

ORIGINAL ARTICLE

## LOW AWARENESS OF OSTEOPOROSIS AMONG WOMEN ATTENDING AN URBAN HEALTH CENTRE IN MUMBAI, WESTERN INDIA

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### ABSTRACT

Osteoporosis is a global health problem both in the developed and developing countries. Patient education forms an important part in the management of osteoporosis. The objective of this study was to evaluate knowledge about osteoporosis and its correlates among women aged  $\geq 40$  years attending an urban health centre in India and to identify their sources of information on osteoporosis. Knowledge about osteoporosis was assessed using the Osteoporosis Questionnaire (OPQ) in 243 women over 40 years of age, attending an urban health centre in the city of Mumbai located in the state of Maharashtra in western India. This exploratory cross-sectional study was conducted over a period of eight months. The OPQ analysis was performed using SPSS for Windows Version 13.0. The scores were expressed as mean  $\pm$  SD (Standard Deviation). The one sample-t test was used to study the differences in the mean scores between socio-demographic variables. The mean total OPQ score was 0.91 (SD  $\pm$  5; range -9 to 10; maximum possible score 20). There was a significant difference in the total OPQ scores by the level of education and family history of osteoporosis ( $p < 0.05$ ). The main sources of information identified were television/radio (55%), family and friends (23%), newspapers (22%) and doctors (20%). The study reveals lack of knowledge about osteoporosis in the present sample, and the need for increased involvement of doctors in educating patients about osteoporosis.

**Key Words:** Osteoporosis, knowledge, osteoporosis questionnaire, western India, patient education

### INTRODUCTION

Osteoporosis is a major problem of health care delivery services, both in the developed and developing countries<sup>1</sup>. It is estimated that by 2050, one out of every two fractures worldwide will occur in Asia<sup>2</sup>. An International consensus development conference has stated that osteoporosis is a systemic skeletal disease characterized by low bone mass and micro-architectural deterioration of bone tissue, with a consequent increase in bone fragility and susceptibility to fracture<sup>3</sup>. The reduction in bone strength is a function of reduced bone mass and abnormal bone quality, including microscopic architecture of the bone, bone turnover, damage accumulation, and mineralization<sup>4</sup>. Loss of bone density occurs with advancing age and rates of fracture markedly increase with age giving rise to significant morbidity and some mortality<sup>5</sup>. Osteoporosis is three times more common in women than men partly because women have a lower peak bone mass and partly because of hormonal changes that occur at menopause<sup>6</sup>.

This silently progressing metabolic bone disease is widely prevalent in India, and osteoporotic fractures are a common cause of morbidity and mortality in adult Indian men and women<sup>3</sup>. Because of its morbid consequences, prevention of osteoporosis and resulting fractures is considered essential to the maintenance of health, quality of life and independence in the elderly population. The primary needs for effective prevention include a good body of knowledge about disease burden and awareness in the community and among physicians<sup>7</sup>.

In India, awareness of osteoporosis is low, since there has been relatively little effort to publicize the disease. Various small-scale surveys indicate that awareness of the disease in the urban population is about 10%-15%<sup>2</sup>. Although a good understanding of the disease may not be sufficient to bring about changes in health-related behavior, knowledge is a prerequisite for the success of preventive efforts.

The objective of this study was to evaluate the knowledge about osteoporosis and its correlates among women aged  $\geq 40$  years attending an

urban health centre in India and to identify their sources of information about osteoporosis.

## SUBJECTS AND METHODS

### Study location, study design and sampling method

In India, urban health centers are health facilities providing promotive, preventive and curative health care to people staying in urban slums. Each centre caters to approximately 20,000 people. The present study was conducted in an urban health centre located in the field practice area of T.N. Medical College and BYL Nair Hospital, which is one of the premier teaching institutes located in the city of Mumbai in the state of Maharashtra in Western India.

This exploratory cross sectional study was conducted from November 2005 to June 2006. The inclusion criteria were: all female permanent residents of the area aged  $\geq 40$  years old attending the outpatient department of the urban health centre and willing to participate in the study. Women who did not fulfill these criteria were not included in the study. 243 women satisfying the inclusion criteria and attending the centre during the study period participated in this study.

### Data collection

Data were collected using a questionnaire. Information on demographic factors such as age, level of education and risk factors for osteoporosis such as menopausal status, family history of osteoporosis and history of fractures was collected. The history of fragility and family history of osteoporosis was verified by the case records available with the respondents and this information was reinforced by asking the respondent's responsible family member. The participants were also asked to identify their sources of knowledge about osteoporosis.

Participants' knowledge about osteoporosis was assessed using the Osteoporosis Questionnaire (OPQ), a reliable (reliability coefficient of 0.84 using the Kuder-Richardson formula 20) and validated, self report questionnaire developed by Pande et al<sup>8</sup>. The OPQ questionnaire is a 20 item multiple choice questionnaires used to assess the participants' knowledge in four areas:

- (1) General information about osteoporosis (5 questions).
- (2) Risk factors (7 questions).
- (3) Treatment (4 questions).
- (4) Consequences of osteoporosis (4 questions).

There are four possible responses for each question, only one of which is correct. A "do not know" response is provided for each question to avoid guessing and to improve the participation. Each correct response scored 1 point, each

incorrect response scored -1 point, and a "do not know" response scored 0 point. The maximum and minimum score on the OPQ is +20 and -20 respectively. In order to ensure optimal quality of response, the questionnaire was translated in two local languages (Hindi and Marathi). The validation of the translated questionnaires was done by the translate retranslate method wherein the questionnaire was pilot tested on ten women before administering it to the study subjects. For literate women, this questionnaire was self report type whereas for the illiterate respondents, the questionnaire was filled in by the data collector.

### Ethics

The study was conducted with the approval of the ethics committee of T.N. Medical College and BYL Nair Hospital. Informed consent was obtained from the eligible women and confidentiality of the subjects was assured.

### Statistical analysis

The OPQ analysis was performed using SPSS for Windows Version 13.0. The scores were expressed as mean  $\pm$  SD (Standard Deviation). The data was tested for normality by applying the Kolmogorov-Smirnov Test and the data was found to be normally distributed. The one sample-t test was used to study the differences in the mean scores between socio-demographic variables. A 'p' value of  $<0.05$  was considered statistically significant.

## RESULTS

### Socio demographic background of respondents

All the 243 women  $\geq 40$  years of age who attended the urban health centre and satisfied the inclusion criteria participated in the study giving a response rate of 100%. The overall mean age of the 243 respondents was 56.7 years ( $SD \pm 12.6$  years; range 40-85 years). Sixty seven percent (163) women were between the ages of 40 - 60 and 33% (80) were 60 years and above. Approximately twenty four percent (59) were illiterate and 75.7% (184) were literate. About seventy seven percent (188) women were post menopausal and 22.6% (55) were premenopausal. Ten percent (24) gave history of fragility of fractures. Approximately six percent (12) of the women gave a positive family history of osteoporosis out of the total 219 participants who responded to the question.

### Knowledge

As seen in Table 1, the mean total score ( $\pm$  SD) for the OPQ was 0.91 ( $SD \pm 5$ ). The minimum score was -9 and the maximum score was 10.

Table 1. Mean and total score of respondents' for OPQ knowledge components

Components of OPQ	Question	Correct response	Incorrect response	Do not know	Mean ± SD score	Range	
						Min	Max
General Information	Condition characterised by fragile bones	125 (51.4%)	60 (24.7%)	58 (23.9%)	-0.12 ± 2.2	-5	4
	Osteoporosis and osteoarthritis as different conditions	92 (37.9%)	139 (57.2%)	12 (4.9%)			
	Bones are strongest between the age of 20 to 50 years	39 (16.0%)	132 (54.3%)	72 (29.6%)			
	Osteoporosis common in women than men	126 (51.9%)	59 (24.3%)	58 (23.9%)			
	How common is osteoporosis in elderly women as compared to osteoarthritis and bone tumour	102 (42.0%)	122 (50.2%)	19 (7.8%)			
Risk factors	Reason for early menopause as risk factor	101 (41.6%)	4 (1.6%)	138 (56.8%)	2.2 ± 1.4	-3	7
	Excessive alcohol intake as risk factor for osteoporosis	125 (51.4%)	114 (46.9%)	4 (1.6%)			
	Excessive dieting as a cause of osteoporosis	101 (41.6%)	107 (44.0%)	35 (14.4%)			
	Lack of exercise as a risk factor	175 (72.0%)	26 (10.7%)	42 (17.3%)			
	High risk of osteoporosis if positive family history	173 (71.2%)	10 (4.1%)	60 (24.7%)			
	Relationship between overactive thyroid and osteoporosis	68 (28.0%)	16 (6.6%)	159 (65.4%)			
	Role of genetic factors in causation	118 (48.6%)	44 (18.1%)	81 (33.3%)			
Treatment	Awareness of HRT in prevention of osteoporosis	21 (8.6%)	195 (80.2%)	27 (11.1%)	-0.31 ± 1.4	-3	3
	Breast cancer as contraindication to HRT	178 (73.3%)	2 (0.8%)	63 (25.9%)			
	Clots in leg veins as side effect of HRT	41 (16.9%)	176 (72.4%)	26 (10.7%)			
	Swimming as a non weight bearing exercise which will not strengthen bones in osteoporosis	114 (46.9%)	55 (22.6%)	74 (30.5%)			
Consequences	Not so common complaints in osteoporosis	153 (63.0%)	75 (30.9%)	15 (6.2%)	-0.9 ± 2.2	-3	3
	High chance of sustaining a fracture if previous history of fragility fracture	15 (6.2%)	192 (79.0%)	36 (14.8%)			

Association between muscle weakness and possibility of fracture	93 (38.3%)	84 (34.6%)	66 (27.2%)		
Effect of benzodiazepines on likelihood of falls	23 (9.5%)	150 (61.7%)	70 (28.8%)		
<b>Total OPQ score</b>				0.91± 0.5	-9 10

**General information:** Fifty one percent (125) women correctly identified osteoporosis as a condition characterized by fragile bones and 37.9% (92) were aware that osteoporosis and osteoarthritis are different conditions with few similarities. However, only 16% (39) respondents were aware that our bones are strongest between the ages of 20 and 50 years. One fourth of the women incorrectly believed that osteoporosis is more common in men than in women. Fifty percent (122) of patients had an incorrect impression about how common osteoporosis is in an elderly women compared to osteoarthritis and bone tumor.

**Risk factors:** Early menopause, excessive intake of alcohol and excessive dieting as risk factors for osteoporosis were correctly recognized by 41.6% (101), 51.4%(125) and 41.6%(101) of respondents respectively. Seventy two percent (175) women were able to appreciate the relationship between lack of exercise and development of osteoporosis. Majority of participants were aware that the chances of developing osteoporosis are higher in the presence of a positive family history. The association between an 'overactive thyroid' and osteoporosis was recognized by 28% (68) of the participants. Forty nine percent (118) of participants were aware of the role of genetic factors in the causation of osteoporosis.

**Treatment:** Majority of the women were unaware about the fact that Hormone Replacement Therapy (HRT) helps prevent progression of osteoporosis. Breast cancer was recognized as a contraindication to HRT by 73.3% (178) of women. Only 16.9% (41) correctly identified clots in the leg veins as the side effect of HRT. Forty seven percent (114) believed that swimming (a non-weight bearing exercise) could help strengthen bones.

**Consequences:** Sixty three percent (153) participants recognized low back pain and loss of height as a common complaint in patients with osteoporosis. Only 6.2% (15) respondents appreciated that the chances of a subsequent fracture is high after sustaining a fragility fracture. The association between muscle weakness and possibility of fractures was correctly recognized by 38.3% (93) of the respondents, while only 9.5% (23) appreciated the effect of benzodiazepines (e.g. diazepam) on the likelihood of a fall.

**Comparison for OPQ scores between socio-demographic variables**

Table 2 shows the relationship of different variables in the study with the OPQ score obtained.

**Age:** There was no significant difference in the mean scores for total knowledge between those in the 40 - 60 years age group and those ≥ 60 years of age.

**Education:** The difference in the total mean scores of the OPQ between literate and illiterate women was statistically significant with the higher mean scores (1.06) in the literate women as compared to the illiterate women (1.00) (p<0.05).

**Menopausal status:** The difference in the total mean scores on OPQ in pre- and postmenopausal women was not statistically significant.

**Family history of osteoporosis:** Out of the 243 respondents, only 219 responded to this question. Twelve participants gave a positive family history of osteoporosis. The total difference in the mean scores of patients with and without family history of osteoporosis was statistically significant. (p<0.03)

**Previous history of fragility fractures:** The difference in the mean scores on OPQ in patients who did and did not have previous history of fragility fractures was not found to be statistically significant.

**Table 2. Differences in mean OPQ scores between socio-demographic variables**

Variables		Number	Mean scores	Difference in mean scores	T test statistic	P value	Confidence interval
Age	40 - 60 years	163 (67.1%)	1.05	0.03	1.063	0.28	-0.02 to 0.086
	≥ 60 years	80 (32.9%)	1.02				
Education*	Illiterate	59 (24.3%)	1.00	-0.06	-1.93	0.05	-0.12 to 0.03
	Literate	184 (75.7%)	1.06				
History of menopause	Postmenopausal	188 (77.4)	1.03	-0.06	-1.86	0.06	-0.12 to 0.00
	Premenopausal	55 (22.6%)	1.09				
Family history of osteoporosis*	Yes	12 (55%)	1.16	0.13	2.07	0.03	0.00 to 0.24
	No	207 (94.5%)	1.03				
History of fragility fractures	Yes	24 (9.9%)	1.00	-0.05	-1.12	0.26	-0.13 to 0.04
	No	219 (90.1%)	1.05				

\*P<0.05

**Sources of information**

As seen in Table 3, several sources of respondents' information have been identified in the present study with television and radio being the commonest (55 %) followed by family and

friends (23%) and newspapers (22%). Doctors were identified as the main source of information about osteoporosis by 20% of the participants.

**Table 3. Different sources of respondents' knowledge about osteoporosis (n=307\*)**

Source	Number	Percentage (%)
Family and friends	56	23
Television/Radio	134	55

Newspaper	53	22
Doctor	49	20
Others	15	6

Total number of sources of knowledge as stated by the 243 respondents' was 307 as more than one source was identified by the respondents.

### Appendix 1. OPQ Questionnaire\*

This questionnaire has been designed to assess the amount of knowledge you have about osteoporosis. You are not expected to know the answers to all the questions. If you do not know the answer or are unsure about it, please mark 'Do not know'. You do not need to write your

- A woman cannot take Hormone replacement therapy (HRT) if she:  
A: Is above 60 years of age B: has breast cancer C: has hot flushes D: do not know
- Early menopause is a risk factor for osteoporosis because of:  
A: Psychological distress B: Lack of sex hormones C: Neither of the above D: Do not know
- An excessive intake of which of the following is most likely to cause osteoporosis:  
A: Leafy green vegetables B: Multivitamins C: Alcohol D: Do not know
- Excessive dieting:  
A: Can cause osteoporosis B: is good for your bones C: Has no effect on bones D: do not know
- Side effects of HRT include:  
A: Clots in the leg veins B: Low back pain C: Vaginal dryness D: Do not know
- More women than men are reported to have osteoporosis because:  
A: They actually do get osteoporosis more often than men do B: Men are not aware of it C: Women are most concerned about their health problems than men D: Do not know
- Osteoporosis is more likely to develop in people who:  
A: Exercise regularly B: Exercise occasionally C: Do not exercise at all D: Do not know
- Which of the following types of exercise will NOT strengthen bones much in osteoporosis?  
A: Swimming B: Running C: Walking D: Do not know
- What is the LEAST likely cause of osteoporosis?  
A: Weather changes B: Genetic factors C: Lack of exercise D: Do not know
- Osteoporosis and osteoarthritis are:

The information obtained will be treated in the strictest confidence and used only for research. Please put a tick in the box against the one answer you think is the most correct. There is only one correct answer.

- A: Different names for the same disease B: Differ only in parts of the body that are affected C: Are different conditions with few similarities D: Do not know
- The condition characterized by fragile or brittle bones is commonly known as:  
A: Arthritis B: Osteoporosis C: Spondylitis D: Do not know
- The following is NOT a common complaint in patients with osteoporosis:  
A: Low back pain B: Loss of height C: Swelling of the feet D: Do not know
- A woman over 60 years is LEAST likely to develop:  
A: Osteoporosis B: Arthritis C: Bone cancer D: Do not know
- All types of hormone replacement therapy (HRT):  
A: Help prevent progress of osteoporosis B: Cause regular menstrual bleeding C: Have no effect on bones D: Do not know
- Our bones are strongest at the following age:  
A: Below 20 years B: Between 20 and 50 years C: Over 50 years D: Do not know
- Having broken your wrist:  
A: Your chance of breaking the other wrist is lower B: You are more likely to break the other wrist C: The chances of further fractures remain unchanged D: Do not know
- If your mother or father has had osteoporosis:  
A: You are more likely to suffer from it B: It does not affect your chances of suffering from it C: You are less likely to suffer from it D: Do not know
- If you have an overactive thyroid:  
A: It does not affect the bones B: You are more likely to suffer from osteoporosis C: You are

less likely to suffer from osteoporosis D: Do not know

19. Muscle weakness:

A: Does not affect your chance of breaking bones

B: Has no effect on the chance of falling over

C: Makes you more likely to break bones D: Do

not know

20. You are more likely to fall over if you take:

A: Sleeping tablets, e.g. Diazepam B: Hormone replacement therapy C: Aspirin D: Do not

know

\* Source: Pande et al (2000).

conducted amongst elderly American women<sup>13</sup> showed similar findings of this study which showed most participants did not know the difference between the terms 'osteoporosis' and 'osteoarthritis'.

The participants of this study had poor knowledge about the risk factors and the consequences of osteoporosis which is consistent with the findings of Ungan and Tumer who found that more than 40% of the Turkish women studied were unable to identify the risk factors and more than 65% were unaware that osteoporosis was directly responsible for disabling hip fractures<sup>14</sup>. A factor contributing to the poor knowledge about the effects of HRT could be due to the lack of use of HRT by all the 188 postmenopausal women. Usage of HRT helps make women aware of its side effects, efficacy and contraindications<sup>15</sup>.

## DISCUSSION

The OPQ used in a sample of English women over 50 years of age<sup>9</sup> showed the total mean score of  $8.5 \pm 5.4$  with a range of -2 to 17, whereas in a study among seventy three faculty members of a teaching institute in India, the mean score was 4.1 with SD of  $\pm 4.1$  and range of -8 to 15<sup>10</sup>. In a study done in Malaysia amongst postmenopausal osteoporotic women on treatment with alendronate, using the Malaysian Osteoporosis Knowledge Assessment tool (MOKT), the mean percentage score was  $69.0 \pm 13.9$  with the maximum possible score being 40. The MOKT has been modified for its utility amongst Malaysian populations and it is specifically directed to postmenopausal osteoporotic women on treatment. In this tool, the constructs studied were the general knowledge about osteoporosis, the risk factors and treatment<sup>11</sup>. There is a wide variation between the mean score of this study and the other three studies. This could probably be due to difference of social, cultural and educational backgrounds of the population.

This study showed that there was a lack of knowledge about osteoporosis in the sample of women studied. There were similarities between the findings of this study with studies done elsewhere. The rates of women who were aware of the definition of osteoporosis in this study were similar with studies done using the OPQ in Brunei<sup>12</sup> and other parts of India<sup>10</sup>. Studies

Higher level of education<sup>16-17</sup> and knowing someone with osteoporosis<sup>18-19</sup> and those on treatment<sup>19</sup> has been associated with increased awareness. This is contrary to a study conducted in India<sup>10</sup> using the OPQ, where education and family history of osteoporosis played no influence on the level of knowledge. However, this study found that history of a fragility fracture was associated with higher OPQ score. However, the effect of education and positive family history on the level of knowledge about osteoporosis was not significant.

This study and studies elsewhere<sup>9,10,12,20,21</sup> have showed media to be the commonest source of information on osteoporosis and only a quarter of the respondents identified doctors as a source of information. But not all information available in the media is accurate. Juby and Davis<sup>21</sup> demonstrated that the information available in the media was not completely accurate and reliable.

## CONCLUSION

The present study has identified deficiencies in the knowledge about osteoporosis particularly regarding the risk factors, treatment and consequences amongst Indian women staying in urban slums. Effective education programs and counseling provided by physicians and other healthcare professionals (such as pharmacists

and nurses) need to be based on the current level of the patient's knowledge and should be directed mainly to at-risk groups.

## STUDY LIMITATION

This study has several limitations. Since, the study has been conducted in the outpatient department of the urban health centre; the study population does not represent the population residing in that area. However, this study is an attempt to identify the level of awareness among a group of women residing in an area so that the results can be utilized to design measures to improve the awareness.

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