

The Effects of Physical Activity Levels, Dairy Products and Calcium Intakes on Risk Factors of Osteoporosis Prevention in Male Students

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Abstract. Osteoporosis is a multifactorial disorder in which nutrition plays a role but does not account for the totality of the problem. This cross sectional study was conducted on 180 healthy Male students aged between 18 to 24 years old who were selected randomly. Subjects completed an informed consent form, health history questionnaire; food questionnaire was used to assess the entire dietary component intakes and physical activity questionnaire (Baecke). Result shows that increase in physical activity and dairy product consumption, the calcium intake with a decrease in BMI, and increase in BMD. Also results shows that there were significant negative correlations between the physical activity levels, dairy product consumption, the calcium intake and risk factors of osteoporosis. Increased physical activity and dairy product consumption, the calcium intake is associated with an increase in BMD and a concomitant decrease in BMI. These findings suggest that population-level interventions to increase physical activity and dairy product consumption, the calcium intake would favorably impact bone and other health outcomes.

Keywords: dietary, intake, physical, physical activity.

1. Introduction

[1] Osteoporosis is a metabolic bone disease characterized by relatively low bone mineral density (BMD) and increased susceptibility to fracture. Osteoporosis is a clinically-silent disease in its early stages. It can lead to hip and spine fractures later in life. [2] Osteoporosis is increasingly recognized as a major public health problem in contemporary Western society with its aging population. [2] According to the National Osteoporosis Association of America in 1999, 28.5 million people in the U.S., of whom 89% are women, had osteoporosis in the USA. Also, 10 million people in the U.S. were categorized as having low bone mass, exposing them to the risk of osteoporosis and osteopenia. The effect of environmental factors on bone is likely to vary across the lifespan, and length of exposure to exercise, diet, alcohol, caffeine, and smoking may have increasing impact in men. [3] Although the morbidity, mortality, and costs of osteoporosis have been well recognized in women, these consequences in men have not been well documented. Several studies have examined either the incidence of fractures or distribution of bone mineral density or life-style risk factors in men, but there is a lack of comprehensive information on risk factors in men in contrast to the extensive data in women.

[4], [5] Physical activity and exercise have been demonstrated to have positive effects on growing bones before and during puberty, and many studies have shown the beneficial effects of high-impact weight-bearing activity on the load-bearing sites of the skeleton. [6] Cross-sectional studies have demonstrated greater bone density in athletes and people with above average levels of physical activity. [7] Most prospective studies have supported the positive effect of physical activity on bone density in middle-aged

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and older adults. For example, Krolner and colleagues [8] and Williams and associates [9] reported a significant increase in the bone mineral content of weight bearing sites in subjects in exercise groups.

[10], [11] Although bone mass achieved by early adulthood primarily reflects bone mass achieved during growth, the additional gain in bone mass that may potentially occur is likely to be dependent on lifestyle factors practiced during young adulthood these factors may include physical activity and nutrient intake, in particular calcium intake. [12], [13] Physical activity has been suggested as an intervention strategy to promote optimal bone density during youth and to reduce the rate of bone loss during middle and later life. [14] Bone tissue responds to dynamic as opposed to static loading, as static loads (even those that produce fairly large stresses or strains) do not initiate osteogenesis. [15] For physical activity to have an osteogenic effect, the mechanical loads applied to the skeleton need to be in excess of those encountered in daily activity. Nutrition could be an important modifiable factor in the development and maintenance of bone mass and the prevention and treatment of osteoporosis. Calcium and vitamin D nutrition play an important role in determining bone health. [16] It has been shown that physical activities and sports during the growing years affect bone mass status in the perimenopausal period, and calcium intake is an additive contributing factor. Reeker et al., [17] reported that calcium intake and physical activity (PA) were significantly associated with increases in both compact and trabecular bone tissue. [16]-[18] Also studies showed that physical activities and sports during growing years affect bone mass status in the perimenopausal period, and calcium intake is an additive contributing factor.

Understanding the causes, prevention, and treatment of osteoporosis is increasingly becoming one of the cornerstones of geriatric medicine. While much research effort and attention have been directed toward identification of risk factors for osteoporosis in women, there have been few studies aimed at examining osteoporosis in men. To our knowledge, the present study is the first study to address the effects of physical activity levels, dairy products and calcium intakes on risk factors of osteoporosis prevention in male.

However, the associations' physical activity levels, dairy products and calcium intakes on risk factors of osteoporosis prevention in Iranian have not been thoroughly investigated. The purpose of this study was investigating the effects of physical activity levels, dairy products and calcium intakes on risk factors of osteoporosis prevention in male students of Islamic Azad university of Iran.

2. Materials and Methods

The target population consisted entirely of male students of Islamic Azad University, Iran. Among them 180 healthy male students with similar age and weight selected were randomly. The condition of the study was thoroughly explained to all subjects, and written informed consent was subsequently obtained. The protocol was approved by the Ethics Committee of Islamic Azad University. Subjects completed an informed consent form, health history questionnaire; food questionnaire was used to assess the entire dietary component intakes and physical activity questionnaire (Baecke). SPSS statistical software (version 18) was used to analyze. Both descriptive (mean and standard deviation) and inferential statistical were used to Spearman correlation coefficient were used.

3. Results

Subject age data are present in Table 1. The result shows that Increase in physical activity and dairy product consumption, the calcium intake with a decrease in BMI, and increase in BMD. Also results shows that there were significant negative correlations between the physical activity levels, dairy product consumption and calcium intake with risk factors of osteoporosis (Table 2).

Table 1: Demographic characteristics of study subjects (n = 180)

Variables	Mean SD
Age (year)	22.25±5.62
Height (cm)	172.18±4.14
Weight (Kg)	72.15±7.87
Body Mass Index	25.01±2.79

Table 2: Relationship between Physical Activity, Dairy production and calcium intakes

	Physical Activity Levels		Dairy Products		Calcium Intakes	
	Pearson correlation	P Value	Pearson correlation	P Value	Pearson correlation	P Value
Risk Factors of Osteoporosis	-49.1	0.013	-51.6	0.000	-59.8	0.001

4. Discussion

This study focused on the investigating the effects of physical activity levels, dairy products and calcium intakes on risk factors of osteoporosis prevention in male students of Islamic Azad University. The results show that significant negative correlations between the physical activity levels, with risk factors of osteoporosis. The literature demonstrates the Physical activity is necessary for bone acquisition and maintenance through adulthood. The best evidence that exercise can slow bone loss or add bone mass to the postmenopausal skeleton comes from prospective intervention studies. Even job-related physical activity is an important factor in maintaining adequate bone mass. [19] The suppression of bone turnover is the key mechanism for the positive response of lumbar BMD to moderate walking exercise in postmenopausal men. [20], [21] The researchers found that Physical activity in childhood may provide a significant positive contribution to an osteoporosis prevention strategy (i.e., maximizing peak adult bone density) that has been endorsed by some researchers. Our results suggest that the skeletal status of the os calcis in young men is influenced by the modulation of mechanical stress (i.e., physical activity) in the growing years.

Also results shows, that there were significant negative correlations between the dairy product consumption and calcium intake with risk factors of osteoporosis. The major part of this dietary calcium came from plant sources, which are known to have low bioavailability. Inhibitors of calcium absorption such as phytates and oxalates are abundant in the vegetarian diet and retard the absorption of dietary calcium. Moreover, absorption of calcium could be hampered by vitamin D deficiency, as this is the major factor influencing absorption of calcium from the gut. Babarousti et al. [22], reported that BMI, Ca intake, and time spent on physical activity affect heel BMD independently but not in an age-dependent manner. Results with regard to the relationship between calcium intake and peak bone mass were disparate. Greater calcium intake is thought to contribute to the acquisition of a high peak bone mass. [23] A meta-analysis showed that calcium intake correlated with BMD of all areas except in the ulna of postmenopausal women. It is paradoxical that, as health researchers and educators become increasingly aware of the importance of good habits in nutrition and physical activity in the prevention of a variety of chronic diseases, children and adolescents are adopting lifestyles that act counter to these. Diets in many developing as well as industrialized countries are moving towards foods that are poor in calcium and minerals, and children gravitate to television and computer games in place of outdoor games and sports. In order to reverse this trend, it is necessary to actively promote healthy behaviors and lifestyles to adolescents. School health education programs are critical opportunities for facilitating healthy lifestyles for youth.

5. Conclusions

Our results suggest that physical activity levels, dairy products and calcium intakes during the growing years has a positive effect on osteoporosis prevention and bone density attained by male students. The findings, together with other data, support the recommendation that regular lifelong physical activity, in combination with adequate nutrition for both calcium intake and weight maintenance, should be part of a healthy lifestyle to enhance musculoskeletal health, and possibly improve the quantity of life in the aged.

6. References

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