

**SCREENING FOR PREVALENCE OF OSTEOPOROSIS AND OSTEOPENIA IN RURAL POPULATION – CAMP BASED STUDY****Dr. Nandkishor Bhaurao Kale and Dr. Laxmikant Sangameshwar Paymalle***

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Article Received on 13/07/2022**Article Revised on 03/08/2022****Article Accepted on 23/08/2022****ABSTRACT**

Background: Bone fragility is a silent condition enhanced by low bone mass and microarchitecture deterioration of bone tissue which leads to osteoporosis. It increases bone fracture risk. The incidence of osteoporotic fractures increases with age and is approximately twice as high in women as in men at all ages. Some study from the southern India in Rural population also reported prevalence of Osteoporosis 50% for women and 30% for men. So to calculate prevalence in rural population of Hiwara Ashram, Dist.Buldana (Maharashtra), The study was conducted by organizing screening camp of low bone mineral density. By using Calcaneus quantitative ultrasound (QUS) scan. **Methods:** In this retrospective study, 77 participants (Aged 28 years and above) evaluated for bone mineral density. Demographic details, food habit, weight was assessed in the prescribed format. By obtaining, BMD t-score, participants were labelled as normal (T-score < - 1 SD), osteopenia (t-score - 1 to - 2.5 SD) and osteoporosis (t-score < - 2.5 SD). **Results:** Mean age of study population was 52 ± 11.58 years. Of the total 77 participants there were 42(54.55%) cases of osteoporosis and 34 (44.16%) cases of osteopenia and only 1 (1.30%) case with a normal BQI. There were 23(62.1%) females with a low BQI and 14 (37.83%) had osteoporosis, 19 (47.5%) males had osteopenia. There were 17 (53.1%) cases of osteoporosis, 14 (43.75%) cases of osteopenia and only one normal case was non-vegetarian. In vegetarians 25 (55.55%) had osteoporosis, 20 (44.44%) had osteoporosis. In the present study, the incidence of osteoporosis was (3.89%) and osteopenia was 15.58%. The maximum number of both osteoporosis and osteopenia recorded in the age group of 41-60 years. The average bone quality index (BQI) score for men was 59.63 and for women was 57.34% i. e. males have a higher average BQI score. **Conclusion:** The prevalence of osteoporosis and osteopenia was increasing with the advancement in age. The higher incidence of osteoporosis in females with a low BQI was noted. Increase in sedentary life style and lack of awareness of bone health leading to osteoporosis in general population. This review focuses on need to early management of bone disorders for healthy human resource.

KEYWORDS: Osteoporosis, Osteopenia, Bone mineral density, Bone quality index, Prevalence.

INTRODUCTION

Osteoporosis characterized by increased porosity of the skeleton which results from reduced bone mass. It is associated with an increase in bone fragility and susceptibility to fractures which is major clinical manifestation of osteoporosis.^[1] Bone fragility is closely correlated with reduced bone mineral density. Senile and post-menopausal osteoporosis are common forms of osteoporosis. Senile osteoporosis affects all individuals and post-menopausal osteoporosis affects only women. It is a silent disease, often remains undiagnosed until it manifests as incidence of osteoporotic fractures, which frequently leads to hospitalization.^[2] The incidence of osteoporotic fractures increases with age and is approximately twice as high in women as in men at all

ages. As per study reports, bone loss starts from the age of 30-40 years in both men and women. Bone loss is most marked in cancellous bone having lattice work structure, as the spongy tissue of the bone.^[3] Any decrease in the amount of bone tissue, regardless of the cause is osteopenia. Decreased bone density caused by failure of the rate of osteoid tissue synthesis to keep up with normal rate of bone lysis.^[4] In 2013, study reported that 50 million people in India are either osteoporotic or low bone mass index.^[5] Indian population unaware about the dietary calcium, vitamin D supplements and a regular exercise regimen starting before the age of 30 which is essential to increase the peak bone density. There are lack of diagnostic facilities and poor knowledge of bone health in Indian village as well as urban population. Due

to these reasons resulted in osteoporosis becoming a major public health problem in day to day life. As bones breath in sun, grow on calcium and gain strength in action, it is now time essential to diagnose the osteoporosis by BMD- Calcaneal QUS which is simple, easy and quick method. Therefore, the aim of the present camp base study was to determine the prevalence of osteoporosis and osteopenia with age, sex, food habit and weight of the patient in rural population of Hiwra Ashram, District-Buldana,(Maharashtra.).

MATERIALS AND METHODS

Detection of bone mineral density camp was organized on 27 Feb 2022 at Hiwra Ashram, Dist. Buldana (Maharashtra). Schedule of research study was approved by Institutional ethics committee. Those having musculoskeletal symptoms were selected for screening of bone mineral density and evaluated by clinical teachers, machine technician and other health professionals. On the day of the camp, registration of the each participant was done and they were enquired about age, sex, food habit and weight in the prescribed format. Total 77 participants in the study had a minimum age of 28 and a maximum age of 80 years were screened and

BMD T- score was noted as per WHO osteoporotic definitions.^[6] The sonost 2000 (Osteosis, South Korea) quantitative ultrasound machine was used to evaluate the level of the BMD of the calcaneus. The main study objective of this analysis was to determine the prevalence of osteoporosis and osteopenia in individuals suffering from musculoskeletal disorders. Data was entered and analyzed using the Microsoft excel software. For qualitative variables, data was presented as frequency and percentages and as mean and standard deviation for qualitative variables. To determine the statistically significant differences in qualitative variables in different groups, Chi- square test was applied. P value < 0.05 was considered as significant for all comparisons.

RESULTS

In the current investigation, calcaneal QUS was used to evaluate a total of 77 patients for their BMD. In which 40 (51.94%) of the participants were male and 37 (48.05%) were female, with a mean age of $52 +_{-} 11.58$ years. Participants in the study had a minimum age of 28 and a maximum age of 80 years.

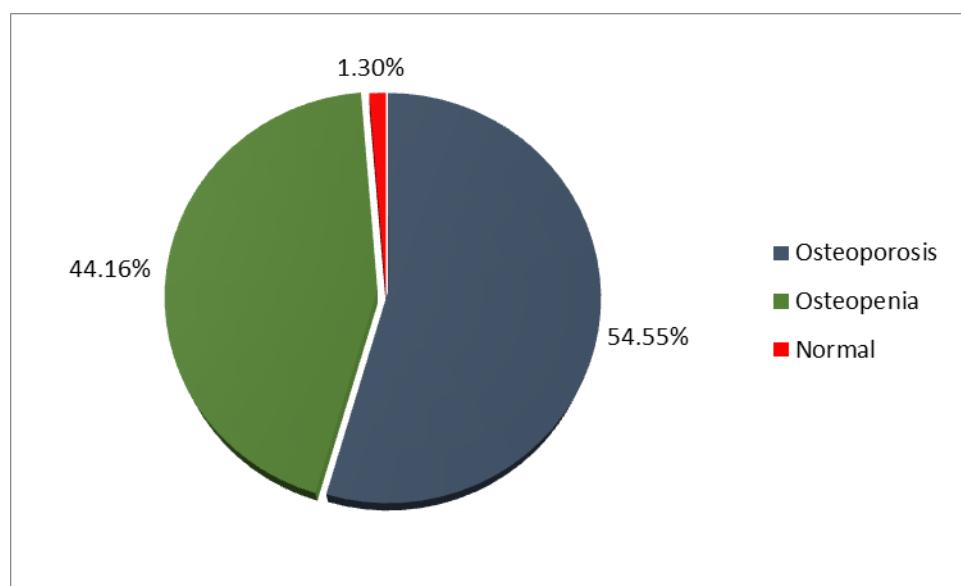


Figure-1: Distribution of patients according to BQI.

There were 42 (54.55%) cases of osteoporosis related to a higher BQI, compared to 34 (44.16%) cases of osteopenia and only 1 (1.30%) case with a normal BQI.

Table-1: Gender-based classification of a patient's condition.

Gender	Condition			Total	P-value
	Osteoporosis	Osteopenia	Normal		
Female	23	14	0	37	0.31[NS]
Male	19	20	1	40	

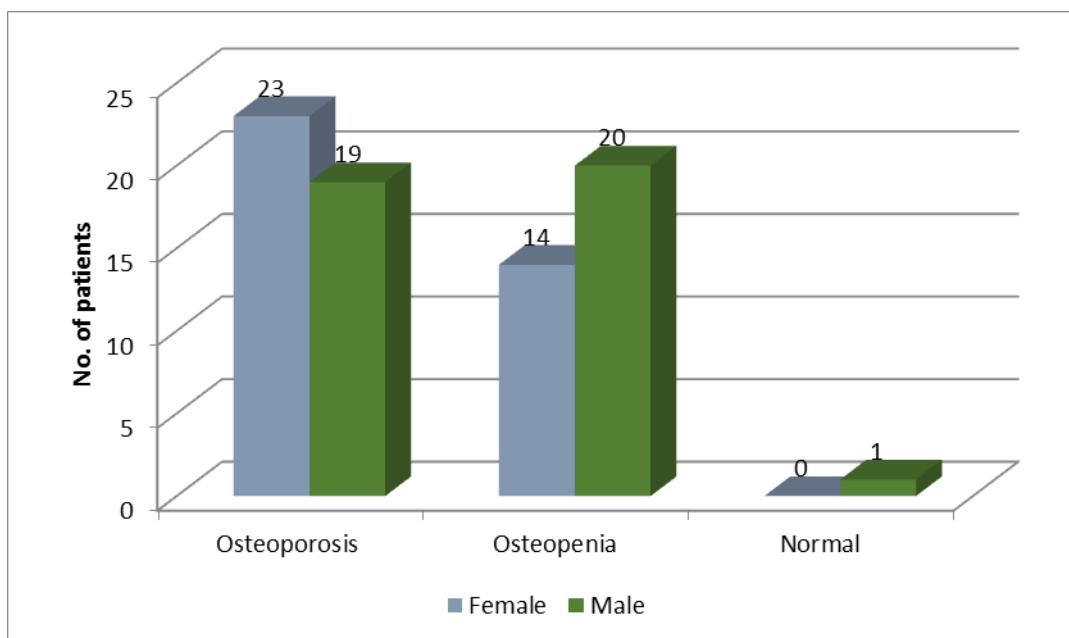


Figure-2: The patient's condition is represented graphically.

The above Table-1 and figure-2 shows, the incidence of osteoporosis in females. There were 23 (62.1%) females with a low BQI and 14 (37.83%) had osteopenia. whereas, in males, 19 (47.5%) had osteoporosis, 20

(50%) cases had osteopenia and only one case of normal was found among males. The P-value of 0.31 indicates that there is no statistically significant difference between genders in terms of patient conditions.

Table: 2 Patients are categorized based on their eating habits.

Food Habit	Condition			Total	P-value
	Osteoporosis	Osteopenia	Normal		
Non Vegetarian	17	14	1	32	0.48[NS]
Vegetarian	25	20	0	45	

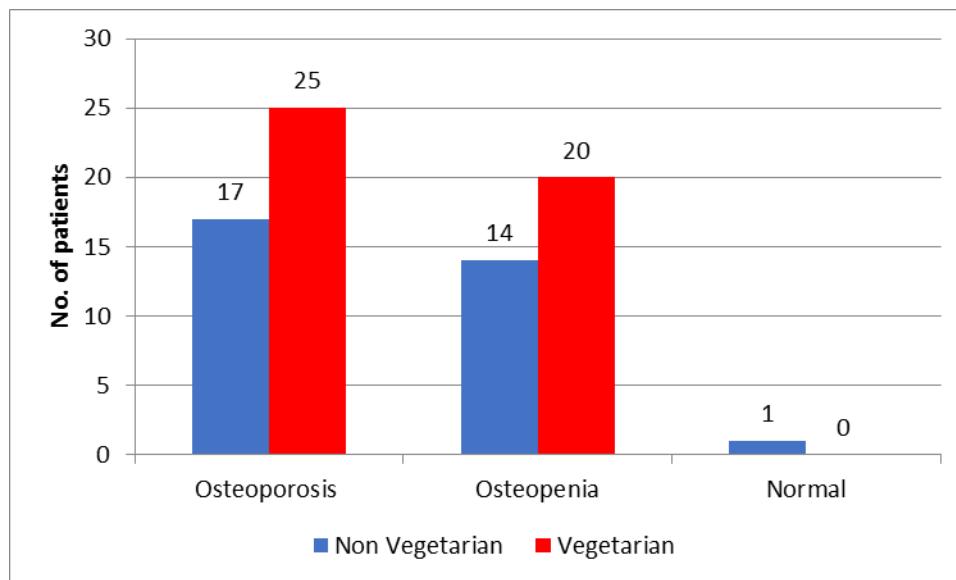


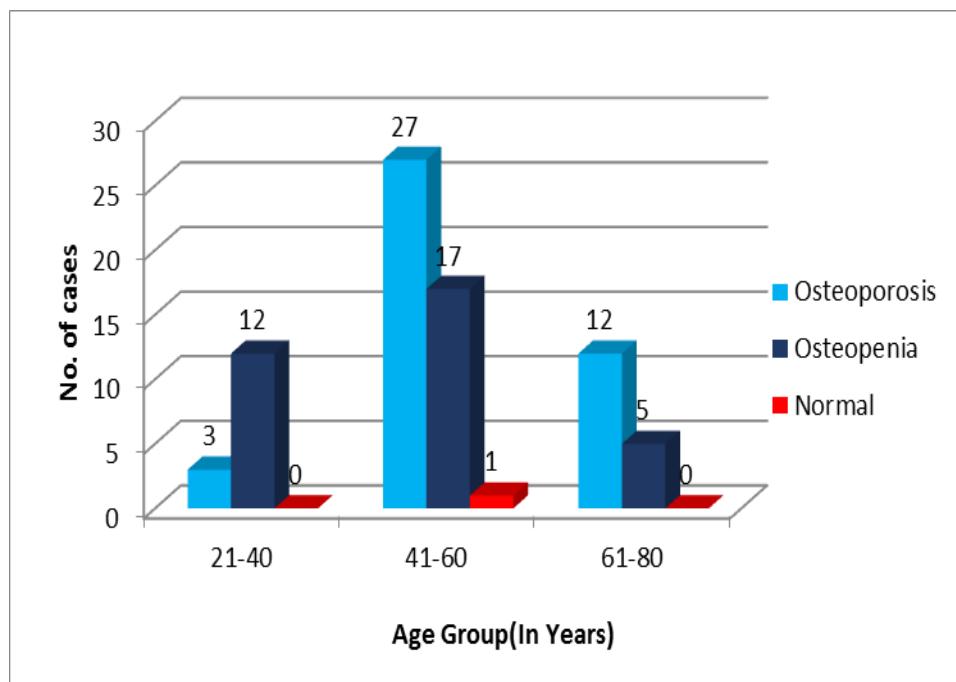
Figure 3: Graphical representation shows distribution of patients according to their eating habits.

In Figure 3, there were 17 (53.1%) cases of osteoporosis, 14 (43.75%) cases of osteopenia and only one normal case was non vegetarian. In vegetarians, 25 (55.55%) had osteoporosis, 20 (44.44%) had osteopenia, and no cases

were found to be normal. There was a high prevalence of osteoporosis & osteopenia among Vegetarians as compared to Non vegetarians. But statistically it was non-significant.

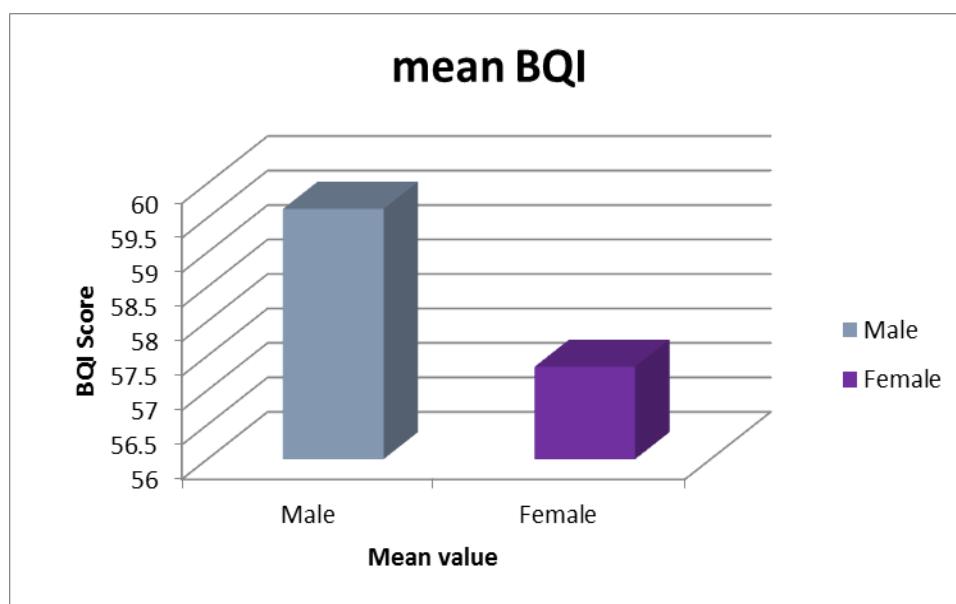
Table 3: Distribution of participant's condition according to age groups.

Age Group(In Years)	Condition			P-value
	Osteoporosis	Osteopenia	Normal	
21-40	3	12	0	0.03[S]
41-60	27	17	1	
61-80	12	5	0	

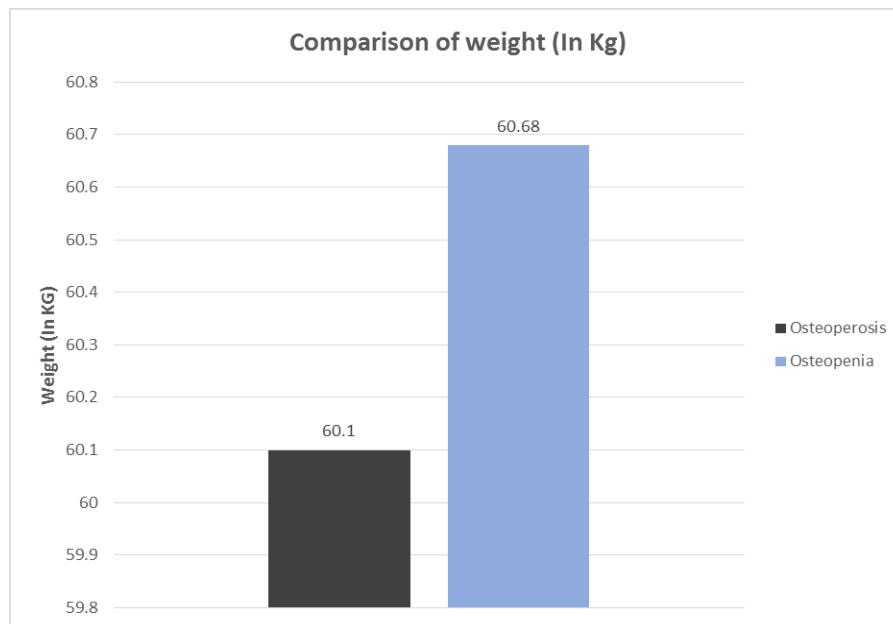
**Figure 4: Graphical representation of participant's condition according to their age groups.**

Maximum number of both osteoporosis and osteopenia detected in the age group of (41–60 years). Whereas only

one case in from group (41–60 years) was found to be in normal condition.

**Figure 5: comparison of Mean BQI score according to gender.**

The average BQI score for men was 59.63, while the average BQI score for women was 57.34. i.e., males have a higher average BQI score. As shown in (Figure-5).



In the above table, the mean weight in the osteoporosis group was 60.10 kg, while in the osteopenia group it was 60.68 kg, with no statistically significant difference between the two groups ($p=0.84$).

DISCUSSION

India facing the musculoskeletal disorders hampering day to day activities leading to osteoporosis. Unawareness of bone health, it is now difficult to handle the challenge of osteoporosis and osteopenia and morbidity associated with it. From the output of the camp, the prevalence of osteoporosis and osteopenia was detected of 77 cases reported. Out of that, 42 (54.55%) cases of osteoporosis and 34 (44.16%) cases of osteopenia was noted. Only one was normal with normal BQI. This indicates the severity of the disease and should be evaluated for bone loss. The average mean age was 52 years in osteoporosis and osteopenia among 77 patients which compares other Indian studies.^[7,8]

Clinical osteoporosis occurs earlier in females due to lower estrogen levels.^[9] In our study we found prevalence of osteoporosis in females was 62% and in males it was 47.5% that means females have higher prevalence of osteoporosis than males but this difference is not statistically not significant ($P = 0.31$). Similar result was found in study by Babulkar S et al 2021.^[10] In relation with food habit in our study we have 31 participants of non-vegetarian out of which 17 cases (53.1%) had osteoporosis and 14 cases (43.75%) had osteopenia whereas 45 individual taking vegetarian diet, 25 has (55.56%) osteoporosis and 20 (44.44%) had osteopenia.. Meaning that higher prevalence in persons taking only single diet pattern. It is necessary to follow

the mixed diet pattern to avoid the bone and joint disorders. The maximum number of osteoporosis and osteopenia was recorded in the age group of 41-60 years as osteoporosis increases with advancing age.

Bone quality is an essential ingredient in bone structure and strength, also the ability of the bone to resist fracture.^[11] Males have higher (59.63) average BQI score as compare to women (57.34%). Body weight, especially adipose tissue, is the main determining factor for BMD.^[12] Average weight in the osteoporotic group (60.10 kg) indicates poor nutritional status, which is an important risk factor for osteoporosis. The study demonstrates the positive correlation between body mass index and BMD.

CONCLUSION

A higher prevalence of osteopenia in our study suggests that these population having greater risk for developing osteoporosis in future. Hence they should manage early to avoid further fractures. Lack of knowledge of bone health, sedentary life style, physical inactivity, improper diet, environmental factors influencing the prevalence of osteopenia and osteoporosis. Higher Indian population suffering from these bone disorders. It's now time to implement the campaign regarding maintaining proper bone health for healthy human resources through organizing such an awareness and detection of bone mineral density camp in rural and also urban population.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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