

Association Between Calcium, Milk Consumption and Hip Fracture Amongst Post-Menopausal Women: An Institutional Based Study

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ABSTRACT

Background: Milk and other dairy products provide a complex source of essential nutrients, including protein, calcium, phosphorus, potassium, and magnesium, thus contributing to bone health. Hence; we planned the present study to assess of association of calcium, milk consumption and hip fracture among postmenopausal women.

Materials & Methods: The present study involved assessment of association of calcium, milk consumption and hip fracture among postmenopausal women. A total of 100 postmenopausal women were included in the present study. Complete demographic details of all the subjects were obtained by the means of a self-administered questionnaire. Subjects with history of fractures were also recorded. Details about the diet of the subjects and the use of supplements were also obtained through the means of questionnaire. On the basis of the nutrient content of the food was assessed. All the results were recorded and analysed by SPSS software.

Results: Hip fractures occurred in 28 subjects in the present study. Significant correlation was obtained while comparing the

total calcium and vitamin D status and dietary intake of calcium and vitamin D.

Conclusion: In postmenopausal women, physiologic adequate levels of Vitamin D and calcium might be associated with lower frequency of hip fractures

Key words: Calcium, Hip Fracture, Milk.

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INTRODUCTION

Milk and other dairy products provide a complex source of essential nutrients, including protein, calcium, phosphorus, potassium, and magnesium and, in the United States, are often fortified with vitamin D, thus contributing to bone health. Furthermore, fortified milk is also a good source of vitamin D. Previous research has suggested a positive relationship between milk intake and bone mineral density (BMD), but not with hip fracture.¹⁻³

Hip fracture is the most serious type of osteoporotic fracture. Hip fractures can lead to other comorbidities, increased mortality risk, and enormous social and economic costs.⁴ According to recent reports, approximately 1.66 million patients are diagnosed with hip fracture occur each year worldwide. World population surveys have shown that the number of adults older than 60 years old was 841 million in 2013, which is approximately four times as high as that in 1950 (202 million).⁵⁻⁷

The present study planned to assess association of calcium, milk consumption and hip fracture among postmenopausal women.

MATERIALS & METHODS

The present study was planned in the. Department of Orthopaedics, S.P. Medical College, Bikaner, Rajasthan, India. The study involved assessment of association of calcium, milk consumption and hip fracture among postmenopausal women. A total of 100 postmenopausal women were included in the present study. Written consent was obtained from all the subjects after explaining in detail the entire research protocol. Inclusion criteria for the present study included:

- Post-menopausal women,
- Subjects more than 48 years of age,
- Subjects with negative history of any other metabolic disorder,
- Subjects with negative history of any other co-morbid condition

Complete demographic details of all the subjects were obtained by the means of a self-administered questionnaire. Subjects with history of fractures were also recorded. Details about the diet of

the subjects and the use of supplements were also obtained through the means of questionnaire. On the basis of the nutrient content of the food was assessed. Quantity of intake of milk and calcium tablets was also assessed. Reported use of a specific vitamin D supplement was assumed to be 10 g/d. all the results were recorded and analysed by SPSS software. Chi- square test was used for assessment of level of significance.

RESULTS

A total of 100 post-menopausal women were included in the present study. Mean age of the subjects of the present study was 53.4 years. Daily intake of milk glasses among subjects of the present study was 1.5 glasses. Mean calcium supplements intake was 560 mg. Hip fractures occurred in 28 subjects in the present study. Significant correlation was obtained while comparing the total calcium and vitamin D status and dietary intake of calcium and vitamin D.

Table 1: Details of the subjects

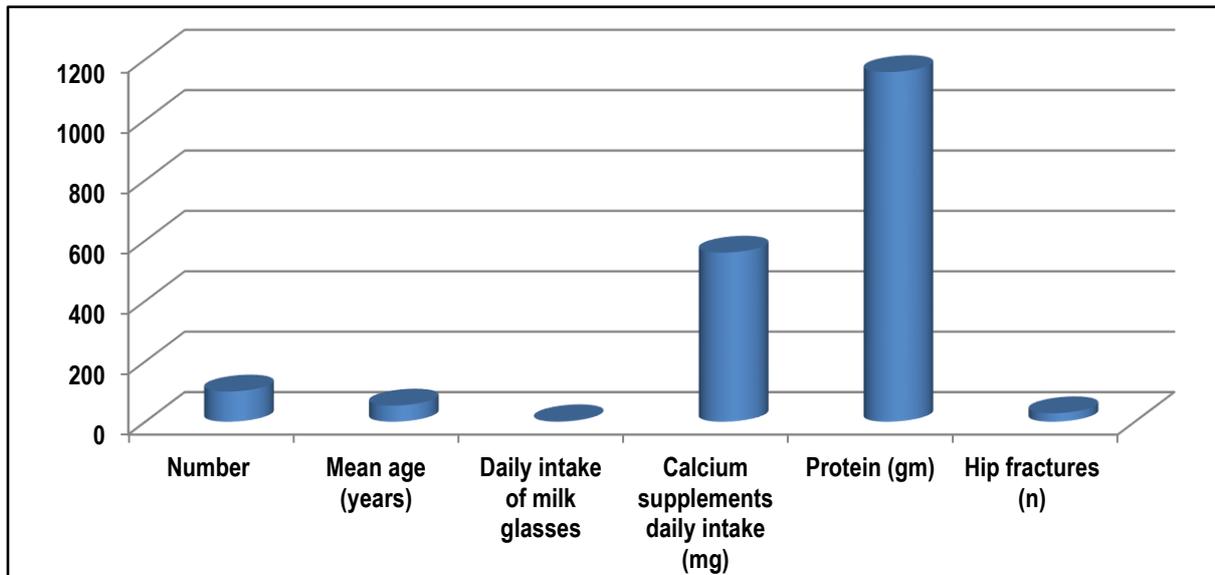
Parameter	Value
Number	100
Mean age (years)	53.4
Daily intake of milk glasses	1.5
Calcium supplements daily intake (mg)	560
Protein (gm)	1158
Hip fractures (n)	28

Table 2: Correlation between calcium & vitamin D intake

Parameter	Calcium intake	Vitamin D intake
Total calcium	-	0.59
Total vitamin D	0.47	-

Pearson's correlation: P- value < 0.05

Graph 1: Details of the subjects



DISCUSSION

In the present study, mean calcium supplements intake was 560 mg. Hip fractures occurred in 28 subjects in the present study. Significant correlation was obtained while comparing the total calcium and vitamin D status and dietary intake of calcium and vitamin D. Compston J highlighted the correlation between obesity and fractures in postmenopausal women. Although obesity was previously believed to be protective against fracture, there is now evidence that a significant proportion of fractures in postmenopausal women occur in those who are obese. There is similarity in many respects between risk factors for fracture in obese and nonobese women, although falls may play a particularly important role in the obese. Treatment rates in obese postmenopausal women with fracture are currently low, and further studies are required to establish effective preventive strategies. Fractures in obese postmenopausal women contribute significantly to the overall fracture burden in this population.⁸

Sullivan SD et al previously reported that in the absence of hormone therapy (HT) or calcium/vitamin D (Ca/D) supplementation, earlier menopause age was associated with decreased bone mineral density and increased fracture risk in

healthy postmenopausal women. Treatment with HT and Ca/D is protective against fractures after menopause. In this analysis, they asked if the age of menopause onset alters fracture risk in healthy postmenopausal women receiving HT, Ca/D, or a combination. Women with menopause <40 years had significantly higher HR for fracture than women with menopause 40 to 49 or ≥50 years, regardless of treatment intervention (HR [95% CI]: menopause <40 y vs ≥50 y, 1.36 [1.11-1.67]; menopause <40 y vs 40-49 y, 1.30 [1.06-1.60]). In the overall Women's Health Initiative Clinical Trial cohort and within each treatment group, women with younger menopause age (<40 y) had a higher risk of any fracture than women reporting older menopause ages.⁹ Feskanich D assessed relations between postmenopausal hip fracture risk and calcium, vitamin D, and milk consumption. In an 18-y prospective analysis in 72 337 postmenopausal women, dietary intake and nutritional supplement use were assessed at baseline in 1980 and updated several times during follow-up. We identified 603 incident hip fractures resulting from low or moderate trauma. Relative risks (RRs) from proportional hazards models were controlled for other dietary and nondietary factors. Women consuming > or = 12.5 microg vitamin D/d from food plus supplements had a 37% lower

risk of hip fracture (RR = 0.63; 95% CI: 0.42, 0.94) than did women consuming < 3.5 microg/d. Total calcium intake was not associated with hip fracture risk (RR = 0.96; 95% CI: 0.68, 1.34 for > or = 1200 compared with < 600 mg/d). Milk consumption was also not associated with a lower risk of hip fracture (P for trend = 0.21). An adequate vitamin D intake is associated with a lower risk of osteoporotic hip fractures in postmenopausal women. Neither milk nor a high-calcium diet appears to reduce risk.¹⁰

Nieves JW et al assessed the effect of calcium and vitamin D intake on bone mass, but not short-term fracture risk, in Caucasian postmenopausal women from the National Osteoporosis Risk Assessment (NORA) study. The impact of calcium and vitamin D intake on bone mineral density (BMD) and one-year fracture incidence was assessed in 76,507 postmenopausal Caucasian women who completed a dietary questionnaire that included childhood, adult, and current consumption of dairy products. Current vitamin D intake was calculated from milk, fish, supplements and sunlight exposure. BMD was measured at the forearm, finger or heel. Approximately 3 years later, 36,209 participants returned a questionnaire about new fractures. The impact of calcium and vitamin D on risk of osteoporosis and fracture was evaluated by logistic regression adjusted for multiple covariates. Higher lifetime calcium intake was associated with reduced odds of osteoporosis (peripheral BMD T-score < or = -2.5; OR = 0.80; 95% CI 0.72, 0.88), as was a higher current calcium (OR = 0.75; (0.68, 0.82)) or vitamin D intake (OR = 0.73; 95% CI 0.66, 0.81). Women reported 2,205 new osteoporosis-related fractures. The 3-year risk of any fracture combined or separately was not associated with intake of calcium or vitamin D. Thus, higher calcium and vitamin D intakes significantly reduced the odds of osteoporosis but not the 3-year risk of fracture in these Caucasian women.¹¹

CONCLUSION

Under the light of above mentioned data, the authors conclude that in postmenopausal women, physiologic adequate levels of Vitamin D and calcium might be associated with lower frequency of hip fractures. However; further studies are recommended.

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