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Educational Status and Knowledge Level of Pre- and Postmenopausal Women about Osteoporosis and Risk Factors: A Questionnaire Based Survey

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Abstract: Osteoporosis is a disease of the skeletal system associated with loss of bone mass and an increased risk of fractures affecting women more often than men. Identification of the knowledge about osteoporosis and its preventive methods is the backbone of any awareness program. The present study's objective was to determine the level of awareness in postmenopausal women using the validated questionnaire-based tool [osteoporosis knowledge assessment tool (OKAT)], to assess the awareness of osteoporosis among postmenopausal women. The survey included questions assessing demographic characteristics, lifestyle habits including physical exercise and smoking, prevention by vitamin D intake and information on personal and family medical history. According to the responses, a scale was created to assess the level of knowledge of preventive osteoporosis measures. An anonymous questionnaire was created via Google Forms and distributed to 200 via social networks (WhatsApp, Facebook, and Gmail). The survey results were automatically calculated on "Google Forms" and checked using SPSS.20 software.

A total of 200 postmenopausal women were enrolled in this study. In spite of being aware of the consequences of osteoporosis, in most subjects there was a generalized lack of awareness concerning available treatment options and risk factors. This study showed an evident deficit in awareness of osteoporosis in postmenopausal women and there is a need to emphasize educating and aware women regarding the consequences of osteoporosis.

Keywords: Awareness, Osteoporosis, Assessment, Postmenopausal women, Bone mass, Risk factor

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Introduction

Menopause can be defined as a period of transition from a reproductive period to the advanced age. This period is characterized by hormonal changes in the female body which are

associated with different diseases and symptoms (Grzechocińska, 2004; Pertyński and Stachowiak, 2006). Osteoporosis is characterised by low bone mass and a deterioration in bone tissue micro-

architecture, leading to increasing bone weakness and consequently risk of fracture. In 2013, Clinician's Guide to Prevention and Treatment of Osteoporosis was developed. In this Guide NOF in collaboration with experts from different fields of medicine indicate the latest advice on prevention, risk assessment, diagnosis and treatment of osteoporosis in postmenopausal women over the age of 50 years. According to the authors of the guide, osteoporosis is "A silent disease until it is complicated by fractures—fractures that occur following minimal trauma or, in some cases, with no trauma".

The most frequent symptom of osteoporosis is low back pain resulting from vertebral fractures. This pain can have a considerable impact on the ability to carry out usual activities of daily living. Patients are unable to work normally, are limited in their social and leisure activities, and may be severely affected emotionally. Before starting the study on the magnitude of health problems, it is prudent to know the awareness level in public about the disease. Its prevention and management require awareness and understanding amongst postmenopausal women and elderly men. To assess the awareness of osteoporosis among postmenopausal women residing in the Moinabad region of India, we conducted our study based on a self-explanatory questionnaire- osteoporosis knowledge assessment tool (OKAT) because it is simple and understandable easily.

Lifestyle factors such as smoking, high alcohol consumption, or lack of exercise also play a significant role in bone quality. Positive family history, vitamin D deficiency, reduced calcium intake, underweight (BMI <20), and age are discussed as additional risks for increased fracture rates. Awareness of such risks and the option for primary prevention is essential in reducing the incidence of osteoporosis. Several studies (Cook *et al.*, 1991; Brecher *et al.*, 2002; Curry *et al.*, 2002) have examined the association between knowledge of osteoporosis and preventive behaviour. Some of them have shown that the level of knowledge could improve the use of

preventive measures such as increasing exercise and calcium intake (Piaseu *et al.*, 2002).

The present study's objective was to determine the level of awareness in postmenopausal women using the validated questionnaire-based tool [osteoporosis knowledge assessment tool (OKAT)], to assess the awareness of osteoporosis among postmenopausal women.

Materials and Methods

Study design:

This cross-sectional study design was used to determine knowledge, attitude, and practice (KAP). The study was conducted from December 2023 to January 2024 among the people living in Moinabad and a total of 200 postmenopausal women were enrolled.

Sample size:

A total of 200 postmenopausal women of age ≥ 45 years, who attained natural menopause and are menopausal for at least 1 year were included and premature menopausal (ovarian failure), surgical menopausal women, menopausal women with osteoporosis are excluded from the study.

Assessment of osteoporosis awareness:

Knowledge regarding osteoporosis was assessed using OKAT questionnaire. OKAT is a valid and reliable tool to assess knowledge about osteoporosis and consists of 20 questions. The first 12 questions pertain to knowledge; questions 13–17 was to assess their understanding of risk factors of osteoporosis and the last three questions assessed practice and perception of osteoporosis prevention. It consists of multiple choices questions with each question having three options such as "true," "false," and "I do not know." The response "I do not know" and unanswered questions were regarded as incorrect. Correct answers were awarded one point and wrong answers were awarded zero point. The total score of the participant was multiplied by 5 and further categorization of state of awareness was done as

Table 1: Demographical characteristics of the study population

Parameters/ Age in years	No of patient <i>n</i> =200	Heard or little knowledge of Osteoporosis	Heard or little knowledge of fragility fracture
45-55	102	70	79
56-65	63	60	52
66-75	22	42	39
76-85	13	28	30
Total	200		

follows: <20: very poor, 21–40: poor, 41–60: average, 61–80: good, and ≥81: very good.

In our study, the level of knowledge about preventive osteoporosis measures was calculated using a scale. After evaluating four questions from the questionnaire and their various positive and negative answer options, a 4-point scale was formed. The more positive answers the patients had, the more informed they were.

The four questions were as follows:

- Have you ever had blood drawn for vitamin D tests?
- Who has prescribed or recommended you vitamin D?
- Has your family doctor ever approached you about bone health?
- Have you ever had a bone densitometry in your life?

The evaluation was carried out according to the following scheme:

The patient received one point in the survey for each positively answered question. If patients received more points when answering, it was assumed that they had a higher level of knowledge regarding bone health. Therefore, according to the number of positive answers, the patients were divided into 4 categories where 0 represented absent; 1, low; 2, moderate; and 3, a high level of knowledge.

Statistical analysis:

Data were analysed using SPSS v. 20. Continuous variables are expressed as mean ± standard

deviation (SD). The obtained data were compiled using MS Office Excel 2007, and the results are presented as descriptive statistics and as figures and tables. Categorical variables are expressed as percentages.

Results

Demographic Variables:

The average age of 200 enrolled women was 65 years (45-85 years). Demographical characteristic of the study population is shown in Table 1. The proportion of women at the age of 45-55 have some knowledge regarding osteoporosis to greater extent than the other age groups. Similarly, the proportion of women who taking milk were not statistically significant. We noted a significant difference between women who had heard of osteoporotic fracture before and those with physical exercise. The early postmenopausal women population who had heard of osteoporotic fracture was significantly higher than the later age of postmenopausal.

Educational status and osteoporosis awareness:

To determine whether educational status had any bearing on the level of osteoporosis awareness among the participants, the mean scores obtained from the OKAT questionnaire were compared between different educational groups. For convenience, those who were illiterate or had completed primary school were compared with the rest of the participants. The mean scores obtained in different domains are shown in Table 2. It was observed that those who had completed secondary school or college had better mean (SD)

Table 2: Educational status and osteoporosis awareness

Parameter	Mean (SD) score Illiterate/primary level	Mean (SD) score Secondary/college level	P
Basic knowledge regarding osteoporosis	21.3 (11.7)	24.1 (11.8)	0.05
Sources of calcium and risk factors	10.2 (7.5)	10.2 (6.5)	0.99
Perceptions about treatment	2.4 (3.9)	2.4 (3.9)	0.99

Table 3: Pre-existing disease and Lifestyle factors

Parameter		Number and percentage of respondents	P-VALUE
Pre-existing disease yes		33.4% (<i>n</i> = 66)	P < 0.058
Pre-existing disease no		26.5% (<i>n</i> = 53)	
Obesity (BMI > 35)		24.0% (<i>n</i> = 48)	P < 0.713
Underweight (BMI < 18)		8.58% (<i>n</i> = 7)	P < 0.565
Cardiovascular disease		24.0% (<i>n</i> = 28)	P < 0.55
Diabetes		14.3% (<i>n</i> = 11)	P < 0.976
Thyroid disease		19.1% (<i>n</i> = 38)	P < 0.399
Rheumatic disease		10.0% (<i>n</i> = 20)	P < 0.500
Physical Exercise	Yes	26% (<i>n</i> = 52)	P < 0.91
	No	33.5% (<i>n</i> = 67)	
Smoking	Yes	13.6% (<i>n</i> = 27)	P < 0.7
	No	65.5% (<i>n</i> = 131)	
Alcohol consumption	Yes	35% (<i>n</i> = 70)	P < 0.61

scores than primary educated/illiterate women in the domain “basic knowledge regarding osteoporosis,” although the difference did not achieve statistical significance ($P = 0.05$). There was no significant difference in scores in the other domains between the two groups.

Lifestyle factors:

When analysing the lifestyle factors, it is noticeable that migrant women exercise less on a

daily basis, smoke less and consume significantly less alcohol (Table 3).

Osteoporosis awareness from OKAT questionnaire:

On an average, 37.1% of the questions (7.4/20) were correctly answered. Of the total responses, a worrying deficit in knowledge was seen in about 60% of the participants. The state of awareness in the study group was characterized as follow:

Very poor – 22.5%

Table 4: Percentage of correct responses on the OKAT questionnaire

S. No.	Questions	Correct answer	No. of correct answer (%)
1.	Osteoporosis leads to an increased risk of bone fractures	True	121(60.5)
2.	Osteoporosis usually causes symptoms (e.g., pain) before fractures occur	False	27(13.5)
3.	Having a higher peak bone mass at the end of childhood gives no protection against the development of osteoporosis in later life	True	45(22.5)
4.	Osteoporosis is more common in men	False	97(48.5)
5.	Cigarette smoking can contribute to osteoporosis	True	76(38)
6.	White women are at the highest risk of fracture when compared with other races	True	45(22.5)
7.	A fall is just as important as low bone strength in causing fractures	True	56(28)
8.	By age 80 years, a majority of women have osteoporosis	True	102(51)
9.	From age 50 years, most women can expect at least one fracture before they die	True	89(44.5)
10.	Any type of physical activity is beneficial for osteoporosis	False	67(33.5)
11.	It is easy to tell whether I am at risk of osteoporosis by my clinical risk factors	True	56(28)
12.	Family history of osteoporosis strongly predisposes a person to osteoporosis	True	76(38)
13.	An adequate calcium intake can be achieved from two glasses of milk a day	True	65(32.5)
14.	Finger millet and broccoli are good sources of calcium for people who cannot take dairy products	True	62(31)
15.	Calcium supplements alone can prevent bone loss	False	54(27)
16.	Alcohol in moderation has little effect on osteoporosis	True	76(38)
17.	A high salt intake is a risk factor for osteoporosis	True	59(29.5)
18.	There is a small amount of bone loss in the 10 years following the onset of menopause	False	65(32.5)
19.	Hormone therapy prevents further bone loss at any age after menopause	True	87(43.5)
20.	There are no effective treatments for osteoporosis available in India	False	84(42)

Poor – 38.1%

Average – 34.1%

Good – 5.3%

The percentage of correct responses to each item in the questionnaire is shown in Table 4. Knowledge and beliefs regarding osteoporosis were analyzed in three separate domains from the information available in OKAT questionnaire.

Basic knowledge regarding osteoporosis (questions 1–12):

On analysing the responses to these questions, it was seen that 60.5% were aware that osteoporosis leads to increased risk of bone fractures, and 58.2% understood the relationship between poor bone strength, falls, and fractures. Although about 60.2% knew that a majority of women would be affected with osteoporosis by the age of 80 years, 51% of the study subjects had a misconception that osteoporosis was more common in men than in women and a majority of women (66%) failed to understand the temporal relationship between advancing age and fracture

risk. About 38% were unaware that cigarette smoking could contribute to osteoporosis. A majority of participants (38%) were unaware that the chances of developing osteoporosis were higher in the presence of a positive family history.

Sources of calcium and risk factors for osteoporosis (questions 13–17):

Excessive intake of alcohol and high salt intake as risk factors for osteoporosis was correctly recognized by 38 and 29.5%, respectively. Although most women (32.5%,) were aware that two glasses of milk yielded sufficient dietary calcium, only 31% identified ragi as a good source of calcium, and an alarming majority of them (27%,) believed that calcium supplements alone could prevent the development of osteoporosis.

Perceptions about treatment (questions 18-20):

A majority of the women (43.5%) were unaware of the fact that hormone replacement therapy could help in preventing the progression of osteoporosis. 42% of women knew that effective treatments for osteoporosis existed in India.

Discussion

The purpose of the study was to assess the level of awareness of osteoporosis among postmenopausal women especially with regard to risk factors, treatment options, and consequences. The purpose of selecting postmenopausal women as study participants was that they are at the highest risk for osteoporosis and fragility fractures, and this warrants early and screening in this group.

In this study, the mean age of attainment of menopause was 46 years. This is consistent with the study conducted by Ahuja *et al.*, in which the average age of menopause of an Indian woman was 46.2 years. The median age at menopause among white women from industrialized countries ranges between 50 and 52 years (Magurský *et al.*, 1975; Stanford *et al.*, 1987; McKinlay *et al.*, 1992). Earlier menopause is associated with increased risk of osteoporosis and fragility fractures. This underscores the need for timely screening of postmenopausal women and early initiation of

treatment to prevent the occurrence of fractures. From Table 1 it is inferred that women at an age of 45-55 years, which is considered as an initial stage of menopause, have knowledge regarding osteoporosis and bone fragility compared to other age groups however, no significant difference was observed with other age groups.

Increased risk of osteoporosis and fragility fractures are associated with menopause, and this emphasizes the need for timely screening of postmenopausal women and early initiation of treatment to prevent the occurrence of fractures, by educating and bringing awareness.

On comparing the performance of participants stratified according to their educational status, no significant difference was observed between illiterate/primary level educated and the rest of the participants with regard to osteoporosis awareness. A small survey conducted in western India has shown media to be the most common source of information on osteoporosis and only a quarter of the subjects identified doctors as a source of information. This reveals the fact that with the current system of education, the weight of importance given to osteoporosis and its consequences is probably suboptimal. This calls for initiation of educational ventures that will enhance awareness about osteoporosis and its treatment. Conducting osteoporosis awareness programs in schools and colleges will assist in improving their knowledge in this regard. Utilizing mass media including print, broadcast, and digital media to improve awareness will help in reaching out to a majority of the general public.

Lifestyle factors such as smoking, high alcohol consumption, or lack of exercise also play a significant role in bone quality (Kanis *et al.*, 2005). Positive family history, vitamin D deficiency, reduced calcium intake, underweight (BMI < 20), and age are discussed as additional risks for increased fracture rates (De Laet *et al.*, 2005; Johansson *et al.*, 2014). In our study it was observed that 33.5% lack performing physical exercise, 65.5 % have a habit of smoking and 35% consume alcohol. There is clear evidence such as

increasing physical activity, cessation of smoking, adequate intake of vitamin D and calcium may reduce the risk of osteoporosis.

Awareness of such risks and the option for primary prevention is essential in reducing the incidence of osteoporosis. Several studies have examined the association between knowledge of osteoporosis and preventive behaviour. Some of them have shown that the level of knowledge could improve the use of preventive measures such as increasing exercise and calcium intake (Piaseu *et al.*, 2002).

In rheumatoid arthritis, a vitamin D deficiency can be associated with diffuse musculoskeletal pain and the severity of the illness. Vitamin D has been used successfully for pain relief in this group of patients (Athanasassiou *et al.*, 2012). Therefore, this observation could hypothetically explain the association between the presence of rheumatoid arthritis and vitamin D intake. Rheumatoid arthritis is associated with increased risk of osteoporotic fractures and osteoporosis is found in a large per cent among patients with rheumatoid arthritis (Kaz Kaz *et al.*, 2004; Lee *et al.*, 2016). Therefore, we evaluated if a presence of rheumatic disease could influence the vitamin D intake of the participants and found a significant association.

In our study, a higher level of education was associated with a higher level of knowledge of osteoporosis. A Turkish study on bone health also confirmed the influence of education on osteoporosis knowledge concerning bone health and preventive measures (Gemalmaz and Oge, 2008).

In this study, good knowledge regarding osteoporosis was observed in 60.5% of the subjects. The deficiency of awareness regarding osteoporosis mandates corrective measures to be adopted to bridge this knowledge gap. The participants of our study had poor knowledge about the risk factors and the consequences of osteoporosis-- 29.5% were aware and 42% were

unaware that effective treatments for osteoporosis existed.

One limitation of our study was that it included a selected group of people. These women may be more interested in health related topics and are therefore better informed. It would be helpful to carry out a survey at places independent of the health care system.

In summary, knowledge of osteoporosis and the option of bone densitometry as well as taking preventive measures is low among women. Hence, it is necessary to promote awareness in this area. The majority of the women surveyed were unaware of the risk factors and consequences. Therefore, better patient information and the development of prevention strategies should be the focus of attention. An individual risk assessment of women should be carried out.

The community should be adequately educated about the burden of osteoporosis and its complications, potential risk factors, and options for treatment in the management of the chronic disease; profound knowledge about the disease enhance patient compliance with treatment. Thus, this study was an attempt to identify the level of awareness among postmenopausal women and know the pharmacological management in general, and hence, these results can be used as an alarming sign to implement further measures to improve awareness and attitude toward osteoporosis.

References

- Athanasassiou P, Lyraki A, Raftakis I and Antoniadis C. (2012) Vitamin D and rheumatoid arthritis. *Therapeut Adv Endocrinol Metabol* 3(6): 181-187.
- Brecher LS, Pomerantz SC, Snyder BA, Janora DM, Klotzbach-Shimomura KM and Cavalieri TA. (2002) Osteoporosis prevention project: a model multidisciplinary educational intervention. *Jf Osteopath Med* 102: 327-335.
- Cook B, Nodeloviz M, Rector C and Krischer J. (1991) An osteoporosis patient education and screening program: Results and implications. *Patient Education Counsel* 17:135-145.

- Curry LC, Hogstel MO, Davis GC and Frable PJ. (2002) Population-based osteoporosis education for older women. *Public Health Nurs.* 19: 460–469.
- De Laet C, Kanis JA, Odén A, Johanson H, Johnell O, Delmas P, Eisman JA, Kroger H, Fujiwara S, Garnero P, McCloskey EV, Mellstrom D, Melton LJ 3rd, Meunier PJ, Pols HA, Reeve J, Silman A and Tenenhouse A. (2005) Body mass index as a predictor of fracture risk: a meta-analysis. *Osteoporos Int.* 16(11): 1330-1338.
- Gemalmaz A and Oge A. (2008) Knowledge and awareness about osteoporosis and its related factors among rural Turkish women. *Clin Rheumatol.* 27: 723-728.
- Grzechocińska B. (2004) The problems of menopause. Treatment options. *Medycyna Rodzinna.* 2: 55-60.
- Johansson H, Kanis JA, Odén A, McCloskey E, Chapurlat RD, Christiansen C, Cummings SR, Diez-Perez A, Eisman JA, Fujiwara S, Glüer CC, Goltzman D, Hans D, Khaw KT, Krieg MA, Kröger H, LaCroix AZ, Lau E, Leslie WD, Mellström D, Melton LJ 3rd, O'Neill TW, Pasco JA, Prior JC, Reid DM, Rivadeneira F, van Staa T, Yoshimura N and Zillikens MC. (2014) A meta-analysis of the association of fracture risk and body mass index in women. *J Bone Miner Res.* 29(1): 223-233.
- Kanis JA, Johnell O, Oden A, Johansson H, De Laet C, Eisman JA, Fujiwara S, Kroger H, McCloskey EV, Mellstrom D, Melton LJ, Pols H, Reeve J, Silman A and Tenenhouse A. (2005) Smoking and fracture risk: a meta-analysis. *Osteoporos Int.* 16(2): 155-162.
- Kaz Kaz H, Johnson D, Kerry S, Chinappen U, Tweed K and Patel S. (2004) Fall-related risk factors and osteoporosis in women with rheumatoid arthritis. *Rheumatology* 43(10):1267-1271.
- Lee JH, Sung YK, Choi CB, Cho SK, Bang SY, Choe JY, Hong SJ, Jun JB, Kim TH, Lee J, Lee HS, Yoo DH, Yoon BY and Bae SC. (2016) The frequency of and risk factors for osteoporosis in Korean patients with rheumatoid arthritis. *BMC Musculoskelet Disord.* 17: 98.
- Luoto R, Kaprio J and Uutela A. (1994) Age at natural menopause and sociodemographic status in Finland. *American J Epidemiol.* 139: 64-76.
- Magurský V, Mesko M and Sokolíková L. (1975) Age at the menopause and onset of the climacteric in women of Martin District, Czechoslovakia. Statistical survey and some biological and social correlations. *Int J Fertility Sterility* 20: 17-23.
- McKinlay SM, Brambilla DJ and Posner JG. (1992) The normal menopause transition. *Maturita* 14:103-115.
- Pertyński T and Stachowiak G. (2006) Menopause - the facts and controversy. *Endokrynologia Polska* 57(5): 525-534.
- Piaseu N, Schepp K and Belza B. (2002) Causal analysis of exercise and calcium intake behaviours for osteoporosis prevention among young women in Thailand. *Health Care Women Intl.* 23: 364-376.
- Stanford JL, Hartge P, Brinton LA, Hoover RN and Brookmeyer R. (1987) Factors influencing the age at natural menopause. *J Chronic Dis.* 40: 995–1002