

Prevalence of risk factors of osteoporosis in post-menopausal women in Shiraz, southern Iran

P Shokrollahi^{1*}, M Rivaz², M Robotjaze³

¹IAU Interntional Azad University, Firouzabad, Iran; ²Shiraz University of Medical Sciences, Shiraz, Iran; ³IAU Interntional Azad University, Varamin, Iran

Abstract

Background: Osteoporosis a serious and debilitating disease resulting in an increased risk of fracture, causing significant morbidity and mortality. This study was performed to determine the risk of osteoporosis in postmenopausal women in Shiraz, southern Iran.

Methods: This is a descriptive cross-sectional study of 405 menopausal women over 55 who referred to health centers from June to October, 2005. The health centers had been chosen by random cluster sampling from different geographic areas of Shiraz. For gathering data, a modified questionnaire, based on postmenopausal osteoporosis evaluation form of NAMS (North American Menopausal Society) as well as an interview and examination were used.

Results: The mean age of menopause was 49 years. Disease and medication intake which are considered as osteoporosis risk factors existed in 12.6% of the subjects. 8.4% of the subjects had positive family history, and lifestyle accounted for 78% of the high risk. The minimum and maximum lifestyle risk factors were inactivity and lack of exercise (33.3%) and no exposure to sunlight (5.9%), respectively. 15.3% of the subjects were smokers. From 75 individuals who had done BMD test, 58 had osteoporosis and 17 had no evidence of osteoporosis. Regarding risk factors, there was no significant difference between osteoporosis and nonosteoporotic individuals.

Conclusion: In general, lifestyle is the most common risk factor in our sample. Lack of physical activity and smoking as life style risk factors are the most common causes of osteoporosis in menopausal women.

Keywords: Menopause; Osteoporosis; Risk factor; Iran

Introduction

Osteoporosis is a common disorder in the elderly population, representing one of the most significant public health problems in the world.¹ Osteoporosis is responsible for more than 1.5 million fractures annually, 700,000 vertebral and 850,000 nonvertebral, including 300,000 hip fractures.² For healthcare systems, osteoporosis-related fractures will become an increasingly important concern for healthcare costs over the forthcoming decades.³ Worldwide, osteoporosis is second only to cardiovascular disease as the leading health care problem, confining patients to more immobile days in bed

than chronic obstructive pulmonary disease, stroke, and myocardial infarction, or breast cancer.⁴ During the perimenopause, both the quantity and quality of bone decline rapidly, resulting in a dramatic increase in the risk of fracture in postmenopausal women.⁵ Although the decreased concentrations of circulating estrogen that characterizes menopause and the rapid phase of bone loss are chiefly responsible for the process,⁶ many other factors are also associated with increased fracture risk.⁷ These factors include prior fragility fracture, advanced age, a family history of osteoporotic fracture, and the use of certain medications.^{8,9} The US National Osteoporosis Foundation has recommended that all white women over the age of 65 have a bone density measurement to assess their risk of osteoporosis.¹⁰ However, the high cost and low availability of bone density scans do not allow screening to be a practical means of assessing future risk of osteoporosis and fracture in many

*Correspondence: Paymaneh Shokrollahi, MSc, Instructor of College of Nursing, IAU. Interntional Azad University, Firouzabad, Iran. Tel: +98-917-7131961, Fax: +98-712-6224402, e-mail: shokrp@sums.ac.ir
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developing countries. Using a questionnaire as a means of screening for low bone density requires taking the influence of various lifestyle factors on the bone into account. It might be helpful in identifying those individuals for whom a bone density scan would be prudent and cost-effective.¹¹ To prevent the progression of osteoporosis and the occurrence and recurrence of fracture in postmenopausal women, primary health care providers must consider osteoporosis as a risk factor for fracture, just as hypertension is a risk factor for stroke⁸ and accordingly intervene as early as possible to maximize the retention and enhancement of bone mass and the structural integrity of the skeleton.^{8,9} The chief goal of osteoporosis management is to prevent fractures. Therefore, the aim of this study was to determine the risk factors of osteoporosis, including demographic and lifestyle factors, drug use, medical history and hormonal changes.

Materials and Methods

This is a descriptive cross-sectional study of 405 menopausal women referring to health centers from June to October 2005. The health centers had been chosen by random cluster sampling from different geographic areas of Shiraz. For gathering data, a modified questionnaire based on the postmenopausal osteoporosis evaluation form of NAMS¹² (North American Menopausal Society) was used, the validity and reliability of which was determined by test-retest and back translation. Some parts of the questionnaire assess

osteoporosis risk factors as BMI, history of hypogonadism, amenorrhea, family history of osteoporosis, age of menopause, medication intake, contraction of a disease making women prone to osteoporosis. Additionally, lifestyle factors including smoking, activity, sedentary life, insufficient exposure to sunlight, malnutrition, and inadequate dairy product intake were among the questions in the questionnaire. The questionnaire was completed through interview and examination after getting informed consent of individuals. The data were analyzed by SPSS software (Version 13, Chicago, IL, USA). The research project was approved by Firoozabad University Ethics Committee.

Results

The findings showed that 49.6% of the subjects were under 60 years old and 1% were over 80 years old. The mean age of menopause was 49 years and 24.9% (n= 99) of the subjects were in high risk of osteoporosis due to menopause more than 5 years. Disease and medication intake are considered as osteoporosis risk factors, existing in 12.6% (n=51) of the subjects. The most frequency belonged to renal diseases (2.5%) and the medication Levothyroxine and Glucocorticoid (5.4%). 92.6% (n=375) of the subjects had BMI >19.8 and the least frequency of risk factors belonged to hypogonadism amenorrhea (0.5%, n=2) (Table 1). Positive family history was in 8.4% (n=24) of the subjects. Lifestyle was found to account for 78% (n=316) of osteoporotic cases. Inactivity and lack of

Table 1: Risk factors in population and the subjects with and without osteoporosis diagnose by BMD.

Risk factors	Population				Osteoporotic subjects				Nonosteoporosis subjects				P value
	High risk		No risk		High risk		No risk		High risk		No risk		
	N	%	N	%	N	%	N	%	N	%	N	%	
Menopause years	99	24.4	287	70.9	49	84.2	9	15.8	11	64.7	635.3		Ns****
BMI*	12	3	375	92.6	2	3.6	54	96.4	1	5.9	16	94.1	Ns
Amenorrhea**	2	0.5	403	99.5	-	-	58	100	-	-	17	100	0.00177
Disease associate with osteoporosis	51	12.6	354	87.4	10	17.2	48	82.8	1	5.9	16	99.1	Ns 1.355
Medication associate osteoporosis	51	12.6	354	87.4	13	22.4	45	77.6	3	17.6	14	82.4	Ns 0.178
Family history***	24	8.4	342	84.4	4	26.7	34	73.9	4	26.7	11	73.3	Ns 1.355
Life style	316	78	89	22	49	84.5	9	15.5	11	64.7	6	35.3	Hs=3.412

*Body Mass Index <19/8; **Hypogonadism Amenorrhea; ***First degree relative; ****No significant difference

exercise (33.3%, n=265) and insufficient exposure to sunlight (5.9%, n=24) were the minimum and maximum lifestyle risk factors, respectively (Table 2). From 75 individuals who had done BMD test, 58 had osteoporosis and 17 had no evidence of osteoporosis. Regarding risk factors, there was no significant difference between osteoporotic and nonosteoporotic individuals, using chi-square test ($p \leq 0.05$).

Discussion

Many studies have shown that aging significantly increases the risk of osteopenia. Additionally, bone loss is accelerated a short period after menopause.¹¹⁻¹⁵ Larijani et al. in a study on 20-69 year old population of Tehran found that 10 years after menopause bone density decreased 1.16% every year.³ In the present study, since all women in the sample were menopausal and 24.9% of them for more than 5 years, they were categorized as high risk individuals. The relationship between current physical activity, bone density, and the role of previous participation in physical activity has shown that both physical activity during adolescence and weight and calcium intake contribute to variation in BMD.¹⁶⁻¹⁸ In a study by Micklesfield et al. on 187 Caucasian women aged 19-79 years, it was found that BMD was significantly lower in the group who reported participating in no current physical activity compared with those who reported participating in physical activity once a week or more.¹¹ In the present study, lack of regular physical activity was the most prevalent risk factor followed by smoking (15.3%). Several studies have found a relationship between small gestature and low weight with osteoporosis, finding that the relative risk of low weight is

2.35. Additionally, in some studies weight < 57kg or BMI < 25 were considered as risk factors.¹⁸⁻²³ In this study, BMI < 19.8 was considered as risk factor since only 3% of the subjects were underweight; it did not play an important role as risk factor in this sample. The most common medications associated with osteoporosis were levothyroxine and Glucocorticoid, being in accordance with the results of Larijani et al. and Hoffman et al.'s studies.²³⁻²⁴ As to the disease, renal disease as a risk factor is associated with osteoporosis. It had the most frequency in our population, showing the prevalence of renal disease in population. The positive family history and genetics are associated with variation in bone density and the its relative risk was 1.38-5.31.^{25,26} In Ferrari et al.'s study, the proportion of variation in BMD attributable to genetic factor in a sample of 8 year old girls and their mothers was 33% and 36% at the lumbar spine and proximal femur, respectively.²⁷ In this study, 8.4% of our sample had first-degree relative (mother and sister) positive history of osteoporosis, which is in agreement with Gill and Hoffman's findings. Regarding risk factors, there was no significant difference ($p=0.05$) between osteoporotic and nonosteoporotic individuals (by BMD test). The non-statistical differences between the two groups cannot be relied on because of the small sample of the study population who had done BMD test, definite diagnosis and also controversial evidence and effect of risk factors in bone density.^{18, 28,29} Also, a large proportion of variation in BMD is due to maternal factors and early life influences.³⁰

In general, lifestyle was found to be the most common risk factor in our sample. Lack of physical activity and smoking as lifestyle risk factors thus necessitate more concern.

Table 2: Life style Risk factor in population

Life style	Population			
	High Risk		No Risk	
	N	%	N	%
Lack of Sport 8 activity*	265	65.4	135	33.3
Malnutrient **	53	13.1	348	85.9
Lactose intolerance	47	11.6	353	87.2
Sedentary life	27	6.7	378	93.3
Sunlight unexposure	24	5.9	381	94.1
Smoking	62	15.3	343	84.7

*3 times in week at least one hour; ** Diet with less than 800mg Ca/day

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