOPAUSAL WOMEN IN RELATION TO SERUM CALCIUM AND SERUM ALKALINE PHOSPHATASE LEVELS"

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ABSTRACT

One of the most important health problems in perimenopausal and postmenopausal women is osteoporosis due to calcium deficiency. Menopause has negative affect on production of estrogen resulting in osteoporosis. **Objective:** To study and compare serum calcium and serum alkaline phosphatase levels in perimenopausal and postmenopausal groups of women. **Methodology :** 50 perimenopausal women and 50 postmenopausal women were included in Group A and B respectively. Serum calcium and serum alkaline phosphatase levels were estimated for all the women. Percentages, mean, paired t test were used. Paired t test(p value) was used to determine the change in serum calcium and serum Alkaline Phosphatase levels in perimenopausal and postmenopausal women. **Results:** The mean serum calcium levels were significantly lower and mean serum alkaline phosphatase levels were significantly higher in postmenopausal women when compared to the perimenopausal women. **Conclusion:** Monitoring serum calcium and serum alkaline phosphatase levels is important in postmenopausal women to prevent osteoporosis.

KEYWORDS : Perimenopausal women, Post menopausal women, serum calcium, serum alkaline phosphatase.

INTRODUCTION :

One of the most important health problems in perimenopausal and postmenopausal women is osteoporosis due to calcium deficiency. Nutritional and estrogen deficiency play a major role in causing osteoporosis¹. Menopause has insufficient follicular development leading to decreased production of estrogen and other hormones. Hence, these women were investigated them for their Serum Calcium and alkaline phosphatase levels, so as to diagnose and intervene at the earliest point possible.

Methodology :

This comparative cross sectional study was conducted on 100 patients over a Period of 2 years from 01/10/2020 to 30/09/2022 in the department of Obstetrics and Gynecology, Mamata Medical College and Hospital, Khammam.

Selection Criteria:

Women within the age of 40 to 60 years who gave consent for the study were included.

Group A : 50 perimenopausal women

Group B : 50 postmenopausal women.

Women who were hysterectomised, those who were on Hormonal replacement therapy and women who did not give consent were excluded from this study.

Serum calcium and serum Alkaline phosphatase levels were estimated for all women by collecting 3 to 5 ml of fresh blood sample.

Serum calcium concentration was calculated with automated analyzer by Arsenazo III method. Serum Alkaline Phosphatase concentration was calculated with automated analyzer by IFCC (International Federation of Clinical Chemistry and Laboratory Medicine) modified method.

The data was analysed using Statistical Package for the social sciences (SPSS) 26 version software. Percentages, mean, paired t test were used. Paired t test(p value) was used to determine the change in serum calcium and serum Alkaline Phosphatase levels in perimenopausal and postmenopausal women

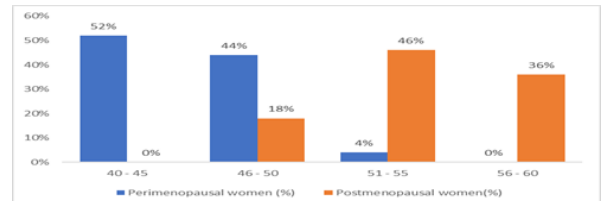
RESULTS

Table 1: Distribution Of Study Population Based On Age (n=100)

AGE in years	Perimenopausal women (n=50)	Percentage (%)	Postmenopausal women (n=50)	Percentage (%)
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40 - 45	26	52%	0	0%
46 - 50	22	44%	9	18%
51 - 55	2	4%	23	46%
56 - 60	0	0%	18	36%
Total	50	100%	50	100%

Majority (52%) of Perimenopausal women were in the age of 40 to 45 years and 44% of them were between 46 to 50 years whereas, 46% of Post Menopausal women were in between 51 to 55 years of age and 36% of them were in 56 to 60 years age group.

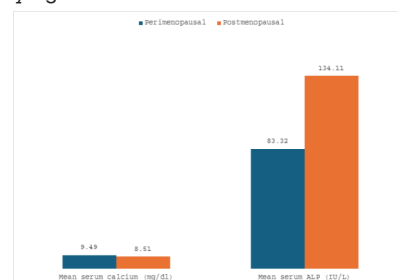


Graph 1: Distribution Of Study Population Based On Age (n=100)

Table 2): Comparison Of Mean Serum Calcium And Alkaline Phosphatase Levels In Perimenopausal And Postmenopausal Women (n=100)

Menopausal status n=100	Mean serum calcium (mg/dl)	Mean serum ALP (IU/L)
Perimenopausal (50)	9.49	83.32
Postmenopausal (50)	8.51	134.11
p value	0.01	0.01

Mean serum calcium levels of Perimenopausal women and Post menopausal women in this study were 9.49mg/dl and 8.51 mg/dl respectively with p value of 0.01 which was statistically significant. Mean serum ALP levels of Perimenopausal women and Post menopausal women in this study were 83.32IU/L and 134.11 IU/L respectively with p value of 0.01 which was statistically significant



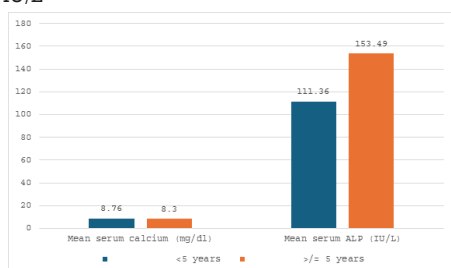
Graph 2): Comparison Of Mean Serum Calcium And Alkaline Phosphatase Levels In Perimenopausal And Postmenopausal Women (n=100)

Mean Serum Calcium And Alkaline Phosphatase Levels

Table 3: Comparison Of Mean Serum Calcium And Alkaline Phosphatase (alp) Levels In Postmenopausal Women With Respect To Years Of Menopause (n=50)

Years of menopause	N=50(%)	Mean serum calcium (mg/dl)	Mean serum ALP (IU/L)
<5 years	23(46)	8.76	111.36
>= 5 years	27(54)	8.3	153.49

46% of Post menopausal women with less than 5 years of menopause had mean serum calcium levels of 8.76mg/dl and mean serum ALP levels of 111.36IU/L. 54% of post menopausal women with 5 or more than 5 years of menopause had mean serum calcium levels of 8.30mg/dl and mean ALP levels of 153.49 IU/L.



Graph 3: Comparison Of Mean Serum Calcium And Alkaline Phosphatase (alp) Levels In Postmenopausal Women With Respect To Years Of Menopause (n=50)

DISCUSSION:

The present study includes 100 women from 40 to 60 years of age. The mean age of Perimenopausal women was 45.36 years whereas mean age of Postmenopausal women was 54.42 years. Maximum women in perimenopausal group and postmenopausal group were within range of 40 to 45 years and 51 to 55 years respectively.

Serum Calcium And Alkaline Phosphatase With Respect To Menopausal Status:

In the present study, there was a significant difference in serum calcium levels and serum Alkaline Phosphatase levels (p value 0.01) with respect to menopause. Lower levels of calcium and higher levels of Alkaline Phosphatase were noted in Postmenopausal women when compared to Perimenopausal women. This may be the result of significant decrease in serum estradiol among postmenopausal group compared to that among Perimenopausal group. This causes sharp acceleration of bone turnover with an imbalance towards excessive osteoclastic activity causing osteopenia and osteoporosis.

Studies conducted by Pardhe et al², Bikram khadka et al³, Bhattarai et al⁴, Kumari et al⁵, Megha et al⁶, Geetha et al⁷, Chetana et al⁸, Sargun et al⁹ and Saha et al¹⁰ also observed patterns for calcium and ALP levels similar to the present study with significant reduction in calcium level but significant upsurge in serum Alkaline Phosphatase level in postmenopausal women as compared to Premenopausal women.

Study done by Suresh et al¹¹ found statistically no significant difference between serum calcium levels with respect to menopause. Onyeukwu et al¹² illustrated that there was a significant decrease in serum calcium but no significant difference in ALP levels among Perimenopausal group and post menopausal group.

Serum Calcium And Alkaline Phosphatase With Respect To Years Of Menopause:

Increased deficiency of estrogen with increase in menopausal years affecting bone mineral density. In a study done by Kumari et al⁵, serum calcium levels were significantly lower and serum Alkaline Phosphatase levels were significantly higher in late postmenopausal women when compared to early postmenopausal women which is in correlation to the present study.

Study done by Pardhe et al² found that the serum calcium levels were significantly decreased and ALP levels were significantly high in women during their late postmenopausal period compared to the early postmenopausal period. Study done by Indumati et al¹³ showed that bone mass continues to decline with age but at a slower rate during late postmenopause than during early postmenopause which is in correlation to the present study in relation to Calcium and Alkaline Phosphatase.

CONCLUSION

Osteoporotic fractures are one of the major causes of morbidity and mortality in Indian women. This risk is exaggerated in Postmenopausal women, where there is a deficiency of calcium and raised Alkaline Phosphatase due to estrogen deficiency. This study showed that the assessment of biochemical markers, which can be easily performed and are convenient for repeated evaluation, are advantageous to observe bone turnover in Perimenopausal and Post menopausal women. These type of studies should be conducted in a larger scale at the national level for setting development policies and statements to guide the diagnosis, treatment and prognosis of osteoporosis in postmenopausal women. Timely diagnosis of osteoporosis in women would be of significant benefit for the effective care for required populations and help to minimize financial burden, rates of morbidity and mortality in India.

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