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Original Research Article

Risk Assessment of Osteoporosis in Postmenopausal Women

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ABSTRACT

Introduction: Postmenopausal osteoporosis is recognized to be a major health problem and is preventable to some extent. In the Indian scenario, inadequate dietary calcium intake, low physical activity and low body weight are important risk factors for postmenopausal osteoporosis.
Objective: To determine the usefulness of risk assessment and screening for osteoporosis in a hospital based population of postmenopausal women.
Materials & Methods: This was a prospective observational study conducted in the department of obstetrics and gynecology of a North Indian tertiary care hospitals. It included a cross-section of 200 postmenopausal females attending gynecology OPD and Menopausal clinic. Women were screened for 10 year risk of major osteoporosis related fracture using FRAX WHO FRACTURE RISK ASSESSMENT TOOL. DEXA scan was done for women having one or more risk factors for osteoporosis and WHO criteria was used to diagnose osteoporosis.
Result: Of the 200 postmenopausal women screened 90 women had one or more than one risk factor for osteoporosis. Out of 90 women, 36 (40%) were found to have osteoporosis while 49 (54.4%) women were osteopenic. Low body weight, decrease physical activity and poor dietary calcium intake were the most commonly observed risk factors in 49%, 25% and 40.5% respectively. There was a strong association between age > 65yrs and osteoporosis (p=0.007). Low body weight and poor dietary calcium intake were also significantly associated with osteoporosis (p=0.027,p=0.021).
Conclusion: Evaluation of postmenopausal women by screening for risk factors was found to be a powerful tool to define the risk status for osteoporosis. Low body weight and poor dietary calcium are modifiable risk factors for developing osteoporosis.
Key words: Osteoporosis, Post Menopausal.

INTRODUCTION

Postmenopausal osteoporosis is recognized to be a major health probable and most preventable. According to world Bank report the worldwide population of postmenopausal women which was 470 million in 1990 is expected to increase to 1.2 billion by the year 2030 and 76% of these women will be living in the developing countries. [1] Postmenopausal females in the Indian population are at a higher risk of osteoporosis because data indicate that Indians have lower bone density than their North American counterparts [2-4] and osteoporosis fracture occurs 10-20 years earlier in Indian as compared to Caucasians. [2] In India. It is projected that by the year 2030, the population of postmenopausal women will be second highest in the world, second to that of China. [5]

MATERIALS AND METHODS

This study is a prospective observational study carried out at a North Indian tertiary care hospitals, in the

department of Obstetrics and Gynecology. It included a cross-section of postmenopausal females attending gynecological OPD and Menopause Clinic.

INCLUSION CRITERIA

Post menopausal women, age more than 40 yrs, cessation of period more than 1yr

EXCLUSION CRITERIA

The women with pre-existing coronary heart disease, osteoporosis, psychological disorders, breast and genital malignancies, surgical/premature menopause (<40 yrs) and noncompliant patients unable to adhere to study protocol were excluded from the study.

All the enrolled women were evaluated regarding age, parity, obstetric history, menstrual history, duration of menopause. A detailed personal, past and present medical & family history was taken with a view to assess the risk for osteoporosis. A thorough general physical, systemic and pelvic examination was carried out.

The diagnosis of osteoporosis is based on the measurement of BMD levels which can be interpreted as per WHO criteria (Appendix 1) and modified by International osteoporotic foundation. [6,7] DEXA, Quantitative USG and qCT, Single Energy absorptiometry are the various diagnostic modalities for BMD measurement. [6]

Further risk stratification for cost effective treatment of postmenopausal osteoporosis was facilitated by WHO FRAX algorithm (Appendix 2) which uses clinical risk factors, BMD and country specific fracture and mortality data to quantify a patient's 10 year probability of hip or major osteoporotic fracture. [6]

STATISTICS

The data was analysed using student t- test, chi square and co-relation coefficient analysis. A logistic regression was performed to assess the impact of the factors known to be important in the prevalence of the osteoporosis. A p value <0.05 was considered significant.

RESULTS

FIG/ TABLE 1: DISTRIBUTION OF VARIOUS SYMPTOMS

SYMPTOMS		N (=200)	Percentage (%)
GYNAECOLOGICAL			
Post menopausal bleeding		19	9.5
Prolapse		22	11
Discharge	Pruritis	16	8
	Without Pruritis	17	8
Pain/ Burning sensation in vulva		26	13
Vaginal Dryness		44	22
URINARY			
Burning micturation		49	24.5
Frequency		53	26.5
Incontinence		47	23.5
CLIMACTERIC			
Vasomotor			
Hot flashes		72	36
Night Sweats		43	21.5
Palpitations		39	19.5
Psychological			
feeling tense/ nervous		57	28.5
loss of interest		29	14.5
crying spells		6	3
Depression		47	23.5
Irritability		63	31.5
Fatigue/ lack of energy		110	55
Sleep disturbance		69	34.5
Decrease concentration		68	34
Decrease Memory		26	13
Psychosomatic			
Joint pain		83	45.5
backache		69	34.5
Sexual			
Loss of libido		65	32.5
Dyspareunia		44	22
Miscellanious			
Lump Abdomen		3	1.5
Others including routine health check up.		5	2.5

A total of 200 postmenopausal patients (>40 yrs) willing to comply with the study protocol were included. The mean presenting age of the women in the study was 57.9 ± 9.4 years and the mean age at menopause was 46.8±2.9 years. The distribution of gynaecological symptoms is depicted in [Table/ Fig-1]. The commonest gynaecological presenting symptom was vaginal dryness, while the commonest vasomotor symptom was hot flashes. One women may have one or > one risk factors. In the present study, amongst 200 women, 90 (45%) were identified to have one or more risk factors for osteoporosis, hence were candidates for primary prevention (Table 2). 39 (19.5%) were more than 65 years of age. Low body weight, inadequate dietary intake of calcium and decreased physical activity were most commonly associated risk factors in 118 (59%),

21(40.5%) and 50 (25%) of women respectively. 7 (3.5%) women were smokers, while 5 (2.5%) had family history of fracture. 3 (1.5%) women had history of oral steroid intake for >3 months for various medical illnesses. [Table/Fig-2]. There was a strong association between the age and osteoporosis (p=0.007).

FIG /TABLE 2: DISTRIBUTION OF VARIOUS RISK FACTORS FOR OSTEOPOROSIS

Risk Factors	N (=200)	Women without Osteoporosis (n=164)	Women with Osteoporosis* (n=36)	P value
Age ≥65 years	39 (19.5%)	9	30	0.007
Major risk factors				
Weight <117lbs	98(49%)	76	22	0.027
Smoking	7(3.5%)	4	3	0.069
Family history of fracture in a first degree relative	5(2.5%)	3	2	0.022
History of steroid intake for > 3 months	3(1.5%)	0	3	0.038
Past history of fracture as an adult	0	0	0	-
Additional risk factors				
Poor calcium / V-D intake	81(40.5)	50	31	0.021
decreased physical activity	105(2.5%)	72	33	0.084

FIG/TABLE 3: PREVALENCE OF OSTEOPOROSIS/OSTEOPENIA AS PER WHO CRITERIA MEASURED BY DEXA IN 90 WOMEN WITH RISK FACTORS*.

Diagnosis	N (=90)	Mean t-score (Hip) ± SD
Osteopenia	49 (54.44%)	-1.7 ± 0.4
Osteoporosis	36 (40.00%)	-3.1 ± 0.9
Normal Study	5 (5.56%)	1.2 ± 0.6

Appendix I

Amongst the 90 women with risk factors, 36 (40%) women were found to have osteoporosis and 49 (54.4%) women were osteopenic. 5 (5.56%) women had normal BMD.

FIG/ TABLE 4: SCREENING FOR 10 YEAR RISK OF *MAJOR OSTEOPOROSIS ASSESSMENT TOOL RELATED FRACTURE IN WOMEN WITH RISK FACTORS (N=90) USING FRAX WHO FRACTURE RISK

Fracture Risk	N (=90)	Percentage (%)
Low Risk (1-10 %)	47	47.78
Moderate (10-20%)	37	41.1
High (>20%)	6	6.7

*Appendix II

It was observed that 47.78% women were at low risk, 41.1% women at moderate and 6.7% women were at higher risk of major osteoporosis related fracture [Table/Fig-4] as per WHO FRAX algorithm (Appendix II).

DISCUSSION

Postmenopausal females in the Indian population are at a higher risk of osteoporosis because data indicate that Indians have lower bone density and osteoporosis fracture occurs 10-20 years earlier in Indian as compared to Caucasiuans. [2] Thomas et al in their study of ambulatory postmenopausal women from Southern India also observed that the mean dietary calcium intake was much lower than the recommended intake for these women. [8] Similar observations were also made by Chibber et al, who observed that the higher prevalence of osteoporosis in women of lower socio-economic status is probably related to their lower nutritional status. [9] Thus a protective role of certain nutritional dietary components can be exploited in preventive educational strategies in Indian women.

Prevalence

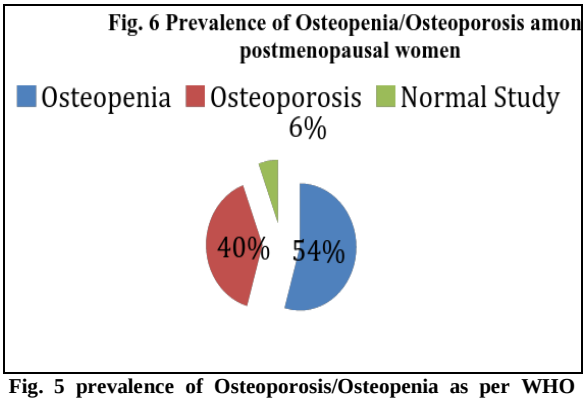

Fig. 5 prevalence of Osteoporosis/Osteopenia as per WHO criteria measured by DEXA in 90 women with risk factors.

In the present study, amongst 200 women, 90 (45%) were identified to have one or more risk factors for osteoporosis, hence were candidates for primary prevention. 39 (19.5%) were more than 65 years of age. Low body weight, inadequate dietary intake of calcium and decreased

physical activity were most commonly associated risk factors in 118 (59%), 21(40.5%) and 50 (25%) of women respectively. 7 (3.5%) women were smokers, while 5 (2.5%) had family history of fracture. 3 (1.5%) women had history of oral steroid intake for >3 months for various medical illnesses. Out of 90 postmenopausal women with risk factors, 36 (40.9%) women were found to have osteoporosis and 49 (54.4%) were osteopenic. The overall prevalence of osteoporosis and osteopenia was 18% and 24.5% respectively. Our observations were similar to those reported by Thomas P et al who reported the prevalence of osteoporosis to be 16.7%. [8] The prevalence of osteopenia observed in the present study was 24.5%, which is similar to that reported by Chibber et al (29%). [9]

FRAX WHO Fracture Risk Assessment

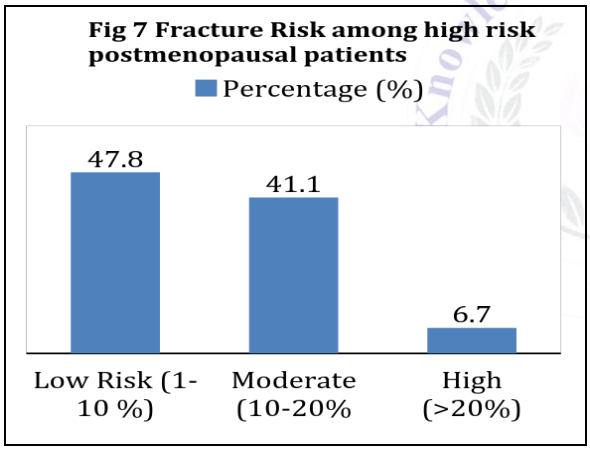

Fig. 6: 10 year risk of major osteoporosis related fracture in women with risk factors (n=90) using FRAX WHO FRACTURE RISK ASSESSMENT TOOL

WHO FRAX algorithm was used to calculate 10 year absolute fracture probability for both hip fracture and other major osteoporotic fractures, taking into account hip BMD and 9 other clinical risk factors. [6] The Current National Osteoporosis Foundation Guide recommends treating patients with FRAX 10 year risk scores of > or = 3% for hip fracture or > or = 20% for major osteoporotic fracture, to reduce their fracture risk. [6] In the present study, according to WHO FRAX scoring system for screening for 10 year fracture risk in high risk women, it was observed that 47 (52.2%) women were at low risk, 37 (41.1%) were at moderate risk and 6 (6.7%) were at high risk. In the Indian scenario, inadequate dietary calcium intake, low physical activity and low body weight are important risk factors for postmenopausal osteoporosis.

CONCLUSION

In the Indian scenario, inadequate dietary calcium intake, low physical activity and low body weight are important risk factors for postmenopausal osteoporosis. Hence a balanced diet intake, appropriate exercise and cessation of smoking are modifiable risk factors which can improve the bone health in postmenopausal women in India.

Comprehensive evaluation by screening for risk factors and risk assessment was found to be a powerful tool to define the risk status for diseases common to this age group and for sensitizing women towards lifestyle modifications to improve postmenopausal health.

All the postmenopausal women presenting to the OPD should be evaluated by a comprehensive holistic approach in the outpatient setting, to understand her needs and to formulate appropriate goals

Counselling regarding modifiable lifestyle risk factors should be done in all women to reduce their risk of various health problems.

LIMITATIONS OF STUDY

This is a hospital based study, so results may not be applicable to general postmenopausal population. The sample size is also small compared to the population based studies.

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APPENDIX: I

W H O CLASSIFICATION OF THE OSTEOPOROSIS

Normal: BMD or bone mineral content (BMC) not more than 1 SD below the young adult mean (T-score above -1).
Osteopenia (or low bone mass): BMD or BMC between 1 and 2.5 SD below young adult mean (T-score between -1 and -2.5)
Osteoporosis: BMD or BMC 2.5 SD or more below the young adult mean (T-score at or below -2.5)
Severe Osteoporosis (or established osteoporosis): BMD or BMC 2.5 SD or more below the young adult mean in the presence of one or more fragility fractures.

Reference: World Health Organisation. Assessment of fracture risk and its application to Screening for postmenopausal osteoporosis: technical report series 843. Geneva: WHO, 1994.

APPENDIX: II

FRAX WHO FRACTURE RISK ASSESSMENT TOOL

Questionnaire to calculate the 10 year probability of fracture with BMD

1. Age (between 40-90 years) or Date of birth		
2. Sex	O Male	O Female
3. Weight (kg)	☐	
4. height (cm)	☐	
5. Previous fracture	O No	O Yes
6. Parent fractured hip	O No	O Yes
7. Current smoking	O No	O Yes
8. Rheumatoid arthritis	O No	O Yes

9. Glucocorticoids	O No	O Yes
10. Secondary osteoporosis	O No	O Yes
11. Alcohol≥ 3 units per day	O No	O Yes
12. BMD (g/cm2)		

Calculate Risk

Reference: World Health Organisation. Assessment of fracture risk and its application to Screening for postmenopausal osteoporosis: technical report series 843. Geneva: WHO, 1994.

Results: Fracture Risk-

Low Risk (1-10 %)

Moderate (10-20%)

High (>20%)

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