



Original Article

Assessment of Knowledge and Awareness Regarding Osteopenia Among University Students

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ABSTRACT

Osteopenia is a term that identifies disproportionate bone mass loss. Osteopenia is caused by severe malnutrition and several abnormalities, which include osteomalacia, osteoporosis and cancer. **Objective:** To assess the knowledge toward calcium intake and the level of awareness about osteopenia among university students. **Methods:** For this study, the cross-sectional method was used as a study design. The study was conducted among students at the University of Lahore in which there were 100 students between 18-30 years' old who took part in this study and time duration of study is 4 months. Moreover, probability convenient sampling technique was used, and a questionnaire was used as equipment for this study. For the statistical analysis SPSS version 24.0 for used. **Results:** The result of this study shows out of the sample, 25% were male, and 75% were female. The 50 belonged to the normal BMI, 2 were obese range of BMI, 31 belonged to the underweight category. 73 participants belonged to urban areas whereas 27 participants belonged to rural areas. The frequency distribution showed that 96% of people knew about calcium deficiency, and 4% were unaware. 88% of people knew about the importance of calcium, and 12% people were not aware. **Conclusions:** Chronic calcium deficiency contributes to osteoporosis, poor mineralization of bones and soft bone osteomalacia. According to results, people now a days are more eager to change their dietary patterns to help improve their bone health.

INTRODUCTION

Osteopenia is a metabolic disorder that requires proper treatment. Osteopenia is a bone condition that occurs when BMD is less than the mean value. It occurs mostly due to insufficient vitamin D. In Pakistan, the growing risk of osteopenia is due to low calcium consumption, lack of proper nutrition, dietary intake and physical activity. Malnutrition and obesity can also lead to bone disorders like osteoporosis and osteopenia [1]. Now, 34 million people in America are affected with osteopenia. From 2010 to 2030, the United States population is foreseen to increase from 13% to 20%. By 2020, it was estimated over 47 million Americans will be affected with osteopenia. In the United States, 54% of women postmenopausal are osteopenia,

and 30% of women are counted as osteoporotic [2]. In the human body, the most abundant stored nutrient is calcium. In the bones and teeth, it's stored more than 99% and less than 1% in extracellular serum. The average absorption rate is approximately 30%. Dietary calcium deficiency affects three major population groups. These include women (female athletes, amenorrhea, postmenopausal), also individuals with lactose intolerance [3]. Female adults are at risk, when growth is most crucial. Both teenage and elderly populations are at higher risk of calcium deficiency due to dietary habits and hormonal changes. Many adolescents decrease their calcium intake by particularly having beverages [4, 5]. Interaction with medication can

inhibit dietary calcium absorption. (Institute of Medicine (US) Standing Committee on the Scientific Evaluation of Dietary Reference Intakes. [6]. The main calcium sources are milk, milk products, yogurt, and cheese. Leafy greens, legumes, seafood and fruit also contain calcium. Many foods and drinks are fortified with dietary calcium. Clinical implications of dietary calcium include prematurity of metabolic bone disease. Rickets and low bone mass in childhood and adolescence [7]. Inadequate fetal bone mass accrual, other metabolic effects, secondary vitamin D deficiency and osteoporosis in postmenopausal [8]. Calcium deficiency symptoms and signs include muscle cramps, brittle nails, dry skin, dental problems, spot on the skin, nails and teeth, fatigue, pain in limbs, minor bone fracture, shrinking of hands and alopecia. The amount of calcium you require depends on your age and gender. Dietary Allowance of calcium is different in age groups. In Males & Females, 18–70 years (males) 1000, 18–70 years (females) 1200 and, the women above than >70 years need 1200. In Pregnancy/Breastfeeding females age 14–18 years old need 1300, and 19–50 years old need 10.7 [7]. Due to the high prevalence rate of osteopenia worldwide. The research aimed to find out about students' knowledge, attitudes and practices regarding osteopenia. The students had enough knowledge about the disease but lacked in a few factors, which included poor attitude, false behavior towards the disease and false dietary practices of students. Awareness could be created in order to reduce the burden of the disease if these practices and behavior are not addressed in time, the number of students suffering from osteopenia will increase.

METHODS

A cross-sectional method was used as a study design. The study was conducted among students at the University of Lahore, Pakistan. There were 100 students between 18–30 years' old who took part in this study. However, students suffering from chronic diseases and aged above 50 and below 18 were not included in this study. Moreover, the sampling technique used in this study was a non-probability convenient sample, and a questionnaire was used in this study. Data were analyzed by using SPSS 24.0 and Microsoft excel 2016.

RESULTS

According to the Table1, results showed that out of 100 participants, 34 were of age between 18–24 years whereas 66 were between 25–30 years. 50 belong to the normal BMI 2 belong to the obese range of BMI (above 30), 31 belong to the underweight range of BMI (less than 18) and 7 belong to the overweight range of BMI (25–29.9), 76 participants were unmarried whereas 24 participants were married, 68 participants were doing graduate while 11 participants

were in pre-graduate and 21 participants were post-graduated, 109 belonged to the middle socio-economic status where 5 belonged to lower and 3 belonged to upper socioeconomic status, 73 participants belonged to urban areas whereas 27 participants belonged to rural areas.

No.	Categories	Ranges	Frequency (%)
1.	Age	18-24 years	34 (34%)
		25-30 years	66 (66%)
2	Gender	Male	25 (25%)
		Female	75 (75%)
3.	BMI	Underweight below 18	31 (31%)
		Normal 18.5-24.9	50 (50%)
		Overweight 25-29.9	7 (7%)
		Obese above 30	2 (2%)
4.	Marital status	Unmarried	76 (76%)
		Married	24 (24%)
5.	Education Level	Pre-graduate	11 (11%)
		Graduate	68 (68%)
		Post-graduate	21 (21%)
6.	Socio-Economic status	Lower Class	5 (5%)
		Middle Class	92 (92%)
		Upper Class	3 (3%)
7.	Residential level	Urban	73 (73%)
		Rural	27 (27%)

Table 1: Frequency Distribution of Age among Participants

According to the Table, 2 frequency distributions showed that 96 participants had knowledge about calcium deficiency, and 4 were unaware. 88 participants agreed that calcium increase the risk of osteoporosis, and 8 participants were unaware. The below results show that 29% of participants have knowledge about osteopenia, and 71% of participants were unaware. 5% of participants had awareness about causes of bone fractures, and 95% were unaware. 57% of the participants realized the importance of Supplements, and a majority of them didn't realize it. 78 % of Participants knew about body needs Vitamin D to Absorb Calcium and 22% were unaware. 88% of participants knew about the importance of calcium, and 12% of participants had no knowledge.

S.No.	Parameters	Frequency (%)
1	Knowledge about calcium deficiency and Osteoporosis	
	Yes	96 (96%)
	No	4 (4%)
2	Knowledge about Osteopenia due to Low Calcium Intake	
	Yes	88 (88%)
	No	8 (8%)
3	Knowledge regarding osteopenia affects gender	
	Yes	29 (29%)
	No	71 (71%)

4	Knowledge about the causes of bone Fractures	
	Yes	95 (95%)
	No	5 (5%)
5	Awareness regarding the supplement consumption	
	Yes	43 (43%)
	No	57 (57%)
6	Awareness regarding body needs Vitamin D to Absorb Calcium	
	Yes	78 (78%)
	No	22 (22%)
7	Knowledge about calcium consumption important for health	
	Yes	88 (88%)
	No	12 (12%)

Table 2: Frequency Distribution of Knowledge Regarding Osteopenia among participants.

According to Table 3, 85 % of participants had knowledge about the sources of calcium and its consumption and 15 were unaware. 73% of participants liked to consume fruits and vegetables daily, but 27% of people did not like to consume fruits and vegetables daily. About 74 % of participants liked carbonated beverages and 26% of participants didn't like them, as shown in the below table.

Parameters	Frequency (%)
Knowledge of sources of calcium and its consumption	
Yes	85 (85%)
No	15 (15%)
Fruits and vegetables consumption	
Yes	73 (73%)
No	27 (27%)
Carbonated beverages	
Yes	74 (74%)
No	26 (26%)

Table 3: Frequency Distribution regarding the dietary consumption among participants

According to the results of Figure 1, 8% of participants had awareness about Bone Mineral Density BMD Test and 92% were unaware about it.

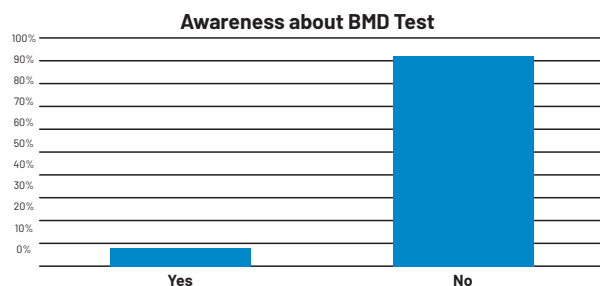


Figure 1: Frequency Distribution regarding awareness about BMD test among participants

According to the Figure 2, 89% of participants knew about the sources and importance of vitamin D, and 11% of the participants didn't know about it.

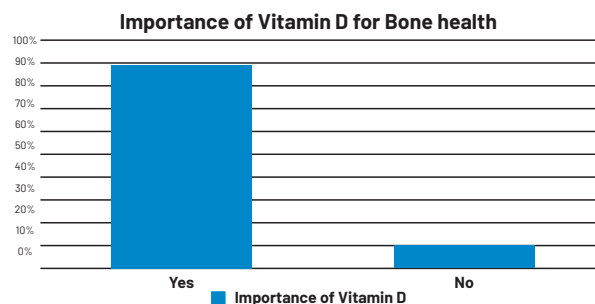


Figure 2: Frequency Distribution about Importance of Vitamin D for Bones Health

DISCUSSION

Osteopenia is a medical condition in which the protein and mineral content of bone tissue is reduced [8]. The prevalence of osteopenia, affecting 200 million people, is 54% in women and 33-47% in men, respectively, based on the criteria [9]. Osteopenia has no symptoms. The current research was conducted to study the knowledge, attitude and practice of osteopenia. Participants were selected through non- probability convenient sampling technique. According to the results of the current study, osteopenia was more in students of having age group above 20, females were suffering more from it, and BMI was above 22kgm². Similar results were observed in the previous research. The result of this study showed that BMI played a major role in osteopenia participants according to this study. Fruits and vegetables consumption are universally promoted as healthy. Fruits and vegetables include a diverse group of plant foods that vary greatly in the content of energy and nutrients. Additionally, fruits and vegetables supply dietary fiber, and fiber intake is linked to a lower incidence of cardiovascular disease and obesity [9]. According to this study, 73% of participants consume fruits and vegetables daily, but 27% of people don't consume fruits and vegetables daily. Alternative results were observed in this study. According to previous research, 76.3% of the 13- to 15-year-olds had inadequate fruits and vegetables consumptions (less than five servings per day), 28% reported consuming fruits less than once per day, and 13.8% indicated consuming vegetables less than once per day. Consumption of fruit and vegetables in our study, 73% consume fruits and vegetables, and 27 do not. But according to the article, 50% daily eat fruits and vegetables because of their preferences. Some don't like to eat, and some people cannot afford fruits [10]. Soft drinks are produced around the world, and they are widely available. Carbonated beverages (CBs) make up the bulk of the global soft drink industry. They are not good for health, especially bone health. The result of this study show consumption of carbonated beverages was 73 %, and non- consumption was 23 %; according to the article, 85% man like to drink

beverages. Similar results were observed in the previous study [11]. Cutting out caffeine may seem like an effective and simple way to improve one's diet, but before people give up that daily cup of tea or coffee, it is worth weighing up the pros and cons. According to this study, 53% of hostel participants take tea, and in a previous study, about 70% of people like to take tea. Alternative result of both the study has been observed [12]. The present results suggested that dairy product intake was linked with less risk of childhood obesity. The totality of available scientific evidence supports that the intake of milk and dairy products contributes to meeting nutrient recommendations and may protect against the most prevalent chronic disease. In this present study, participants took dairy products of severing 3 to 5. About 53%, but according to previous research, 47 % of participants fulfill their dairy products because their choice for fast food is more than dairy products. Similar results have been observed in both researches. 31 Food allergies can result in life-threatening reactions and diminish the quality of life. In the last several decades, the prevalence of food allergies has increased in several regions throughout the world [13]. In this study, 20 % of participants have food allergies, while in previous research perceived prevalence of food hypersensitivity varies from 3.24% to 34.9%.13 Yoga and Pilates contain movements that may increase fracture risk for people with osteopenia. If you have low bone density, it is important to avoid any movements that round or twist the spine and put excessive force upon the vertebrae. Exercise for osteoporosis. According to this study, 5% of participants like to do yoga; an alternative result was observed. In previous research, 30% of people like to do yoga [14]. Swimming is an aerobic activity that is related to increased lean body mass and aerobic capacity. According to this study, 25% think Swimming cause strong bone. But alternative results have been observed in previous research [15]. Food packaging is the cover of any food item which provides protection, resistance and special physical, chemical or biological needs and additional information regarding food. In this study, the results showed that 68% of participants were very much concerned to read food packaging of food items when they purchased, and 32% of them were not even aware of the food packaging and how to read it, and similar results were found in the previous study that was done by Nguyen. After. Diet high in calcium and vitamin D-rich foods helps boost and improve bone health in all groups. Some people follow specific diet plans containing a high percentage of dairy products to prevent and treat their bone problems, and in this current study, it was observed that 42% of people were involved in practicing diet plans having high amounts of dairy products in them to treat their

bone problems and other bone diseases such as osteoporosis, arthritis and many other. But the results in previous studies showed that participants are taking low intake of dairy items in their diet on a daily basis [16]. By following diet plans customized to an individual's needs are the best way to improve health and quality of life, and now a day's, people are very concerned about their health, so they target specific diseases by eliminating those food groups which trigger their disease. The present study showed that 67% of people tried to change their food preferences to improve their bone health, and 33% of them were not interested, and same results were seen in previous studies; the people were more eager to change their dietary patterns to help improve their bone health Smoking affects our lungs health and dangerous for all groups of people but still people are addicted to it. Smoking can have negative effects on bone health by suppressing vitamin D-parathyroid hormones and lowering estrogen exposure; it increases risk factors in bone health and speeds up bone damage, specifically at the femur. Smoking today is very common among our youngsters, so it was really very necessary to ask them about its impact on their bone health. Results of this current study showed that 89% of them were aware of the harmful effect of smoking, and 11% were unaware about it. A previous study also concluded that quitting smoking has a favorable impact on bone health [17, 18]. Vitamin D is a basic need of every adult and child, it helps in the absorption of calcium and maintains bone health. This present study indicates that intake of vitamin D in hostel girls is common because it was observed that many girls had knowledge regarding this aspect, 75% were taking supplements to improve their bone health, and 35% of them were not putting any effort to improve their bone diseases. Results of previous studies also showed that vitamin D insufficiency had a strong linkage with increasing body fat and decreasing muscle strength and elasticity. Vitamin D deficiency is also linked to adipose tissue infiltration [19]. Sugar reserve is known as a food additive that gives a sweet taste similar to sugar but has very low energy than that of sugar-based sweeteners, which effectively makes it low calorie. Non-nutritive sweeteners (NNSs) elicit a multitude of endocrine effects in animal models and in humans. In this current study, people were asked about their choices regarding desserts that they preferred mostly desserts made with artificial sweeteners or made with pure dairy products, so 60 % of them preferred to eat desserts made with dairy products, and 40% ate desserts made with artificial sweeteners. In previous studies use of artificial sweeteners was very common due to less awareness 85% of people normally use these sweeteners in their desserts which ultimately affects their health and increases the disease ratio [20,21].

CONCLUSIONS

Osteopenia can occur due to impaired calcium absorption; vitamin D deficiency is caused by defective absorption of fat-soluble vitamins and also due to the binding of unabsorbed dietary fatty acids. Dietary calcium deficiency affects three essential populations that are at maximum chance. According to results, people nowadays are more eager to change their dietary patterns to help improve their bone health than the ones before us we have seen.

Conflicts of Interest

The authors declare no conflict of interest.

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