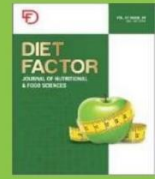




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Original Article

## Association Of Osteopenia With Dietary Factors Among Females

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### ABSTRACT

Osteopenia is regarded as a bone condition whereby its is observed that the Bone Mineral Density (BMD) is lesser than the mean value. however, it is not as low as Osteoporosis. Unfortunately Pakistan has become one of those countries which encounter the issues of Osteoporosis and Osteopenia among women which may or may not be influenced by dietary factors. **Objectives:** The objective of this study was to find the frequency of osteopenia among females and its relationship with dietary factors. **Methods:** This cross-sectional study was carried out at Niaz Medicure Clinic in Faisalabad. Selection of the participants was based on Non probability purposive sampling. 323 females were taken for the study. The Bone Mineral Density was measured using Quantitative Ultrasound (QUS) machine. The factor dietary habits was taken into account for the study. **Results:** The results showed that about 56% of the females had Osteopenia. However, Dietary factors didn't seem to influence BMD levels in this study ( $p < 0.05$ ). **Conclusion:** There was no association found between Osteopenia and Dietary factors including milk intake ( $p = 0.603$ ) and junk food (0.159).

## INTRODUCTION

Osteopenia is a metabolic disorder which requires appropriate treatment and management [1,2]. Unfortunately Pakistan has become one of those countries which encounter the issues of Osteoporosis and Osteopenia among women which may or may not be influenced by dietary factors.

The occurrence of osteopenia is mostly associated with lack of appropriate amount of vitamin D or sunlight [3]. In the subcontinent, there is availability of appropriate amount of vitamin D through good sunlight exposure. Vitamin D works as a hormone in the body and plays an important role in the bone mineralization [4]. It also contributes to the proliferation of the cell, maintains the muscle as well as immune health. It also plays a part in proper skin formation, reproductive and other metabolic functions [5]. In view of its growing importance; scientists have recommended its dosage to be minimum 1000 IU. About 50% of the people all around the world are affected by the Vitamin D deficiency [6]. The deficiency associated with Vitamin D has now been recognized as a pandemic globally. Improper exposure to sunlight is considered to be the most important factor contributing to vitamin D deficiency [7]. Due to urbanization, people have become physically less active due to sedentary lifestyle. This also leads to less sunlight exposure which deteriorates bone health [8].

It is important to increase bone health during puberty by forming an environment which allows attainment of maximum bone mass, maintaining this bone health throughout the life cycle and finally taking precautionary measures to prevent bone loss during after menopause [9,10]. Simultaneously, people in Pakistan take lower calcium in their diet (346mg/dl) which



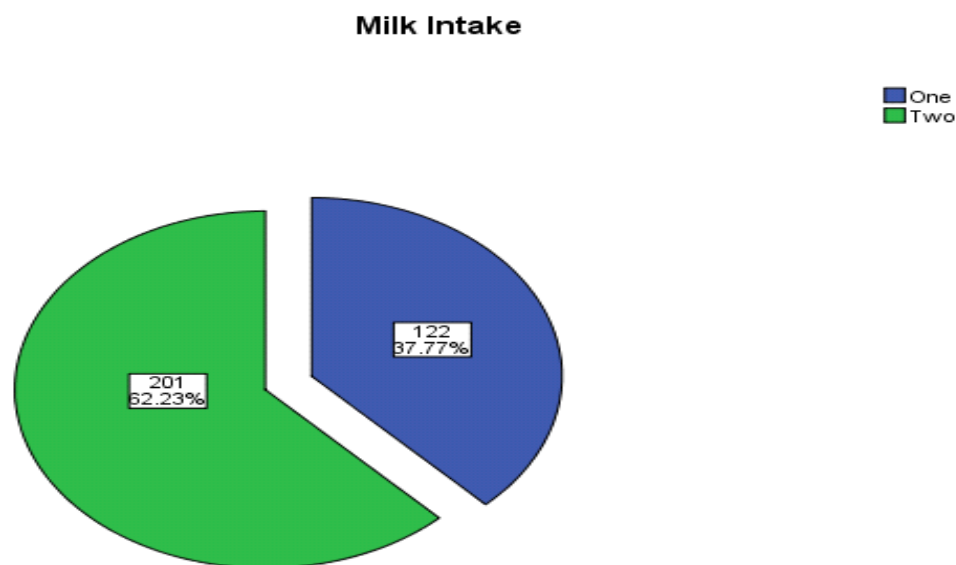
doesn't even account for half of the required amount set by World Health Organization (WHO) [11]. Towards the end of puberty, the skeletal mass grows at double the rate. The growing risk of osteopenia among females in Pakistan is related to lack of physical activity, consumption of low calcium food and increased inclination towards junk food [12]. Two of the factors that can have adverse effects on health include malnutrition and obesity which can in turn lead to bone disorders including Osteopenia, Osteoporosis, Osteopenia with sarcoidosis and osteoarthritis [13]. To manage metabolic bone disease, dietary supplements, medicinal drugs and food are used [14]. Pakistan lacks the resources to tackle the burden of this disease due to its silent progression and expensive treatment. Females have a higher tendency towards developing Osteopenia because of poor nutrition, lack of proper sun exposure due to modest clothing and lack of physical activity. Intake of milk and consumption of junk food as to create awareness for prevention and management of this bone condition are some of the factors responsible for osteopenia. The main factor taken into account was the dietary factor in order to evaluate its association with Osteopenia.

#### METHODS:

This study was conducted at Niaz Medicure Clinic in Faisalabad. Three twenty three (323) females were enrolled in this study. Bone Mineral Density was evaluated using Quantitative UltraSound (QUS) machine. The dietary habits was taken into account for the study. A questionnaire was prepared to analyze dietary habits of the participants.

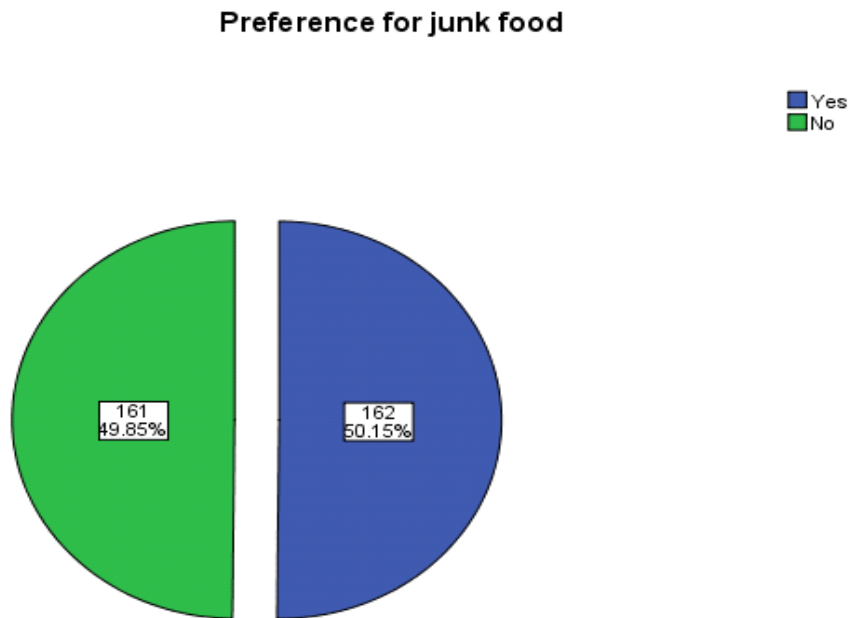
#### RESULTS:

BMD were categorized into three termed as normal, osteopenia and osteoporosis. According to the results, 54.9% of the females who took one glass of milk per day had Osteopenia. However, 57.2 % women who mentioned taking two glasses of milk per day had Osteopenia. The results suggested no association between milk intake and Osteopenia ( $p>0.05$ ).



**Figure 1:** Descriptive statistics of milk intake per day

Preference for junk food was one of the variables selected for this study. The participants who mentioned their preference for junk food had a 58.6% prevalence of Osteopenia while 54% of those women who expressed their dislike for junk food had Osteopenia. The p value suggested no association between junk food and Osteopenia ( $p>0.05$ ).



**Figure 2:** Descriptive statistics of preference for junk food

Out of the total participants, 56.3% females had Osteopenia. Furthermore, 20.1% females had normal BMD while on the other hand 23.5% of the participants had Osteoporotic bones.

T score	
<i>Mean</i>	-1.5019
<i>S.D</i>	1.26302
<i>Range</i>	6.60
<i>Minimum</i>	-3.30
<i>Maximum</i>	3.30

**Table 1:** Descriptive statistics of T score

The T score values were used to categorize BMD level for each participant. The mean T score was calculated to be -1.5019. The maximum values for the t scores were 3.30 while the minimum were -3.30.

		BMD			Total
		Osteopenia	Osteoporosis	Normal	
<i>Milk Intake</i>	<i>One</i>	67(54.9%)	28(23%)	27(22.1%)	122(100%)
	<i>Two</i>	115(57.2%)	37(18.4%)	49(24.4%)	201(100%)
<i>Total</i>		182(56.3%)	65(20.1%)	76(23.5%)	323(100%)

**Table 2:** Comparison of BMD in milk intake, Chi-square = 1.013, P-value = 0.603 (Insignificant)

		BMD			Total
		Osteopenia	Osteoporosis	Normal	
<i>Preference for junk food</i>	<i>Yes</i>	95(58.6%)	36(22.2%)	31(19.1%)	162(100%)
	<i>No</i>	87(54%)	29(18%)	45(28%)	161(100%)
<i>Total</i>		182(56.3%)	65(20.1%)	76(23.5%)	323(100%)

**Table 3:** BMD in Preference for junk food. Chi-square = 3.681, P-value = 0.159 (Insignificant)

## DISCUSSION:

Low intake of calcium didn't seem to play a role in developing osteopenia ( $p=0.603$ ). Women who took two glasses of milk had slightly higher frequency of Osteopenia than women who took only one glass (57.2% and 54.9% respectively). Calcium is absorbed through intestine by vitamin D [15]. So it is important to maintain appropriate intake of calcium and vitamin D [16]. The results of this study can be supported by a study which concluded that increasing calcium through diet didn't produce any significant improvement in BMD levels ( $p>0.05$ ) [17]. Further, calcium absorption is dependent on normal vitamin D levels. Vitamin D, known as sunshine vitamin as 80% is obtained from sunshine and butter and cholesterol rich food and fish is a hormone and around 62.7% Pakistani females are vitamin d deficient [18]. Keeping in view all this is not surprising to observe insignificant result of calcium alone with osteopenia.

In this study there was no statistically significant difference in the frequency of osteopenia among females who either consumed junk food or not ( $p=0.159$ ). Insignificant difference may be attributed to certain factors like duration and frequency of exposure to junk food. In contrast, a study conducted in South Korea depicted that fast food had significant correlation with osteopenia ( $p=0.028$ ). Another study conducted in Australia showed that associations between fast food outlet exposure and bone measures at four or six years of age were not statistically significant ( $p>0.1$ ). However further multi centered studies with larger sample size should be done to establish valid association.

## CONCLUSIONS:

Frequency of osteopenia was high in females and dietary factors such as milk intake or consumption of junk food.

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