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Awareness of osteoporosis among educated urban adults

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Abstract

This cross-sectional descriptive study was conducted on of 357 educated individuals (150 females: 42.02% & 207 males: 57.98%), based in Mumbai metropolitan region, using online questionnaire. Significantly more males ($Z=2.078$; $p=0.037$) took calcium supplements and self-reported exposure to sunlight for more than one hour per day was significantly ($Z=3.094$; $p=0.002$) higher for males. As compared to males, fewer females reported consumption of tobacco ($Z=5.133$; $p<0.0001$) and alcohol ($Z=4.280$; $p<0.0001$). Significant gender differences were observed in frequency of physical exercise ($Z=2.612$; $p=0.009$) and in preference for type of physical exercise: walking ($Z=2.044$; $p=0.041$) and strength exercises ($Z=6.262$; $p<0.0001$). Significantly more female respondents reported family history of osteoporosis ($Z=3.085$; $p=0.002$) and co-morbid conditions ($Z=3.228$; $p=0.001$). The gender differences in awareness of osteoporosis were not significant. Community-based studies are necessary for creating awareness about osteoporosis and bring about early interventions, such as, calcium and vitamin D supplementation, and other lifestyle changes.

Keywords: Awareness, educated urban adults, osteopenia, osteoporosis

1. Introduction

Osteoporosis (Greek: *osteo* = bone; *poro* = porous) is a progressive, systemic, skeletal disease characterized by low bone mass and deterioration of bone microarchitecture, resulting in bone fragility and vulnerability to fractures. [1] It is one of the most under-diagnosed and under-treated nutritional deficiency in the world [2,3].

Type 1 (or “post-menopausal”) osteoporosis generally occurs before the age of 65 years and affects women and has a higher risk of wrist and spinal fractures. Type 2 (or “senile”) osteoporosis is found in both men and women after peak bone mass has been attained and primarily increases risk of hip fractures [4]. While women experience marked increase in bone loss during peri-menopause and post-menopause, in men, a small longitudinal bone loss is observed throughout life [5,6]. Studies have shown that bone loss starts from the age of 30-40 years in both men and women [7]. Menopause is followed by an immediate decrease in bone mass and density, which reaches equilibrium approximately 10 years after menopause and then merges into a continuous age-related loss [4].

Globally, it is estimated that one-third of women and one-fifth of men aged above 50 years will experience osteoporotic fractures [8]. An estimated 50 million people in India are either osteoporotic (T-score lower than -2.5) or have low bone mass (T-score between -1.0 and -2.5) [9]. Studies indicate that osteoporosis and osteopenia or low bone mass may occur at a relatively younger age in Indian population [10,11]. The goal of health education is to ensure that the vulnerable population understands the risk factors and can make an informed decision regarding their health-related behaviours to prevent such diseases.

The purpose of this study was to determine the levels of awareness about osteoporosis among educated city-dwelling adults.

2. Materials and Methods

This cross-sectional descriptive study was conducted using the snowball sampling technique. A pre-tested and pre-validated questionnaire was administered via Google forms to adult respondents, of either gender, with educational attainment at least up to undergraduate level.

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Informed consent was taken on the Google forms. The data were adapted to Microsoft Excel spreadsheet (Microsoft Corporation, Redmond, WA, USA) and analyzed using SPSS statistical software Windows Version 25.0 (IBM Corporation, Armonk, NY, USA). The percentage of responses and the standard error of difference between two sample proportions were calculated. The statistical significance was determined at $p < 0.05$.

3. Results and Discussion

A total of 357 individuals (150 females: 42.02% & 207 males: 57.98%) participated in the study.

3.1 Socio-Demographics

Significant gender differences were observed in age distribution, marital status, education and occupation (Table-1).

Table 1: Gender differences in socio-demographic parameters

Parameter	Females (n=150)	Males (n=207)	Z value	'p' value	
Age group	18-30 years	61 (40.67%)	62 (29.95%)	2.102	0.035 *
	31-45 years	43 (28.67%)	70 (33.82%)	1.032	0.303
	46-60 years	31 (20.66%)	42 (20.29%)	0.087	0.928
	61+ years	15 (10.00%)	33 (15.94%)	1.624	0.105
Marital status	Single	62 (41.33%)	50 (24.15%)	3.452	0.0005 *
	Married	86 (57.33%)	154 (74.40%)	3.390	0.0007 *
	Divorced	01 (00.67%)	01 (00.48%)	0.229	0.818
	Separated	01 (00.67%)	02 (00.97%)	0.306	0.756
Education	Undergrad	49 (32.67%)	48 (23.19%)	1.987	0.046 *
	Graduate	47 (31.33%)	71 (34.30%)	0.588	0.555
	Postgraduate	54 (36.00%)	87 (42.03%)	1.150	0.250
Occupation	Homemaker	12 (08.00%)	...	4.139	<0.0001 *
	Retired	08 (05.33%)	43 (20.77%)	4.114	<0.0001 *
	Student	31 (20.67%)	26 (12.56%)	2.063	0.039 *
	Employed	99 (66.00%)	138 (66.67%)	0.131	0.896

Z= Standard error of difference between two proportions; *Significant

Despite being a common cause of male morbidity, there is paucity of Indian data on male osteoporosis. A study in Delhi estimated the prevalence of osteoporosis as 24.6% in men and 42.5% in women above 50 years of age [12]. A Jaipur-based study [13] reported that the prevalence of osteopenia and osteoporosis in male study population was 28.5% and 11.5%, respectively. Even though these estimates suggest that prevalence of osteoporosis in males is lower than in women, mortality in males after hip fracture is high. [14] In older men, the risk of hip fracture or vertebral fracture is 30% higher than in women of the same age [14].

Male osteoporosis largely remains under-diagnosed and untreated and is discovered only after the occurrence of a fracture. Osteoporotic fractures in men are more common than myocardial infarction and prostate cancer, and yet the majority of studies in osteoporosis have a focus on women especially postmenopausal women with little data available in men [15].

With an increase in the life expectancy, the geriatric population of the developing countries like India is increasing and the impact of osteoporosis on the population and the nation is expected to increase [16]. Postmenopausal women, especially those with age more than 65 years are prone to develop complications of osteoporosis like fragility fractures. [17] Using effective bone sparing and bone formation promoting medications, osteoporosis can be managed effectively. Moreover, healthy lifestyle practices such as regular exercises and adequate calcium intake can promote the maintenance of bone mineral density [17, 18].

3.2 Diet & Personal Habits

The gender differences in dietary preferences were not significant. However, significantly more number of males ($Z=2.078$; $p=0.037$) took calcium supplements as compared to females. Likewise, self-reported exposure to sunlight for more than one hour per day was significantly ($Z=3.094$; $p=0.002$) higher for males. Significant gender differences were observed in self-reported non-consumption of tobacco

($Z=5.133$; $p<0.0001$) and alcohol ($Z=4.280$; $p<0.0001$). Insufficient sun exposure, inadequate calcium and Vitamin D intake and lack of physical activity are major causes of osteoporosis. Vitamin D deficiency is widely prevalent in Indian population despite adequate sun exposure. The majority of Indians experience adequate sunlight throughout the year due to the geographic location of India (between 8.4°N and 37.6°N latitudes) and despite this fact, Vitamin D deficiency is widely prevalent in the Indian population [19]. An estimated 61 million Indians have osteoporosis; nearly two-thirds of them are women [20, 21].

3.3 Physical exercises:

Significant gender differences were observed in frequency of physical exercise ($Z=2.612$; $p=0.009$). There were significant gender differences in preference for type of physical exercise: walking ($Z=2.044$; $p=0.041$) and strength exercises ($Z=6.262$; $p<0.0001$). There was no significant gender difference in preference for yoga, aerobics and cardio exercise. Lower BMI is a risk factor for osteoporosis; [22-26] the change in risk associated with a single unit change in BMI (approximately 5-8 lb) is of greater magnitude than most other modifiable risk factors [27]. Load-bearing exercises are to be emphasized on because they have been shown to be more strongly associated with improvements in bone mineral density when compared to non-weight-bearing exercises [28].

3.4 Morbidity

39 (26.00%) female respondents and 23 (11.11%) male respondents reported having joint pains, exhibiting significant gender difference ($Z=3.665$; $p=0.0002$). Gender difference was also significant ($Z=3.465$; $p=0.0005$) amongst female and male respondents who were prescribed medications for joint pains: 27 (18.00%) and 13 (06.28%), respectively. Significantly more female respondents reported family history of osteoporosis ($Z=3.085$; $p=0.002$) and co-morbidity ($Z=3.228$; $p=0.001$). The co-morbid conditions were diabetes mellitus, hypertension and combination of these diseases.

3.5 Investigations and Awareness

In the present study, 94 (62.67%) females and 127 (61.35%) males had never got their serum calcium levels checked, while 86 (57.33%) females and 117 (56.52%) males had never got their vitamin D levels checked. Less than one-quarter of the respondents had attended awareness programmes on osteoporosis, while about one-third had watched programmes on this disease on television and electronic media. The gender differences were not significant. The overall prevalence of osteoporosis has been reported to be higher in the Asian populations,^[29] which may be due to ethnic factors, inadequate nutrition, and frequent childbirth, lower socioeconomic and educational status in Asian populations^[30]. Awareness on the part of such women with regards to osteoporosis and its management is considerably inadequate^[17, 31]. A Turkish study^[32] found that the women who reported having osteoporosis did not have a better knowledge than those who did not report having osteoporosis. Women's knowledge about adequate calcium intake and physical activity for prevention of osteoporosis did not influence their exercise or dietary behaviors.^[33] It has been reported that even if most of the people know that physical activity is beneficial for health, a very few people actually participate in physical activity^[34]. Therefore, education programs should be informative as well as participative and inclusive so that the women can practice the physical activity and include them in their daily routine. Involving the population in spreading knowledge and arranging exercise workshops where actually they can learn the exercises would be a good step in the educational programs.

An American study^[33] reported that women prefer handouts, brochures, magazine articles, and short-duration counseling sessions during clinic visits; however, an Indian study found that for Indian women, knowledge transmission through pictorial brochures or street plays or skits would have a greater impact.^[35] Interactions with osteoporosis patients ought to be arranged in educational programs to motivate the vulnerable population to have a healthy lifestyle.^[35]

4. Conclusion

Though all the respondents were educated, awareness of osteoporosis was inadequate; less than one-quarter of the respondents had attended awareness programmes on this silent disease, while only about one-third had watched programmes on this disease on television and electronic media. There is a need for large community-based studies for identifying high-risk populations and initiating awareness about osteoporosis and bring about early interventions, such as, calcium and vitamin D supplementation, and other lifestyle changes.

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