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## Characteristic of patients with osteoporotic hip fracture in Kashan, Iran

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# Characteristic of patients with osteoporotic hip fracture in Kashan, Iran

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## Abstract

### Background

Reports indicated that prevalence of hip fracture is high; however, few published studies are available from Iran and Middle East countries. This survey conducted to identify the characteristic of patient osteoporotic hip fracture fractures in Iran.

### Method:

A survey conducted in a 3 years period. Hip X-Rays of all patients with hip fracture were assessed by the Singh method for confirming osteoporosis. To reject other illness like osteomalacia, serum calcium, phosphorous and alkaline-phosphatase were assessed. Information related to demographic data, job, smoking and its duration and numbers, diet, exercise and physical activity in young-hood and now, weight, height, side and cause of fracture, history of hip fractures in parents, visual loss and history of falls recorded.

### Results:

114 patients were diagnosed as osteoporotic related fracture. About 80% of subjects did not exercise in young-hood. Amount of daily walking had decreased with age and the mean time of daily walking had decreased to 1 hour before the fracture occurred. The most causative events leading to fracture were falls in walking. Approximately 14% of males and 18% of females had the history of hip fracture in the other side. Also 9.6% of the patients mentioned the history of hip fracture in their mothers and 12.3% mentioned such a history in their fathers.

### Conclusions:

Fractures occurred in lower ages in comparison with other countries. Iranian population is susceptible for this fracture. It is necessary to carry out preventive measures. Public education for altering lifestyle, diet regimen and regular exercise is recommended.

## Background

Osteoporosis is a popular public health problem worldwide. It predisposes old people to fractures with minimal trauma. These fractures are, in turn, associated with increased morbidity and mortality, high health care costs and reduced quality of life [1-5].

Osteoporosis affects approximately 28 million people in the United States, mostly women, due to accelerated bone loss at menopause [6, 7]. According to the World Health Organization (WHO) criteria, 13% to 18% of women aged 50 and over had osteoporosis and another 37% to 50% had low bone mass [8].

It is predicted that one out of two women and one in every five men over age 65 will suffer an osteoporosis-related fracture at some time in their life [9].

Hip fracture is a common and serious consequence of osteoporosis. Almost 250,000 hip fractures occurred in the United States in 1995, and the annual rate of hip fracture worldwide is expected to rise considerably as life expectancy increase. However, hip fracture has a poor prognosis and one in five people die within a year after sustaining a hip fracture. The rate of institutionalization into long-term care facilities among hip fracture survivors is more than twice that for age- and sex-matched controls [10]. Because of the diminished mobility, patients with hip fracture experience a rapid deterioration in health related quality of life. Fifty percents of these patients would need helps in their daily living activities and only one third regain their pre-fracture level of function [11].

Although osteoporosis and its complications are recognized as public health problem in the world, the literature currently relies on data that is overwhelmingly from the United States and Europe while epidemiology of osteoporotic fractures in non-Western populations have poorly understood.

According to a recent study from a Middle East country, the prevalence of osteoporosis among the Jordanian female population is extremely high, and is even found in younger ages compared to the other international surveys [12]. Consequently, it can be predicted that the prevalence of osteoporotic fractures may be higher in Asian and Middle East countries. However, there is not enough published work from Iran to confirm or refute these reports. Considering differences between reported studies and variety of influencing factors, this study was conducted to identify the characteristics of patient with osteoporotic hip fractures in Kashan, Iran.

## Methods

A prospective survey was conducted in a 3 years period in Kashan, Iran. All patients with hip fracture who hospitalized in Kashan's orthopedic hospital units recruited as samples. Hip X-Rays of all patients with femoral neck fracture were assessed using the Singh method for confirming osteoporosis. To reject other illnesses like osteomalacia, serum calcium, phosphorous and alkaline-phosphatase were assessed on entrance of patients in emergency department.

Using literature review, a checklist was prepared for data collection. The checklist was then approved by a group of specialists in internal medicine and orthopedists.

Aside the demographic characteristics, the checklist was made up of 25 questions including: previous and present job, history of smoking (including its duration and its daily number), living location, usual diet, doing exercise and physical activity and duration of daily walking in young-hood and before the fracture occurred, side and cause of fracture, weight [Kg, on the most recent time the patient weighted itself], height [cm, measured using a strip meter, while the patient was in a flat position]. (Body Mass Index (BMI) was then calculated. Overweight was classified as having a BMI between 25 and 29 kg/m<sup>2</sup>), height loss, visual loss, history and the number of falls in the last 6 month, history of medications, previous surgeries, fractures and other medical disorders, history of kyphosis and vertebral or hip fractures in parents. Then, the results of serum calcium (Ca), phosphorous (P) and Alkaline-phosphatase (ALP) were also recorded on the patient checklist. The researcher or two nurses, who were specially trained, completed the checklists for each patient.

Statistical analysis was performed using SPSS v.11.5. The Chi-square test was used to evaluate the relationship between sex and some of the potential risk factors (e.g. smoking, exercise, kyphosis, visual impairment and hip fracture in opposite side of patient and also history of kyphosis and hip fracture in parents). t-test was also used to analysis the differences between means of height, weight, BMI, duration of exercise, duration of daily walking, duration and dose of daily smoking in both sex.

The ethics committee of Kashan University of Medical Sciences gave permission for the study. Written informed consent was also obtained from each participant.

## Results

A total of 185 patients with hip fractures were hospitalized during the study. Of these 114 cases were diagnosed to be osteoporotic based on the Singh index and the results of serum Ca, P and ALP.

The patients' demographic characteristics are shown in table 1. The study population consisted of 52 males (45.6%) and 62 females (54.4%) ranging in age from 35 to 100 years with a mean age of 72.52 (sd= 12.34) years. Approximately 56% and 39% of the subjects had education at level of elementary and high school respectively.

From the total sample, 64.7% of females and 11% of males were carpet makers in their young-hood and adulthood and 12% of both sexes have continued this job until the fracture occurred.

All subjects used bread, and 95.6 used rice in their usual diet; however, only 16% used milk in their usual diet during the past three months.

Twenty one percent of patients exercised regularly during their young-hood. However only 4 subjects of this group have continued regular exercise in their older ages. Patients had a mean time of 3.9-4.6 hours of daily walking for doing their daily living activities in their young and adulthood, however this time had decreased to 1.2-1.5 hours in their later ages and even decreased to less than one hour before the fracture occurred.

Fall (during walking/in climbing stairs/of bed) was the most frequent event leading to fracture. Also 66% of subjects were suffering from poor vision and 40% had a history of one or more times of fall in the previous months.

Based on BMI, 9.7% of subjects were underweight, and 37.7% were overweight.

Approximately 22% of subjects smoked cigarettes during their lifetime. Also 47.4% of subjects did not have any important medical history, 27.2% were hypertensive and 11.4% suffered from diabetes and 14% had other disorders. Forty-five subjects (39.5%) had the history of surgeries. Of these, one-fourth had the history of gastrointestinal surgeries and one-third had history of orthopedic surgeries (i.e. surgeries for treatment of hip fracture in the opposite side). More than 13% of men and 17% of women had history of hip fracture in other side. Also, 9.6% of the patients had the history of hip fracture in their mothers and 12.3% mentioned such a history in their fathers.

## Discussion

Results of the present study showed that incidence of hip fractures has considerably increased at age 56 onward and this is 10 years lower than the developed countries in which the highest incidence of hip fracture is found on ages 70-80 and over [13].

The sex ratio (female/male) of hip fracture was 1.25 and this is the same of what reported by Branco (2001), however, the sex ratio of hip fracture varies greatly between countries [14,15].

Also the frequency of fractures was higher in men till age of 75 years, but its frequency was higher in women afterward. This might be due to postmenopausal osteoporosis in women [15-16]. This is in accordance with Dennison et.al (2005) who also reported that 27% of Americans women under the age 50 are osteopenic however 70% are osteoporotic at their hip and lumbar spine or forearm by the age 80 years [16].

Most of our subjects were domestic carpet makers. Therefore, domestic carpet making can be considered as a risk factor for hip fracture in Iran. The immobility in this job, which needs sitting for long hours and deprivation of sun exposure, might be related to acceleration of osteoporosis and high frequency of hip fracture in the study sample.

Most of the subjects in this study didn't use diary in their usual diet. Dietary calcium and vitamin D must be adequate to maintain normal bone mineralization [17, 5]. So, inadequate dietary calcium along with lower level of calcium absorption and increase in its voiding in older people [18] would lead to a sever imbalance between its supply and demand which in turn would accelerate the process of osteoporosis and osteomalacia in older ages. It seems that there is a need for public education regarding diet and its impact on prevention of hip fracture and osteoporosis.

Results of this study showed that most of subjects have not had regular exercise since their young-hood. There was also significant relationship between sex and doing regular daily exercise. Though regular physical activity would increase bone density, lacking regular activity enhances osteoporosis [18, 19]. It has reported that regular daily walking or biking more than 30 minutes could decreases the risk of osteoporotic fractures in women [20]. The relative risk of hip fracture has reported to be 1.9 and 3.8 in men and women who had not regular exercise [21]. A study on the effects of physical activity in older women has also indicated that very active women had 36% reduction in hip fractures compared with the less active women [22]. Regular exercise would strengthen muscles,

which in turn would lead to better balance and decreased risk of fall. However our sample has not had regular exercise. Their daily walking have also been decreased significantly with advancing of age, that made them more susceptible for osteoporosis and muscle weakness, so, the risk of fall and hip fracture have increased.

Fall was the leading event resulting in hip fracture and visual weakness seems to play an important role in predisposing patients for falls. Previous studies have also reported that fall is the leading cause of hip fracture and 15% of falls were happened when patient were going to toilet [23, 24]. Simple environmental protective changes such as increasing the light of the place can prevent a considerable numbers of hip fractures.

BMI was out of normal range in 47.4% of subjects. The low BMI was 1.75 times more frequent in women. Our female subjects were also significantly lower weight and shorter than men. This findings suggest that the majority of subjects were small size and it causes their BMI seems to be over the normal range. These findings are consistent with other reports which indicated that Asian race, sex and small body frame, are risk factors for osteoporosis and hip fracture [25].

More than 15 % of our patients reported a history of hip fracture in other side. This could be a confirming factor for advanced osteoporosis and can be considered as a risk factor for hip fracture [25]. Unfortunately there was not any preventive or educational program after the first fracture.

The history of hip fracture and kyphosis of the patient's mothers was more common in women. Therefore, such a history may be used as a predictive factor for osteoporotic hip fracture in women. This is consistent with the reports of some previous studies indicated that the history of hip fracture in mother might be a risk factor for hip fractures in both sexes [25, 15].

Our study had some limitations. First, the small sample size may limit the generalizability of results. The sophisticated technology for detecting osteoporosis (like densitometry) did not used because of limitations for patients and the researchers as well. Also we used a strip meter for measuring height; however, measures in flat position may not be accurate. The patients' weight was also measured based on the most recent time the patient weighted him / herself. Although some reports indicated that reliability of patient's self report is good for weight and height [26].

## Conclusion

Our study showed that the age of hip fracture in Iran is lower than some developed countries. However, it is not getting enough attention in this country.

Considering the complications of hip fractures, it is important to pay more attention to reducing some important risk factors such as low level of physical activity, low calcium diet, and smoking. Preventive programs such as encouraging regular exercise, providing a diet with complementary calcium and vitamin D and healthy life style should be of the goals in our health system.

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## Illustrations

### Illustration 1

Table 1: Clinico-demographic characteristic of the subjects

<i>Variable</i>		<i>Men</i> No. (%)	<i>Women</i> No. (%)	<i>P</i>
<b>Age (years)</b>	Means±SD	70.64±11.93	74.73±10.87	-
	Lower 55	7 (13.4)	4 (6.7)	
	56-75	25 (48.1)	29 (35.8)	
	Over 76	20 (38.5)	29 (46.8)	
<b>Previous job</b>	Carpet maker	3 (11.1)	22 (64.7)	
	Household/clerk	4 (14.8)	7 (20.6)	
	Farmer/worker	20 (74)	5 (14.7)	
<b>Height (cm)</b>	Means±SD	163.05±12.69	155.08±14.10	0.001
<b>Weight (kg)</b>	Means±SD	66.26±10.10	58.19±9.59	0.000
<b>BMI (kg/m<sup>2</sup>)</b>	Means±SD	28.06±7.12	26.38±5.85	0.42
	Low	4 (7.7)	7 (11.3)	
	Normal	28 (53.8)	32 (51.6)	
	High	20 (38.5)	23 (37.1)	
<b>Time of daily walking in young hood</b>	Means±SD)	4.68±2.47	3.90±1.63	0.035
<b>Time of daily walking in old age</b>	Means±SD	1.58±1.69	1.29±0.90	0.224
<b>Regular exercise:</b>		17 (32.7)	7 (11.3)	0.004
<b>Cause of fracture</b>	Fall	40 (76.9)	54 (87.1)	
	Accident	12 (23.1)	8 (12.9)	
<b>Smoking status:</b>		22 (88)	3 (12)	0.000 0.250 0.068
	Duration of smoking (years) Means±SD	34.03±16.61	20.0±8.66	
	Number of cigarette/day Means±SD	20.57±12.17	9.60±6.51	

<b>Kyphosis in father:</b>	5 (9.6)	9 (14.5)	0.334
<b>Kyphosis in mother:</b>	6 (11.5)	10 (16.1)	0.363
<b>Hip fracture in father</b>	9 (17.3)	5 (8.1)	0.10
<b>Hip fracture in mother</b>	3 (5.8)	8 (12.9)	0.183
<b>Visual impairment</b>	29 (55.8)	46 (74.2)	0.540
<b>Low back pain</b>	17 (32.7)	43 (69.4)	0.032
<b>Height loss</b>	19 (36.5)	24 (38.7)	0.541
<b>Kyphosis in patient</b>	6 (11.5)	13 (21)	0.156
<b>History of hip fracture in other side</b>	7 (13.5)	11 (17.7)	0.390
<b>Side of fracture</b>			0.426
Right	18 (34.6)	22 (35.5)	
Left	24 (46.2)	24 (38.7)	
<b>Total</b>	52	62	

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