Research Article

A Study of Awareness of Appropriate Bone Mass Density and Its Impact on Bone Health Among Adult Rural and Urban Women

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ABSTRACT
Background: Osteoporosis disproportionately affects women worldwide. Low bone mass density [BMD] increases fracture risk, especially among postmenopausal women. Rural women face heightened risks due to limited healthcare and poor lifestyle choices. Addressing urban-rural disparities in BMD awareness is crucial for promoting bone health equity.
Methods: The cross-sectional survey that was conducted in Karad and Varunji the purpose of this repetitive study is to identify disparities and inform targeted interventions promoting bone health equity among these populations. Prior to conducting the survey, the ethical committee approval was made. Patient select according to inclusion and exclusion criteria. With permission.150 women are participating in this study. And result was obtained.
Result: This study revealed significant disparities in bone mass density awareness between rural and urban women. In comparison to urban women rural women lack of knowledge related to specific risk factors and preventive measures with relation to adulthood.
Conclusion: This study concludes that rural women have lack of awareness related to age specific preventive measures and knowledge of nutrition emphasize on adulthood. Its what we got the information with the availability of many types of food and dairy products including vegetarian and non-vegetarian the urban people have attended knowledge level with relation to quality of food and its nutrition in practicality.

Keywords: Bone mass density, osteoporosis, awareness, rural and urban women, bone health.

INTRODUCTION

Low bone mass density (BMD), which is a defining feature of osteoporosis, increases the risk of fractures and mortality and is a major global health concern for women (World Health Organization, 2020). Women are more likely than males to have fractures caused by the disease.[WHO].[1] Low bone strength and an increased risk of fragility fractures are the hallmarks of osteoporosis, a skeletal condition. The condition of menopause known as estrogen insufficiency is linked to the highest bone loss that happens in women during the perimenopause.[2] As a result of decreased bone mass and the degradation of the micro-architecture of the bone, osteoporosis is a systemic bone disease that finally results in fractures. The

most prevalent and widespread nutritional deficit in the world, it is inevitably linked to vitamin D deficiency, which is also the most under-diagnosed and undertreated. People without regard to age, sex, colour, or geography are disproportionately affected by vitamin D deficiency, particularly in underdeveloped nations like India.[3] Due to their lower wealth, greater prevalence of medical disorders, and restricted access to healthcare, rural areas have particular difficulties that have a detrimental influence on health outcomes.[4] Individual fracture risk and osteoporosis diagnosis are frequently made using bone mineral density. Bone mineral density has been classified into three categories by the World Health Organization: normal (T-score –1 or higher), osteopenia (T-score between –1 and –2.5),

and osteoporosis (T-score –2.5 or less). The T score is the number of standard deviations above or below the mean for young adults.[5] The prevention of osteoporosis may come from having sufficient knowledge, a positive outlook on the condition, and engaging in osteoprotective activities.[6] Given that osteoporosis is a major concern for Indian postmenopausal women and that the condition significantly increases morbidity and death after fragility fractures, screening for osteoporosis should be done as a preventative measure. The dearth of knowledge about this illness among women in rural and urban areas frequently hinders screening efforts. In order to enhance health-seeking behaviour and increase awareness among women living in urban and rural areas, it is imperative to evaluate the existing level of awareness among them and endeavour to close any detected knowledge gaps.[7] With increasing body weight and BMI of women, BMD and BMC at all skeletal locations and across the body increased significantly (P<0.05). On the other hand, as BMI increased, bone area (BA) remained same. Age, menopause, and calcium consumption were the other significant factors of BMD (P<0.05) in the multiple regression analysis, in addition to body weight.[8] Fractures become more likely in those with low bone mineral density (BMD).Throughout life, a multitude of modifiable risk factors, such as serum vitamin D levels, weight-bearing physical activity, and dietary consumption of calcium and protein, impact the accumulation and loss of bone mass.[9] In the aged, osteoporosis (OP) is a major cause of illness and mortality. The effects of different factors on bone mineral density (BMD) vary among different populations.[10] Measurement of bone density is a crucial technique to apply to the population at risk, which includes women with women who have specific risk factors for osteoporosis, such as menopause, because it is the single most important predictor of

1)Age

fracture risk along with people who smoke, have a lifelong low calcium intake, are extremely thin, have anorexia, have a family history of osteoporosis, or who take certain medications or illnesses. [11]

METHODS
A cross-sectional survey conducted in karad and varunji.150 participants are given their consent to participant in this study.75 of them are urban women and 75 are rural women. Who are living in karad and varunji the statistician determined the sample size based on a thorough review of literature. The questionnaire has been validated in Marathi for better purpose and to understand women in rural area.

Ethical committee give permission for conducting this study with ethical concern. Assessing awareness of appropriate bone mass density and its impact on bone health among adult rural and urban women, consider evaluating their knowledge of osteoporosis risk factor, prevention strategies and screening methods. We ask them about bone mass density related questions to give information about risk factors and prevention strategies. Rural women awareness about bone mass density and osteoporosis is alarmingly low due to limited healthcare. Raising awareness especially in rural areas, addressing disparities and promote bone health equity , ultimately enhancing women overall well-being. All data was collected and the assistance of statistician was used for data analysis. And result was made.

RESULT:
The present study was conducted the awareness 0f bone mass density and its impact on bone health among adult urban and rural women in this study 150 women are participate.

Age group	n(%)
30 to 40	56(37.33%)
41 to 50	67(44.66%)
51 to 60	24(16%)
61 to 70	3(2%)

Table no.1: frequency of Age group of participants

Table 1-This explained description age group of participants as there 56 women are in age group of 30 to 40 (37.33%) and 67 women are in age group of 40 to 50 (44.66%) and 24 women are in present with age group of 50 to 60 (16%) and remaining 3 women are in age group of 60 to 70 (2%)
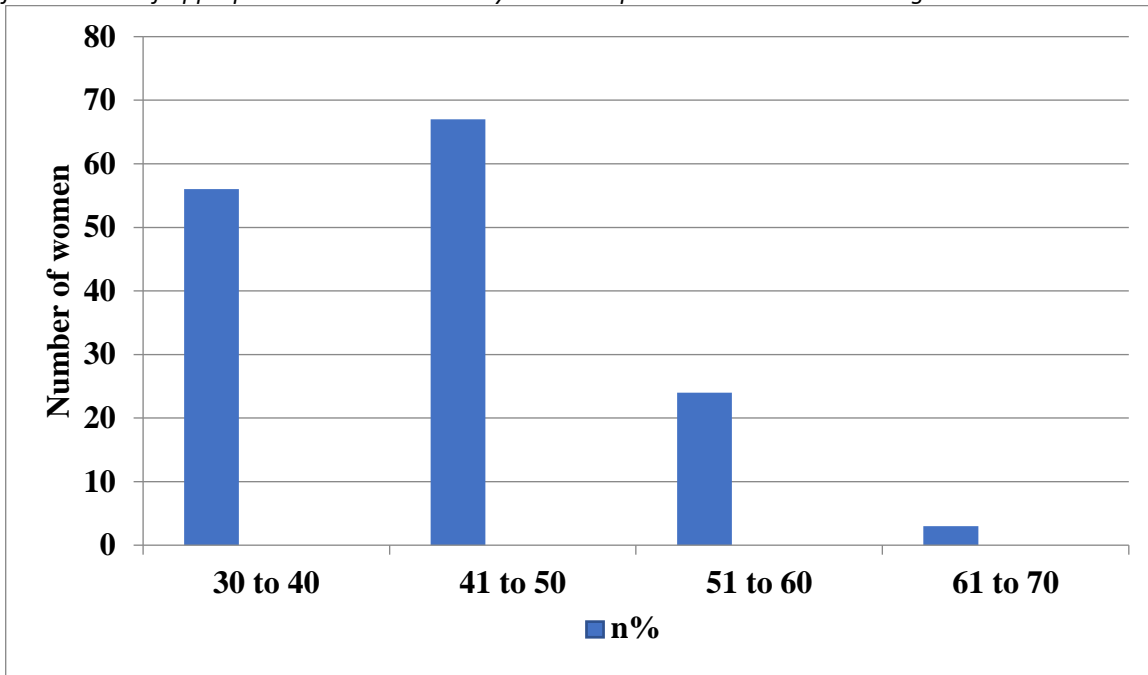
1. Do you think that bone health and bone mass density are significant factors for women's wellbeing?[महिलांच्या आरोग्यासाठी हाडांचे आरोग्य आणि हाडांची घनता हे महत्त्वाचे घटक आहेत असे तुम्हाला वाटते का?]

Options	Karad [Urban]	Varunji [Rural]
Yes	41 (54.66%)	27 (36%)
May be	30 (40%)	32 (42.66%)
No	4 (5.33%)	15 (20%)
Don't know		1 (1.33%)

Table no 1- Frequency of women answering the above question no1.

Women participation is 150 that is urban 75 and rural 75 women which is 100% of participants. In which women participants in urban area answering "Yes" are 41(54.66%) of total participants. Women participants answering " May be" are 30 (40%) of total participants. Women participants answering "No" are 4 (5.33%) of total participants.

Women participants in rural area answering "Yes" are 27(36%) of total participants. Women participants answering "May be" are 32(42.66%) of total participants. Women participants answering 15(20%) of total participants. Women participants answering "Don't know" are 1(1.33%) of total participants.
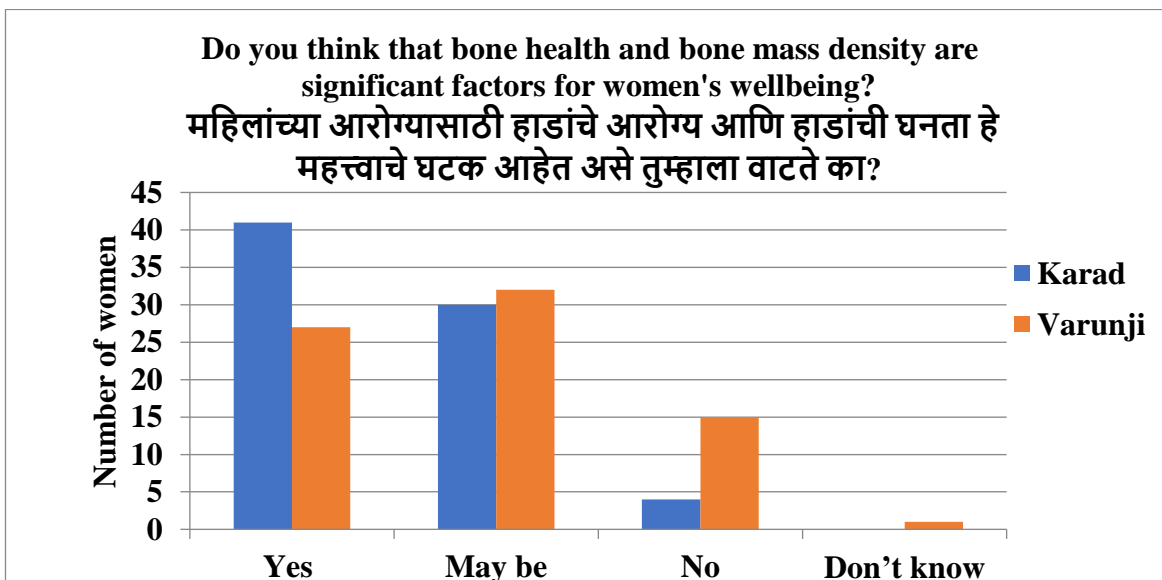
2. Are there any groups in particular that are more vulnerable to having poor bone mass? [विशेषतः असे काही गट आहेत का ज्यांना हाडांचे द्रव्यमान कमी असण्याची शक्यता जास्त असते?]
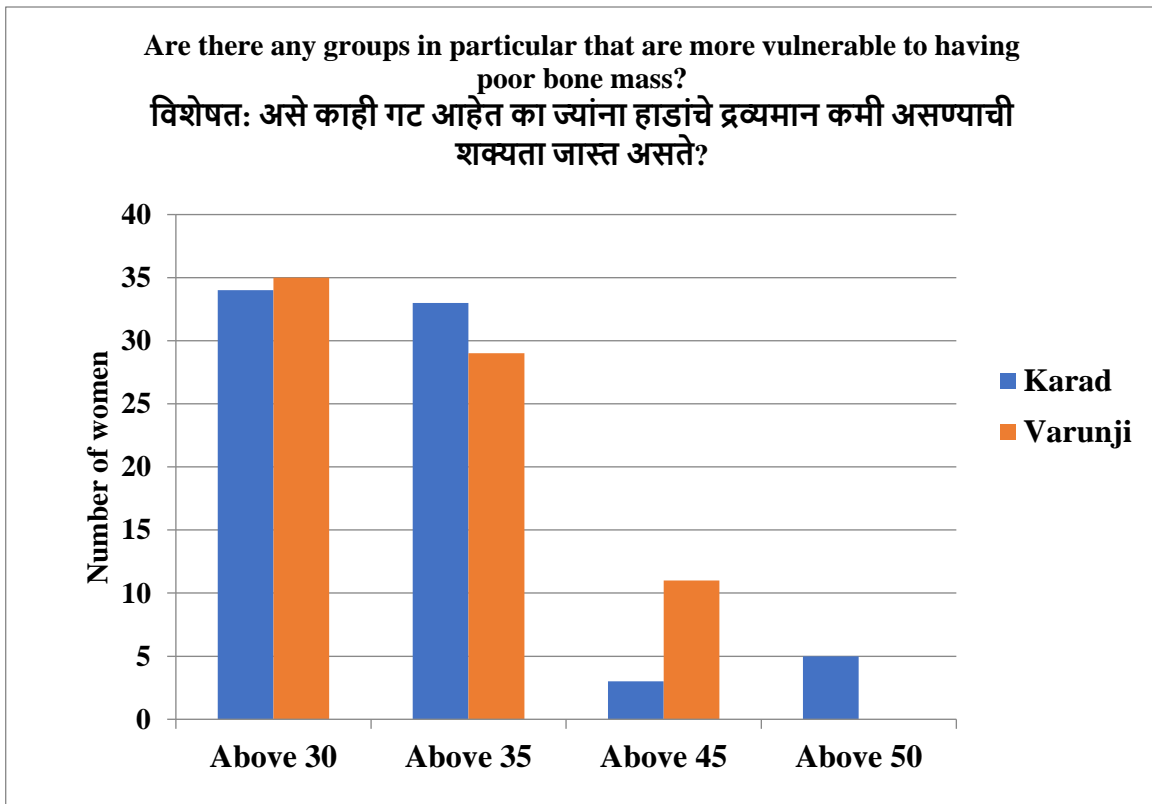
Options	Karad [Urban]	Varunji [Rural]
Above 30	34 (45.33%)	35 (46.66%)
Above 35	33 (44%)	29 (38.66%)
Above 45	3 (4%)	11 (14.66%)
Above 50	5 (6.66%)	

Table no 2- Frequency of women answering the above question no 2.

Women participation is 150 that is urban 75 and rural 75 women which is 100% of participants. In which women participants in urban area answering "Above 30" are 34(45.33%) of total participants. Women participants answering "Above 35" are 33(44%) of total participants. Women participants answering "Above 45" are 3(4%) of total participants. Women participants answering "Above 50" are 5(6.66%) of total participants.

Women participants in rural area answering "Above 30" are 35(46.66%) of total participants. Women participants answering "Above 35" are 29(38.66%) of total participants. Women participants answering "Above 45" are 11(14.66%) of total participants.

3. Do you eat a variety of fruits, veggies, whole grains, lean meats, and healthy fats in your diet every day?
[तुम्ही दररोज तुमच्या आहारात विविध प्रकारची फळे, भाज्या, संपूर्ण धान्य, पातळ मांस आणि निरोगी चरबी खाता का?]

Options	Karad [Urban]	Varunji [Rural]
Yes	44 (58.66%)	28 (37.33%)
May be	23 (30.66%)	13 (17.33%)
No	7 (9.33%)	22 (29.33%)
Don't know	1 (1.33)	12 (16%)

Table no 3- Frequency of women answering the above question no3.

Women participation is 150 that is urban 75 and rural 75 women which is 100% of participants. In which women participants in urban area answering "Yes" are 44(58.66%) of total participants. Women participants answering " May be"

are 23(30.66%) of total participants. Women participants answering "No" are 7(9.33%) of total participants. Women participants answering "Don't know" are 1(1.33%) of total participants.

Women participants in rural area answering "Yes" are 28(37.33%) of total participants. Women participants answering "May be" are 13(17.33%) of total participants. Women participants answering 22(29.33%) of total participants. Women participants answering "Don't know" are 12(16%) of total participants.

Do you eat a variety of fruits, veggies, whole grains, lean meats, and healthy fats in your diet every day?
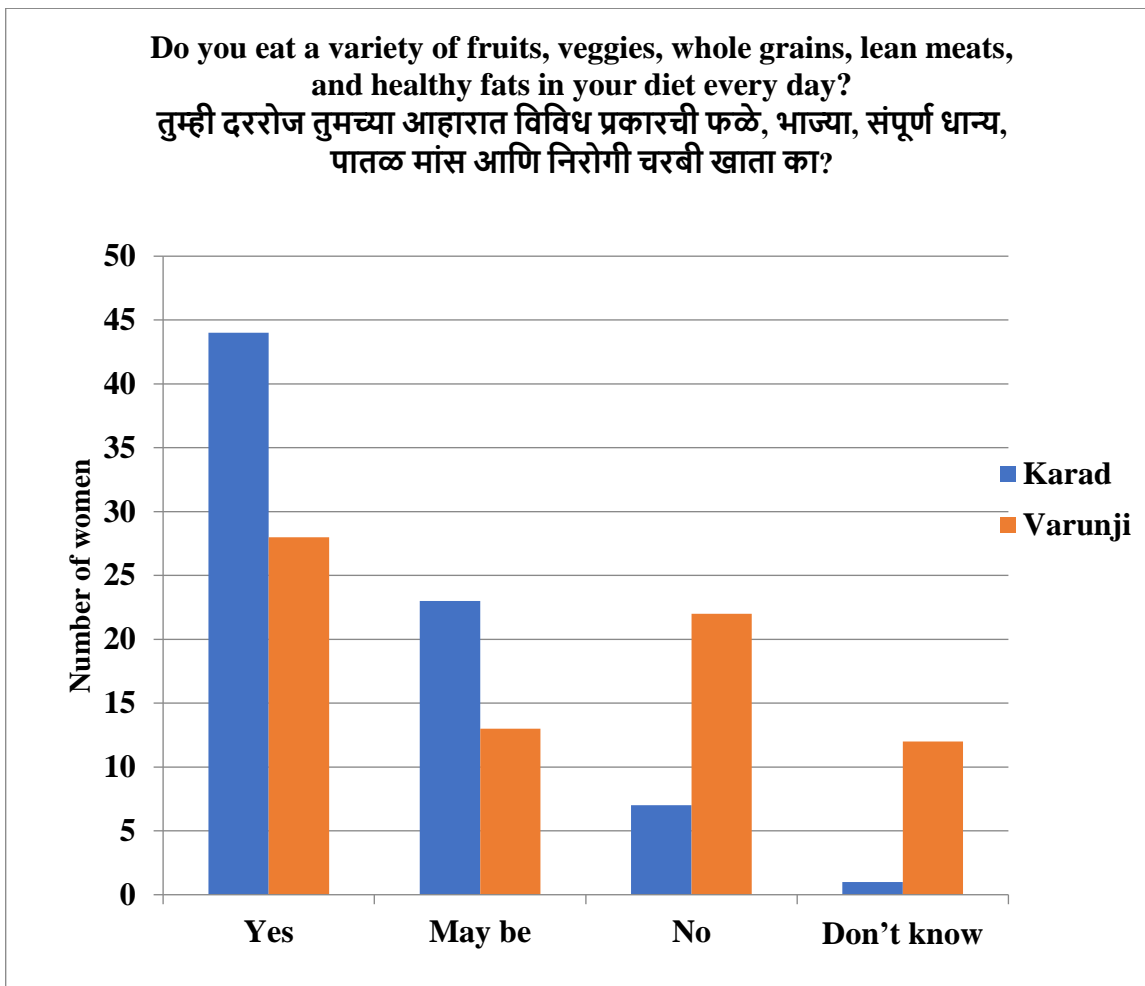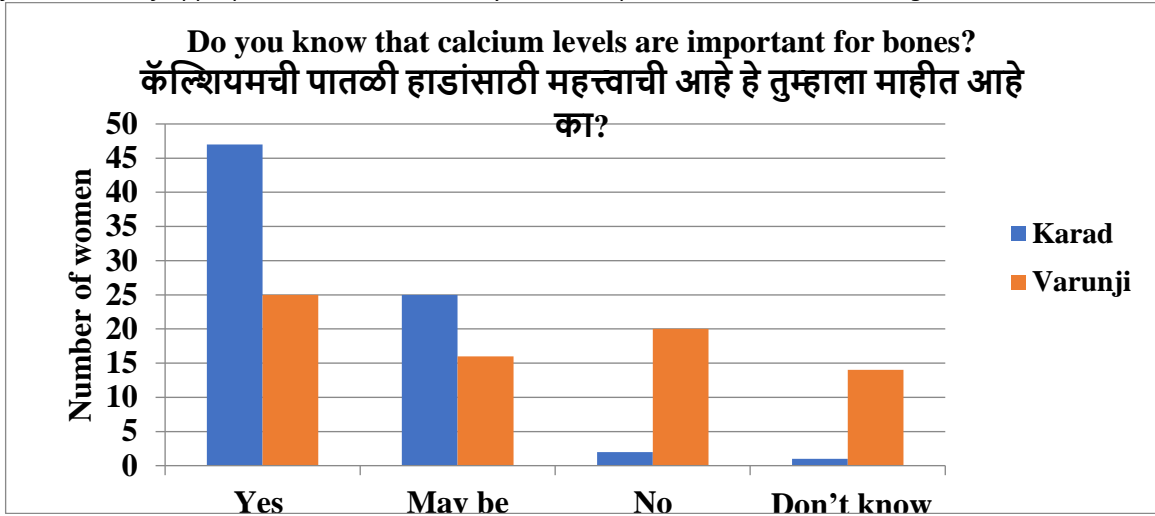**तुम्ही दररोज तुमच्या आहारात विविध प्रकारची फळे, भाज्या, संपूर्ण धान्य, पातळ मांस आणि निरोगी चरबी खाता का?**

4. Do you know that calcium levels are important for bones?
[कॅल्शियमची पातळी हाडांसाठी महत्त्वाची आहे हे तुम्हाला माहीत आहे का?]

Options	Karad [Urban]	Varunji [Rural]
Yes	47 (62.66%)	25 (33.33%)
May be	25 (33.33%)	16 (21.33%)
No	2 (2.66%)	20 (26.66%)
Don't know	1 (1.33%)	14 (18.66%)

Table no 4- Frequency of women answering the above question no 4.

Women participation is 150 that are urban 75 and rural 75 women which is 100% of participants. In which women participants in urban area answering "Yes" are 47(62.66%) of total participants. Women participants answering "May be" are 25(33.33%) of total participants. Women participants answering "No" are 2 (2.66%) of total participants. Women participants answering "Don't know" are 1(1.33%) of total participants.

Women participants in rural area answering "Yes" are 25(33.33%) of total participants. Women participants answering "May be" are 16(21.33%) of total participants. Women participants answering 20(26.66%) of total participants. Women participants answering "Don't know" are 14(18.66%) of total participants.

Do you know that calcium levels are important for bones?
कॅल्शियमची पातळी हाडांसाठी महत्त्वाची आहे हे तुम्हाला माहीत आहे का?

5. Which is the most important nutrient for maintaining normal bone health?
[हाडांचे सामान्य आरोग्य राखण्यासाठी सर्वात महत्वाचे पोषक तत्व कोणते आहे?]

Options	Karad [Urban]	Varunji [Rural]
Phosphorus	4 (5.33%)	2 (2.66%)
Magnesium	8 (10.66%)	9 (12%)
Vitamin K	9 (12%)	16 (21.33%)
Calcium	54 (72%)	48 (64%)

Table no 5- Frequency of women answering the above question no 5.

Women participation is 150 that are urban 75 and rural 75 women which is 100% of participants. In which women participants in urban area answering "Phosphorus" are 4(5.33%) of total participants. Women participants answering "Magnesium" are 8(10.66%) of total participants. Women participants answering "Vitamin K" are 9(12%) of total participants. Women participants answering "Calcium" are 54(72%) of total participants.

Women participants in rural area answering "Phosphorus" are 2(2.66%) of total participants. Women participants answering "Magnesium" are 9(12%) of total participants. Women participants answering "Vitamin K" 16(21.33%) of total participants. Women participants answering "Calcium" are 48(64%) of total participants.

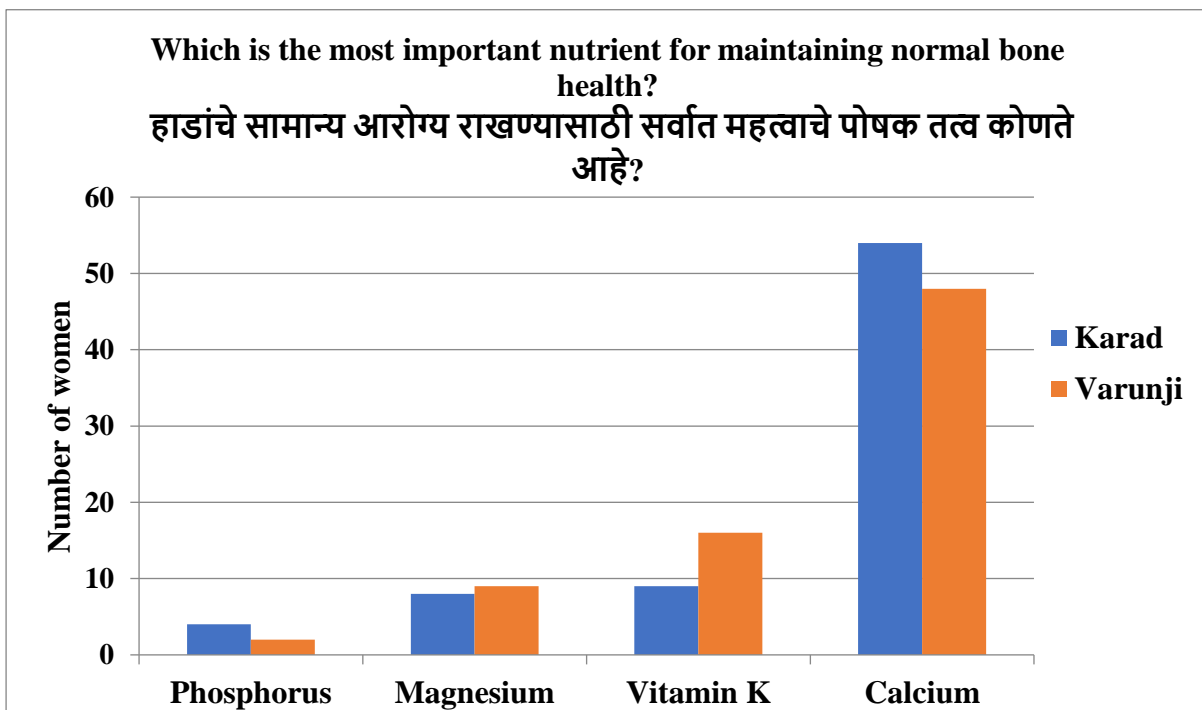**Which is the most important nutrient for maintaining normal bone health?**
हाडांचे सामान्य आरोग्य राखण्यासाठी सर्वात महत्वाचे पोषक तत्व कोणते आहे?

6. What problems can occur if the amount of calcium in the body is too low or too high? [शरीरात कॅल्शियमचे प्रमाण खूप कमी किंवा खूप जास्त असल्यास कोणत्या समस्या उद्भवू शकतात?]

Options	Karad [Urban]	Varunji [Rural]
Muscle cramps	15 (20%)	24 (32%)
Weaken bones	19 (25.33%)	18 (24%)
Kidney stones	1 (1.33%)	7 (9.33%)
All of the above	40 (53.33%)	26 (34.66%)

Table no 6- Frequency of women answering the above question no 6.

Women participation is 150 that is urban 75 and rural 75 women which is 100% of participants. In which women participants in urban area answering "Muscle cramps" are 15(20%) of total participants. Women participants answering "Weaken bones" are 19(25.33%) of total participants. Women participants answering "Kidney stones" are 1(1.33%) of total participants. Women participants answering "All of the above" are 40(53.33%) of total participants.

Women participants in rural area answering "Muscle cramps" are 24(32%) of total participants. Women participants answering "Weaken bones" are 18(24%) of total participants. Women participants answering "Kidney stones" 7(9.33%) of total participants. Women participants answering "All of the above" are 26(34.66%) of total participants.
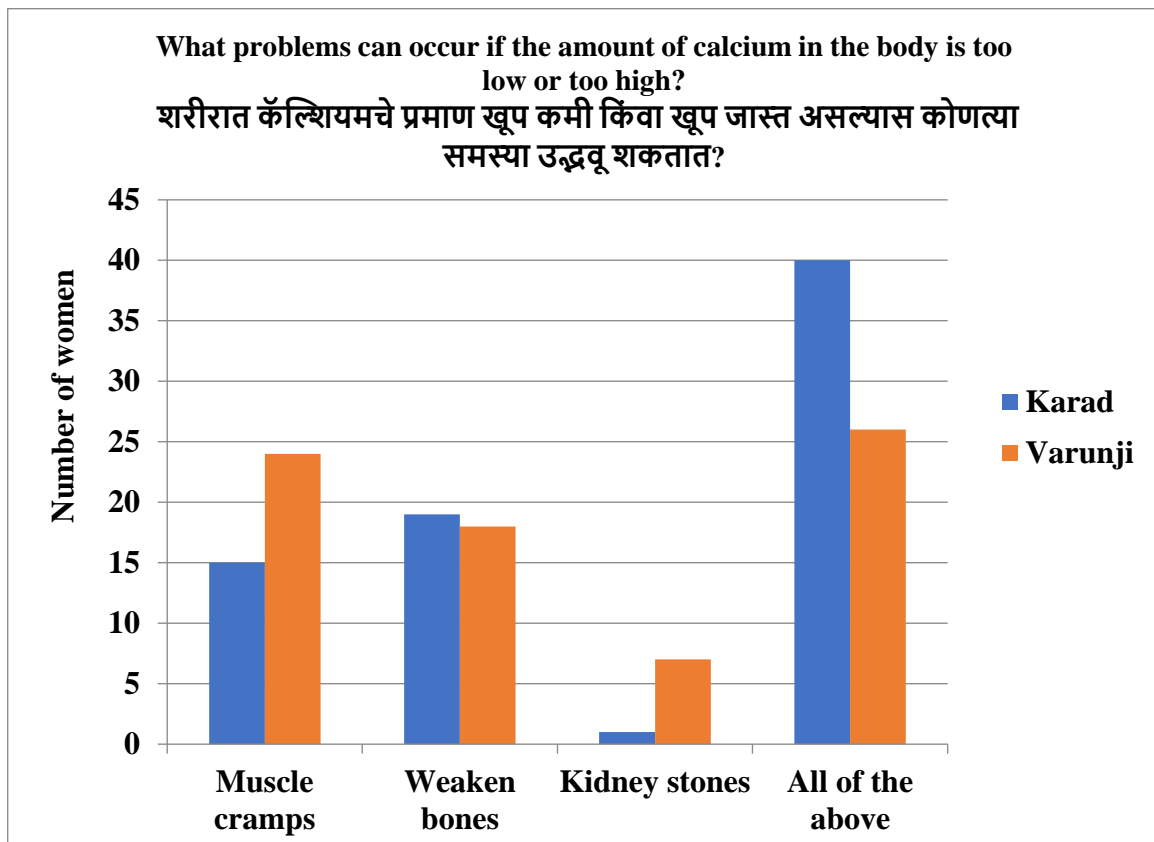
7. What are the causes of low calcium in your body?
तुमच्या शरीरात कॅल्शियम कमी होण्याची कारणे काय आहेत?

Options	Karad [Urban]	Varunji [Rural]
Poor diet (low calcium and vitamin)	9 (12%)	13 (17.33%)
Changes in hormone	12 (16%)	24 (32%)
Age	11 (14.66%)	14 (18.66%)
All of the above	43 (57.33%)	24 (32%)

Table no 7- Frequency of women answering the above question no 7.

Women participation is 150 that are urban 75 and rural 75 women which is 100% of participants. In which women participants in urban area answering "Poor diet (low calcium and vitamin)" are 9(12%) of total participants. Women participants answering "Changes in hormone" are 12(16%) of total participants. Women participants answering "Age" are 11(14.66%) of total participants. Women participants

answering "All of the above" are 43(57.33%) of total participants.

Women participants in rural area answering "Poor diet (low calcium and vitamin)" are 13(17.33%) of total participants. Women participants answering "Changes in hormone" are 24(32%) of total participants. Women participants answering "Age" 14(18.66%) of total participants. Women participants answering "All of the above" are 24(32%) of total participants.
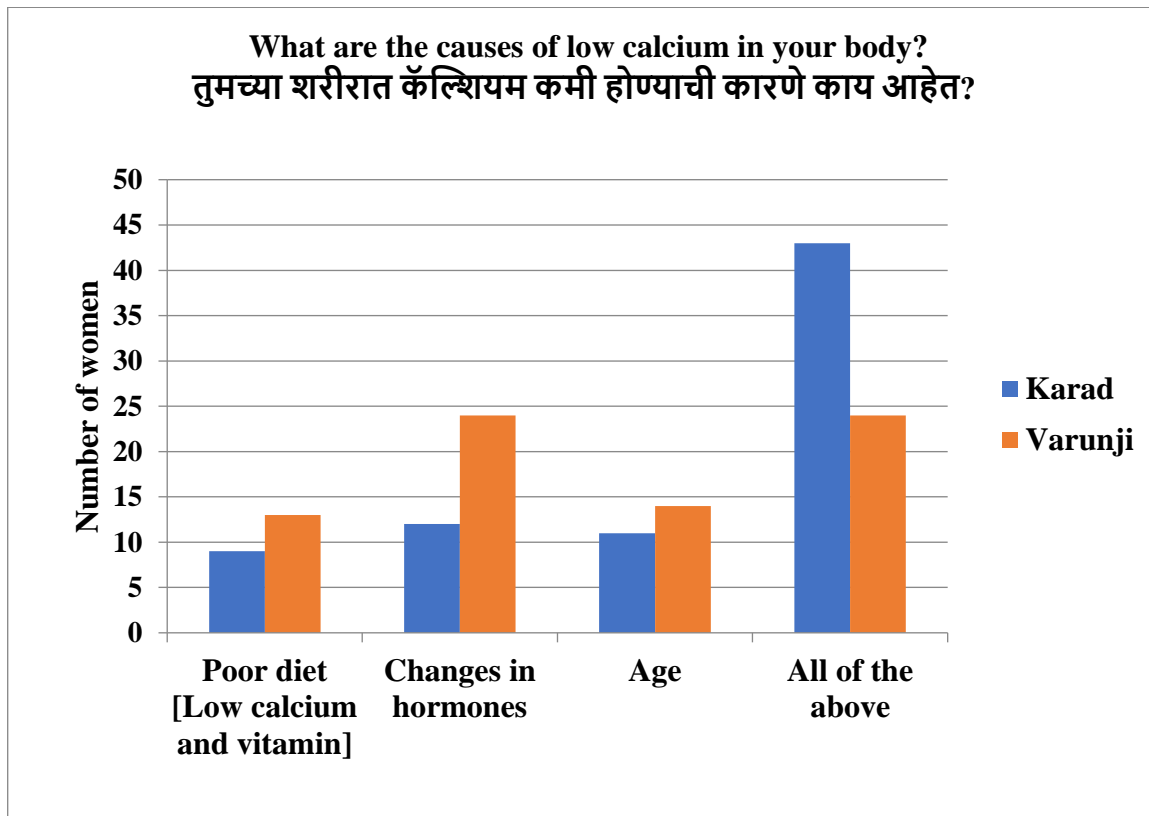
DISCUSSION-:

The study was aimed to find out awareness of bone mass density and its impact on bone health among adult urban and rural women at age between 30- to 70-year-old this study was performed among 150 women using questionnaire as a outcome measure. The study reveals notable differences in the awareness of bone mass density (BMD) between women living in rural and urban areas. The rural group exhibits lower BMD awareness, along with a lack of understanding about osteoporosis risk factors and a restricted ability to obtain healthcare. These differences highlight the necessity of focused education and interventions, with a focus on BMD education and screening in rural regions. Limited healthcare access, a lower financial position, and cultural influences are among the factors causing these differences. Healthcare professionals and community health workers should support BMD screening and education. Enhancing bone health equity and decreasing osteoporosis-related fractures among women in rural areas will ultimately result from raising BMD awareness and expanding access to healthcare services .Therefore, study is must to conducted for awareness of bone mass density and its impact on bone health. Study was conducted in Karad and

Varunji total 150 women are selected according to inclusion criteria. First questionnaire are distributed in all participant and was explained to all participant and consent form was taken on their consent in present study shown that from total participation of 150 women 37.33% of population belong to age group of 30 to 40,44.66% of population belong to age group of 41 to 50, 16% of population belong to age group of 51 to 60 and 2%of population belong to age group of 61 to 70.This study found that rural and urban communities "awareness of bone mass density [BMD]differed significantly. Compared to urban counterparts, rural women showed a poorer degree of understanding of significance of bone mineral density[BMD],osteoporosis risk factors and preventative methods. To bridge this divide, community based education programs, collaborations with local healthcare providers, and culturally sensitive awareness campaigns crucial. Women were more likely to maintain a sufficient calcium intake and participate in regular exercise in urban regions , where awareness was growing. Rural communities ,on the other hand , fell behind, with considerable challenges including poor access to healthcare, education, and cultural differences. Given that rural women are disproportionately affected by

osteoporosis and other bone-related illnesses, the worrying awareness gap highlights the dangers that these women confront. Conversely, urban women showed a better degree of knowledge on preventative strategies including regular exercise, a balanced diet, and timely screenings, as well as risk factors such insufficient calcium intake, a sedentary lifestyle, and family history. These results imply that focused educational initiatives and public awareness campaigns are essential to closing this knowledge gap and equipping rural women with the knowledge they need to safeguard their bone health. The concerning findings of the study underscore the urgent necessity of bridging the information gap that exists among rural women about adult nutrition and age-specific preventive interventions. Health disparities are made worse for rural women because of their increased vulnerability to osteoporosis and lack of understanding about and access to preventive measures. The quality and nutritional worth of different food options, including dairy products and vegetarian and non-vegetarian options, have been shown to be better understood by urban populations, in sharp contrast. The higher accessibility and availability of a wider variety of food options in metropolitan regions is the reason for this discrepancy. In order to close this knowledge gap and provide rural women with the knowledge they need to make educated decisions about their health and nutrition, it is imperative that focused interventions, education initiatives, and awareness campaigns be launched. By addressing these disparities , we can promote bone health equity, improve quality of life, and reduce the burden of osteoporosis related fracture in rural communities. These results highlight the need for focused interventions and education to close the gap between rural and urban areas and advance equity in bone health.

CONCLUSION-

This study concludes that rural women have lack of awareness related to age specific preventive measures and knowledge of nutrition emphasize on adulthood. Rural women are disproportionately vulnerable to osteoporosis due to inadequate awareness and access to preventive measures. Its what we got the information with the availability of many types of food and dairy products including vegetarian and non-vegetarian the urban people have attended knowledge level with relation to quality of food and its nutrition in practicality.

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