

## Original Article

# Knowledge and awareness of osteoporosis and its related risk factors among the undergraduate students of doctor of physical therapy in Karachi, Pakistan

**Varisha Tariq, Zainab Khalid Khan & Hafsa Paracha**

Institute of Physical Medicine and Rehabilitation, Dow University of Health Sciences (DUHS)



DOI:10.29052/IJEHSR.v6.i4.2018.01-08

Corresponding Author Email:

varishatariq93@gmail.com

Received 12/04/2018

Accepted 15/10/2018

Published 01/12/2018

## Abstract

**Background:** Osteoporosis (OP) is a chronic progressive skeletal muscle disorder, which leads to an increased risk of fracture due to low mineral density. It is one of the major global health problems and most people are unaware of it. Education of OP was one of the key factors to reduce the risk from the society.

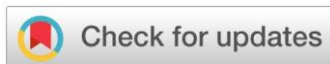
**Methodology:** This observational cross-sectional survey was conducted from October 2017 to March 2018. A sample size of 252 was calculated through Open Source Epidemiologic Statistics for Public Health (Open EPI) version 3.0 with a hypothesized frequency of 79.4% confident limit of 5%, design effect of 1% and confidence level of 95%. Undergraduate students of DPT i.e. 3rd to 5th-year students were research participants & those who already had some knowledge regarding OP via any kind of workshop and conference were excluded. Non-probability purposive sampling technique was used for sampling purpose. OP was evaluated through OKAT scale. Statistical Package of Social Sciences (SPSS) version 20 was selected for data entry and analysis.

**Results:** Out of 252 participants, 81.3% of students were female while only 18.7% were males. According to our results, 20.6% students were found having poor knowledge regarding OP, 77% participants had satisfactory knowledge and only 2.4% students were having good knowledge regarding the awareness of OP and its related risk factors.

**Conclusion:** OP is a crucial health problem which is significantly rising in many countries, so the awareness regarding this progressive disorder is essential. Interventional programmes and campaigns should be held across the globe to increase awareness in society.

## Keywords

Osteoporosis, Fracture, Basal Metabolic Rate, Dual-Energy X-Ray Absorptiometry



---

## Introduction

---

National Institute of Health has demarcated OP as a skeletal disorder characterized by the high rate of risk for fractures due to decreased bone strength<sup>1</sup>. OP is labeled as bone mineral density  $> 2.5$  standard deviation (SD) below average by the World Health Organization (WHO)<sup>2</sup>. OP is a systemic skeletal disease causing weakening of bone strength due to its effect on bone density and quality<sup>3</sup>. It is a crucial health problem which is compromising the quality of life among aged population<sup>3</sup>. Early detection is a key component for OP as with the help of preventive measures we can reduce the risk of fractures and disability<sup>4</sup>. Loss of bone structures occurs without signs due to which OP is also acknowledged as silent disease<sup>4</sup>.

Every 1 in 4 women and 1 in 8 men are affected by OP in their lifetime<sup>4</sup>. Females are more prone to experience OP as compared to males<sup>4</sup>. According to WHO data, 9 million fractures occur yearly worldwide due to osteoporosis<sup>1</sup>. According to recent Statistics, it is evident that by the year 2050 OP would probably become a major cause for fractures i.e. the rate of fractures and cost may increase by 50%, with greater than 87% rise for people aged 65-74 years<sup>2</sup>. In 2000, 9 million fractures occurred, many were due to osteoporosis<sup>5</sup>. According to 2017 statistics, around 75 million people suffer from OP worldwide<sup>6</sup>.

The prevalence of OP has reached endemic proportions. Almost 58.1% of females at the age of menopause suffer from OP<sup>1</sup>. As per WHO, 75 million people are affected by OP in Europe<sup>1</sup>. As per the study conducted in Saudi Arabia, over 300 children were vitamin D deficient<sup>5</sup>. Hypovitaminosis is re-emerging as a major health problem globally<sup>5</sup>. It is estimated that about 9.9 million people in Pakistan have osteoporosis out of which 7.2

million are females. The prevalence in Pakistan is thought to reach by 11.3 million by 2020 and 12.9 million by 2050<sup>7</sup>. Statistics of the risk factor of OP found in Pakistan as per the study, 72% people lead a sedentary lifestyle in Pakistan, 83% population have vitamin D deficiency and the prevalence of smoking is found to be 22%-40%<sup>8</sup>. The prevalence of OP in Malaysia was reported as 24.1% in 2005, particularly hip fracture being commonest<sup>6</sup>.

Quality of life and function can be affected due to chronic pain and disability because of osteoporotic fracture<sup>5</sup>. Fractures due to OP can be dangerous, as the most common site of osteoporotic fracture is at the hip joint which can lead to cardiovascular shock and even death<sup>8</sup>. Modifiable & non-modifiable risk factors are based on primary and secondary OP. Modifiable risk factors include low calcium, low vitamin D consumption, carbonated beverages, low body mass index (BMI), sedentary lifestyle and prolong immobilization, whereas the non-modifiable risk factors include age, family history, menopause and aging<sup>6</sup>. Risk of fracture can be assessed by conventional clinical risk factors even without bone mineral density (BMD)<sup>9</sup>. Aging is not only the risk factor for OP, lifestyle choices, side effect of certain medications can also cause OP in children, adults, men and premenopausal women<sup>1</sup>. Levels of fracture risk increase due to bone loss because it is associated with a decline in estrogen levels in postmenopausal women<sup>2</sup>.

BMD measurement that evaluates bone strength is the assessment tool for screening and diagnosis<sup>2</sup>. BMD can be calculated through Dual-energy X-ray absorptiometry (DXA), the most authenticated technique<sup>2</sup>. T-score is used to explain BMD, labeled as the variance in number of standard deviations

(SDs) from the mean BMD of a customarily distributed on an adult reference population, it is stated as a negative number. Normal bone is no more than 1 SD below this value, and osteopenia is 1 to 2.5 SD below average<sup>2</sup>. Severe osteoporosis is BMD greater than 2.5 SD below average and one or more fragility fractures<sup>2</sup>. BMD is an assessment tool for diagnostic classification of OP, it should not be applied in premenopausal women and males under 50 year<sup>2</sup>. Age to measure the peak bone mass is 18 and tends to slight change in total bone mass between age 30 and menopause<sup>4</sup>.

OP can be prevented by taking adequate amount of calcium and with the help of physical activity<sup>7</sup>. As per a study, the intake of daily calcium was found to be less than 50% of daily recommendation by WHO<sup>7</sup>. Calcium intake and weight bearing exercises play an important role in OP prevention, 1300mg of calcium is needed daily during the teen years<sup>4</sup>. Knowledge of OP plays a significant role in the identification of its risk factor and prevention management. As it is not only confined to growing older, it could be implicated in all age. Awareness regarding osteoporosis remains low especially in developing countries and health education has been shown to enhance the knowledge, so it is important to acknowledge the awareness of osteoporosis among the adolescent group which is the peak bone density age. This study was conducted to check the level of knowledge regarding this critical joint disease, its finding will become baseline evidence for further awareness and health education programs.

This study focuses on awareness and knowledge of OP and its risk factors among undergraduate students because youth are the future of every society, they should be aware of this disease so that they could engage more into research regarding this condition and explore advanced preventive measures. As there is little evidence about OP particularly among undergraduate students. Due to the belief that

it is an old age disease, it is neglected by most of the students. This research will help in gathering data regarding awareness and knowledge of osteoporosis as very little evidence was present previously.

---

## Methodology

---

This cross-sectional survey was conducted in four different universities of Karachi including Institute of Physical Medicine and Rehabilitation (IPMR), Ojha Campus, Dow University of Health Sciences (DUHS), Jinnah Post Graduate Medical College (JPMC), Liaquat National Medical College (LNMC), Ziauddin Medical University from October 2017 to March 2018 among the enrolled students of 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> year of 21-25 age group. Non-probability purposive sampling technique was used for recruitment of participants and sample size of 252 students was calculated through Open EPI version 3.0 with hypothesized frequency of 79.4% (knowledge on risk factor, symptoms, signs, cause, prevention, diagnosis, and treatment of osteoporosis) confident limit of 5%, design effect of 1% and confidence level of 95%.

A validated osteoporotic questionnaire and Osteoporotic knowledge and assessment tool (OKAT), were used for evaluation<sup>9</sup>. OKAT questionnaire consisted of 20 questions mainly addressing five main components including general knowledge, beliefs, risk factor, consequent treatment and management. It consists of two main sections, 1<sup>st</sup> part was related to the demographic details (age, gender, institute, and semester), while the 2<sup>nd</sup> part emphasized on the components which evaluate knowledge of osteoporosis its risk factor, causes, treatment and prevention. OKAT was chosen due to its record of reliability throughout the literature.

Data was entered and analyzed using SPSS Version 20. Frequencies and percentages were taken out for all quantitative variables. Descriptive statistics such as means and standard deviation was reported for qualitative variables. Chi-square test was applied to identify the association between quantitative variable (P-value 0.05 was considered significant). Each question was marked with two answers either agree denoted by 0 and disagree denoted by 1. Minimum and maximum knowledge ranged from 0 to 20<sup>6</sup>.

## Results

Out of 252 participants, 81.3% of students were female and 18.7% were male. Around 27.8% of study participants belonged to 3<sup>rd</sup> year, 25% were 4<sup>th</sup>-year students & 47.2 % were final year students (Table I). While the association of these variables with knowledge regarding OP was not very significant, gender and study year had no association with knowledge whereas on the institutional level there was a difference observed.

**Table 0I: Association of the level of knowledge of students regarding OP with gender, year of study and department**

Variables	Status	N (%)	p-value
Gender	Male	47(18.7)	0.95
	Female	205(81.3)	
Departments	Dow University Of Health Sciences (IPM&R)	150(59.5)	0.09
	Dow University Of Health Sciences (OJHA)	56(22.2)	
	Jinnah Postgraduate Medical College (JPMC)	25(9.9)	
	Liaquat National Hospital	11(4.4)	
	Ziauddin University	10(4.0)	
Year of study	3 <sup>rd</sup> year	70(27.8)	0.34
	4 <sup>th</sup> year	63(25)	
	5 <sup>th</sup> Year	119(47.2)	

*N= Frequency OP= Osteoporosis*

Table 2 represents the responses of the participants that how many of them agree and disagree with these facts. OKAT scale was used to evaluate the level of knowledge of OP regarding its risk factors, symptoms, causes, prevention and treatment.

Table 02: Evaluation of level of knowledge regarding OP

Questions inquired from participants to evaluate knowledge	Agree (%)	Disagree (%)
OP increase risk of bone fracture	97.6	2.4
OP usually causes pain before fracture occur	75.4	24.6
High peak bone mass at the end of childhood gives no protection against the development of osteoporosis in later life	23.4	76.6
OP is more common in men	7.9	92.1
Cigarette smoking contributes to osteoporosis	58.3	41.7
White women are at highest risk of fracture	48	52
A fall is as important as low bone strength in causing fracture	85.3	14.7
By 80 years majority of women have osteoporosis	91.3	8.7
Female are prone to develop at least one fracture after 50 years	38.5	61.5
Any type of physical activity is beneficial to prevent OP	64.3	35.7
It is easy to figure out the risk of OP by assessment of clinical risk factors	77	23
OP is hereditary	65.9	34.1
Two glasses of milk a day is sufficient source for calcium	81	19
Sardines & broccoli are sufficient calcium sources for those who avoid dairy products	42.5	57.5
Calcium supplements alone can prevent bone loss	40.5	59.5
Excessive intake of salt increase possibility of osteoporosis	26.2	73.8
Alcohol consumption increase risk of osteoporosis	44	56
Little amount of bone depletion under 10 years following onset menopause	63.5	36.5
After menopause risk of fracture reduce by hormone replacement therapy	71.8	28.2
There is no effective treatment for OP available in Pakistan	19.4	80.6

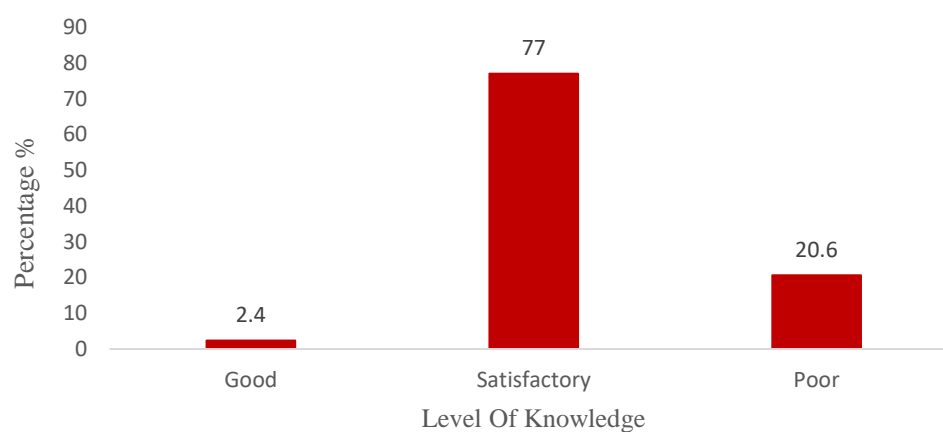


Figure I: Distribution of level of knowledge among the participant

Regarding the level of knowledge/awareness regarding OP and its related risk factors among the participants, it is evident from study results that 2.4% participants had good knowledge related to OP, 77% of participant had a satisfactory level of knowledge while 20.6% had a poor level of knowledge of OP.

---

## Discussion

---

OP is becoming a major health issue which is affecting millions of people across the globe, it is not only a disease of old age but also implicate all age groups. In spite of the fact that OP incidences have increased rapidly during the past few years, there is not much known about it and its knowledge and awareness is rare. A survey conducted in Malaysia showed only 6.8% of students within the age group of 20-30 years were having good knowledge of OP<sup>6</sup>. In contrast to our survey, a study done in Saudi Arabia shows 77% of students with knowledge of OP<sup>5</sup>. Similar surveys have been conducted in China, United States of America (USA) to assess the risk of OP<sup>10</sup>. The study results indicated that both American and Chinese students had inadequate knowledge of OP.

Healthy diet & physical activity are key pillars for fitness. Exercise is beneficial for health and fitness. Physical activity can prevent the incidence of many diseases and decreases the occurrence of fracture. Around 64.3 % of the participant favoured that physical activity can be beneficial for osteoporosis (Table 2). A systemic review shows that resistance training exercises have a useful effect on BMD<sup>11</sup>. Our results were also supported by a survey conducted in Iran which shows 8 out of 15 students agreed for the fact that physical activity is important for the prevention of OP<sup>12</sup>.

Many studies indicated exercises at an early age have an effective prevention in BMD<sup>11</sup>. So, it is important for the students especially in the field of medicine or allied health profession that they should encourage themselves to engage in physical activity and appropriate life habits.

It is evident that family history increases the risk of OP, 65.9% participants agreed to the fact (Table 2), in contrary to our results the finding of a study conducted in USA & China, stated that family history has no association with the future occurrence of OP<sup>11</sup>. In extension, a research program was conducted in Qatar which revealed that inadequate knowledge was seen among the participants related to the fact that one of the risk factors of OP is family history i.e. only 31% agreed to the fact that family history increases disease susceptibility<sup>13</sup>.

Calcium intake is an essential source to halt the occurrence of OP. According to our results, 81% of the participant agreed to the fact that two glasses of milk a day is an adequate source of Calcium (Table 2), same results were seen in Fauji foundation research on osteoporosis<sup>8</sup>. Iran students have knowledge of OP but the alternative sources of calcium and dietary intake were inappropriate<sup>12</sup>. Although no scientific reason was found for the observation that newly married respondent had a better understanding of OP, calcium, vitamin D benefits and their effects as compared to unmarried participant<sup>5</sup>.

Regarding the risk factor of OP high salt intake can increase disease risk but our participant had poor knowledge related to this fact 73.8% disagreed with the statement (Table 2). Hormone therapy can further prevent OP at any age. Majority of participant i.e. 71.8% agreed with the



statement and 28.2% disagreed (Table 2), whereas the other study conducted in Pakistan classify that 27% were literate and only 19% were illiterate about menopausal symptom could be reduced by Hormone Replacement Therapy (HRT)<sup>14</sup>.

Many studies conducted worldwide showed decreased knowledge regarding OP among young people. So, they could be the early victim of OP<sup>12</sup>. Therefore, is important to take a step to acknowledge the students in colleges and schooling level for appropriate exercises and diet strategies.

---

## Conclusion

Our results indicated a satisfactory level of knowledge regarding OP among the study participants. As OP has been significantly rising in many countries, so the awareness of OP risk factor is vital part because it increases the risk of osteoporotic fracture, which is a crucial health problem that can cause a central burden on society due to a large portion of disability and medical cost worldwide. Therefore, it is important that educational board should provide a better educational program regarding OP, which could be established through proper guidelines, more appropriate and advanced continuous teaching program. Workshop and seminar should be held across the globe, and it is also imperative that that specific health messages should be conducted through campaigns via media.

---

## Conflicts of Interest

None.

---

## Acknowledgement

The authors are thankful to the participants of Doctor of Physical Therapy from the respective institutes. DUHS, LNMC, Ziauddin University and JPMC for their

voluntary participation. We are also thankful to our research supervisor Dr. Wakash Lal (Physiotherapist) for his guidance and assistance.

---

## Funding

None.

---

## References

1. Khan YH, Sarriff A, Khan AH, Mallhi TH. Knowledge, attitude and practice (KAP) survey of osteoporosis among students of a tertiary institution in Malaysia. *Trop J Pharm R.* 2014; 13(1): 155-162.
2. Kling JM, Clarke BL, Sandhu NP, Osteoporosis prevention, screening, and treatment: A Review. *J of Women Health.* 2014; 23(7):563-723.
3. Shakeel S, Naveed S, Iffat W, F Nazeer F Yousuf YN. Pakistani Women Knowledge, Beliefs and Attitudes towards Osteoporosis. *J Bioequiv Availab.* 2015; 7(6):270-273.
4. Khorsandi M, Hasanzadeh L, Ghobadzadeh M, Assessment of knowledge and self-efficacy in achieving osteoporosis prevention behaviors among high school female students. *J Procedia-Soc Behavi. Sci,* 2012; 46; 4355-4388.
5. Zakai G, Zakai H. Awareness about osteoporosis among university in Jeddah, Saudi Arabia. *J Adv. Lab. Res.* 2015; 6(2): 43-47.
6. Amin S, Mukti NA .Assessment of Knowledge Level on Osteoporosis among a Private University Students in Malaysia. *Int.J.Interdiscip.res.* 2017; 3(3): 141-145.
7. Lowe NM, Ellahi B, Bano Q, Bangash SA, Mitra SR, et al. (2011) Dietary calcium intake, vitamin D status, and bone health in postmenopausal women in rural Pakistan. *J Health Popul Nutr* 29: 465-470.

8. Akhtar A, Shahid A, Jamal AR, Naveed MA, Aziz Z, Barkat N, Wazir A and Ali F. Knowledge about Osteoporosis in Women of Child Bearing Age (15-49 Years) Attending Fauji Foundation Hospital Rawalpindi. *Pak Armed Forces Med J.* 2016; 66(4): 558-563.
9. Nagi D, Butt Z, Farooq F, Aamar A. Frequency of osteoporosis in an ambulatory setting in Lahore using quantitative calcaneal ultrasound. *J. Pak. Med. Assoc.* 2013; 63: 965-968.
10. Ford MA, Bass M, Zhao Y, Bai JB, Zhao Y. Osteoporosis Knowledge, Self-Efficacy, and Beliefs among College Students in the USA and China. *J Osteoporos.* 2011; Article ID 729219.
11. Warburton DE, Nicol CW, Bredin S. Health benefits of physical activity: the evidence. *Can Med Assoc J.* 2006; 174(6): 801-880.
12. Ghaffari M, Nasirzadeh M, Rakhshanderou S, Hafezi Bakhtiari M, Harooni J. Osteoporosis-related knowledge among students of a medical sciences university in Iran: calcium intake and physical activity. *J Med Life* 2015; 8(4): 203-208.
13. Muraikhi HA, Said H, Selim N, Chehab MA. The knowledge of osteoporosis risk factors and preventive practices among women of reproductive age in the state of Qatar: a cross-sectional survey. *Int J Community Med Public Health* 2017; 4(2):522-527.
14. Sarfaraz S, Amir R, Javed S, sarfaraz A, Sarwar G. Awareness regarding preventive measures and treatment to overcome menopausal system in female population of Karachi. *RADS-JPPS* 2015; 3(2): 65-71.