

KNOWLEDGE AND BEHAVIOUR REGARDING OSTEOPOROSIS IN WOMEN

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ABSTRACT

Objective: To evaluate the knowledge, attitude and practice regarding osteoporosis in women belonging to different educational status

Study Design: A cross-sectional descriptive study.

Place and Duration of Study: Dist. Hattian Bala of Azad Jammu and Kashmir (AJK) from Oct 2015 to Dec 2015.

Material and Methods: A total of 410 women between 12–45 years of age were included in the study and grouped according to educational qualification. Women who were health-care workers, already diagnosed with the disease or those who had never heard of the disease were not included in the study. A self-made, pre-validated questionnaire including demographic data and 24 items assessing knowledge, attitude, and practice (KAP) regarding osteoporosis was administered after obtaining verbal informed consent. The scores ranged from 0-15 in knowledge section, 0-4 in attitude section and 0-8 in practice section. The results in each section of KAP were cross tabulated with educational status of the respondents.

Results: Books and teachers (34.60%) were the main source of information followed by television/ radio (22.40%). The mean score for knowledge section was 5.12 ± 1.11 , for attitude section 1.65 ± 0.64 , and for practice 3.79 ± 2.61 . All the three dimensions had significantly better results in women with higher educational status (graduate or more).

Conclusion: Women with higher education demonstrated better knowledge, positive attitude and healthier practice than those with lower education.

Keywords: Osteoporosis, Preventive Health Services, Primary, Secondary.

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INTRODUCTION

Osteoporosis is a chronic skeletal disease with a gender predilection for females¹. It is characterized by diminution in bone mass density, deterioration in microarchitecture, and alteration in bone proteins. Consequently, a compromise in bone strength results in an enhanced fragility and predisposition to fractures². WHO defines osteoporosis as bone mass density 2.5 standard deviation or more below the mean peak bone mass in Caucasian post-menopausal women, as measured by dual X-ray absorptometry at forearm, hip or lumbar spine³.

Osteoporosis is broadly classified as Primary osteoporosis (Type I and Type II) and

Secondary osteoporosis. Type I primary osteoporosis is a direct consequence of decrease in estrogen after menopause which results in increased resorption of bone in females. It is also called post-menopausal osteoporosis and is the most common type of osteoporosis. Also known as senile osteoporosis, Type II is associated with normal process of aging. It manifests after 70 years of age; females are affected twice as frequently as men. Secondary osteoporosis is considered a decrease in bone mass density either due to some disease (leukemia, hyperthyroidism, hyperparathyroidism) or intake of some drugs (such as glucocorticoids, thyroid hormones or anti-convulsants)⁴. Although clinical manifestations of primary osteoporosis present after 50 years of age⁵, this disorder has an adolescent onset. Since maximum peak bone mass is attained by 20 years in males and by 18 years in females, the mineral deposition and

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skeletal growth in youth determines fate of bones in later life⁶.

The risk factors of osteoporosis are wide ranged non-modifiable risk factors include Caucasian or Asian ethnicity, female gender, positive family history, low body mass index, early menopause. The modifiable factors include low calcium intake, reduced vitamin D levels in body, smoking, excessive intake of caffeine and carbonated drinks, alcohol abuse, low physical activity/ exercise along with prolonged use of some drugs such as glucocorticoids, thyroid hormones, anti-coagulants, aluminum antacids and anti-convulsants².

The prevalence of osteoporosis has now increased to endemic proportions⁷, posing a major public health problem globally¹. It is estimated that a new patient suffers from osteoporotic fracture every 03 seconds; approx. 200 million women are distressed from this disorder worldwide. The serious economic impact of osteoporosis can be appreciated by the estimation that more than 50 percent of all patients with osteoporotic hip fractures, by 2050, will be Asians⁸.

Despite emergence of new therapies for osteoporosis treatment, prevention is still considered more cost effective and preferable⁹. Preventive measures in childhood and adolescence are key steps to disease control. An essential measure is to get sufficient dietary calcium early in life. An average of approx. 1300 mg calcium per day is required between 8–18 years of age. This requirement decreases to 1000 mg in individuals older than 19 years¹⁰. For ages 9 and above, 3 cups of dairy products (1 cup = 8 oz milk/ yoghurt or 1.5 oz cheese) everyday provide adequate daily value for calcium¹¹. Similarly, regular 30 min physical activity every day is vital for healthy bones. Routine exercise helps in achieving greater peak bone mass in young and prevents bone loss in older individuals¹². In addition to adequate calcium intake and regular exercise, optimal amount of vitamin D is also crucial to osteoporosis

prevention. The main source of vitamin D, for majority of the people, is sunlight¹³. The adequate sunlight exposure depends on various factors including latitude, season and skin pigmentation. In general, exposing arms and legs, twice a week, for duration of 5-30 min between peak day time (1000 hrs to 1500 hrs) is considered sufficient; Asians being dark-skinned require greater duration of exposure than Caucasians¹⁴, treatment of high risk individuals with anti-recommended as preventive strategies¹⁵.

The paucity of available data makes it difficult to enumerate the disease burden in developing countries. The few studies conducted on the topic in Pakistan reveal that 83% of the women suffer from vitamin D deficiency¹⁶. Moreover, the diet of common man in Pakistan is insufficient in calcium¹⁷. The high burden of disease coupled with poor knowledge of risk factors and unsatisfactory health practices of the masses make matters worse. Educational programs targeting modifiable risk factors and treatment of osteoporosis were shown in some studies to be beneficial in improving behaviors¹⁸. In order to design interventional strategies, it is crucial to know where the population stands regarding health education and preventive actions. This study was aimed at assessing the level of awareness and preventive behavior regarding osteoporosis among women.

MATERIAL AND METHODS

It was a descriptive cross-sectional study, conducted in distt. Hattian Bala of AJK, in a duration of 03 months (Oct-Dec 2015). A total of 422 women aged between 12-45 years were approached using non-probability convenient sampling. Any woman who was a healthcare administrator, already diagnosed with the disease, or those who had never heard of osteoporosis were excluded. To determine the minimum number of respondents required for study, Raosoft sample size calculator was used. Assuming response distribution to be 50% and keeping confidence interval (CI) of 95%, the

calculated sample size was 377 with an error bound of 5%.

Data were collected via a self-made, pre-validated, questionnaire in Urdu language. A clear explanation was offered prior to obtaining verbal informed consent. In some cases where the participant was either illiterate or unable to comprehend, the questions were explained and later the answers were written by a member of the research team himself.

The questionnaire included demographic data and 24 items assessing KAP on osteoporosis. Demographic information included age, level of

yoghurt/ 1.5 oz. cheese), daily 30 min exposure of face, arms and/ or legs to sunlight (without sunscreen/ glass shield), and 30 min rigorous physical activity everyday were considered as good preventive behavior. Each of these was given 2 points. A practice which was “never or rarely” done was scored 0; “sometimes” was scored 1. The total practice score could range from 0 – 8. An open ended question was also asked regarding use of any other food sources of calcium in diet. A list of dietary foods rich in calcium suggested by national institutes of health (NIH) was provided along.

Data was analyzed using SPSS 20.0.

Table-I: Frequency of participants who correctly identified risk factors for osteoporosis compared with regards to their education status.

Risk factor	Education of the subjects			p-value*
	< 10 th Grade n=80	10 th Grade - <14 th Grade n=174	> 14 th Grade n=156	
Female Gender	24	137	153	<0.001
Genetics / Family History	0	10	42	<0.001
Underweight	17	59	66	0.005
Lack of physical activity	36	110	130	<0.001
Low Calcium diet	80	162	148	0.059
Low Sunlight exposure	10	44	58	<0.001

*p-value < 0.05 is statistically significant.

Table-II: Cross tabulation between KAP dimensions and educational status.

Dimension*	Education of the subjects			p value**
	< 10 th Grade n = 80	10 th Grade - <14 th Grade n = 174	> 14 th Grade n = 156	
Knowledge	4.03 ± 0.86	4.98 ± 0.86	5.84 ± 0.95	<0.001
Attitude	1.51 ± 0.62	1.63 ± 0.68	1.76 ± 0.66	0.019
Practice	2.49 ± 2.69	3.71 ± 2.93	4.56 ± 1.82	<0.001

**significance calculated with oneway ANOVA. P value <0.001 is statistically significance

education, household income, and marital status. The questions in “Knowledge” (question 1-15) and “Attitude” (question 16-20) sections had answer choices of yes/ no/ don’t know. Each correct answer was scored as 1. A wrong or don’t know response was given a score of 0. This resulted in a score range of 0–15 for osteoporosis knowledge and 0–4 for attitude assessment of respondents. Question 21–24 evaluated the “Practice” of the participants. Intake of 1 or more cups of milk per day (1 cup=8 oz.), 1 or more portions of yoghurt/cheese (1 portion = 8 oz.

Descriptive statistics were applied. Tables and bar charts were plotted for data representation. Frequencies and percentages were calculated for categorical data while means and standard deviation was calculated for continuous data. All the three dimensions i.e. knowledge, attitude and practice were cross tabulated against educational status. Pearson’s Chi square test was employed to calculate the significance for categorical data. Differences among group means were analyzed by using one-way ANOVA. Tukey HSD post-hoc test was applied to confirm the differences

between groups where an overall significant difference in group means was found. For each test, *p* value <0.05 was considered significant.

RESULTS

A total of 422 respondents were approached. Ten subjects refused to participate (99.5% response rate) and 2 who had never heard of osteoporosis were excluded. Overall, 410 subjects were included in the study with approximately equal percentage in all the three age groups. A

decreased physical activity and female gender. The lowest score was on the questions regarding prolonged corticosteroid use, smoking, and alcohol abuse where no participant was able to recognize either of them as a risk factor. The highest score (100% i.e. 410 candidates with correct answers) was observed in the questions regarding definition of osteoporosis and fracture being a complication of the disease. The frequency of women in different educational groups able to correctly identify risk factors of

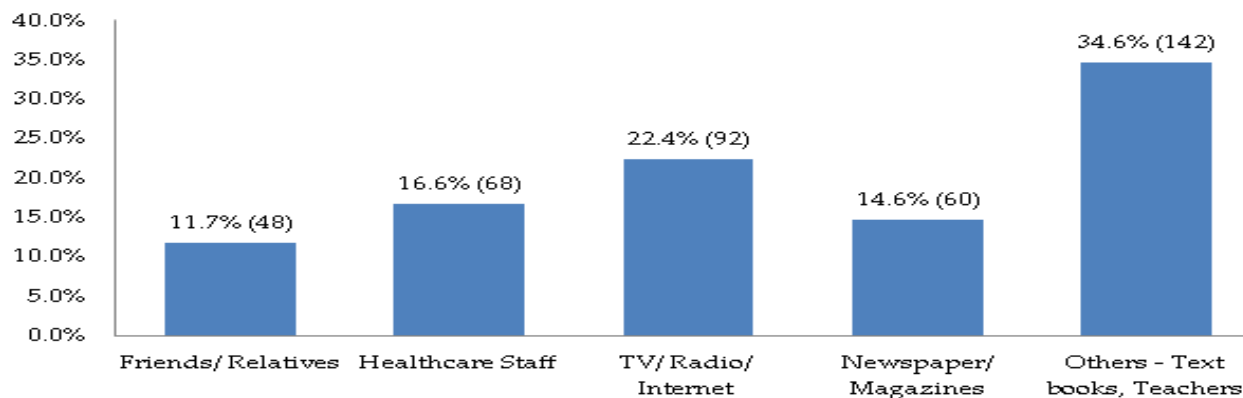


Figure-1: Sources of information.

small percentage, 5.4% (22), of the studied sample was illiterate (never attended a formal school). The frequency of higher education (grade 14 and above) was highest between ages 26–35 years. Maximum no. of students (22.2% i.e. 91) was observed in younger age group (12–25 years); maximum women in 26–35 years were professionals (41.2% i.e. 169) while those in 36 – 45 years were housewives (58.8% i.e. 241). The data on total household earning indicated that maximum respondents were in PKR 10,000–20,000 range.

About 34.6% (142) of women identified textbooks/ teachers as their source of information making it the most important resource in the region. Electronic media (TV/ Radio) ranked second with 22.4% (92) nominating it as their source (fig-1).

In the knowledge section of questionnaire, the mean score was 5.12 ± 1.11. Most identified predisposing factor included low calcium diet,

osteoporosis is given in table-I.

The mean score in the attitude section was 1.65 ± 0.67. About 52.0% (213) subjects agreed on being concerned about getting osteoporosis and 80.2% (329) considered prescription of calcium supplements in predisposed individuals beneficial. However a majority (63.7% i.e. 261) of the respondents considered chronic back pain normal for aging which did not require evaluation by a doctor and 74.6% (306) thought that very strict dieting cannot lead to osteoporosis.

The frequencies in the practice section revealed that adequate daily intake for milk was observed by 25.9% (106) and for yoghurt by 24.4% (100). Only 24.9% (102) participants were sufficiently exposed to sunlight. The lowest score was seen for regular physical activity (20.7% i.e. 85). However women with higher education status made healthier lifestyle choices than those with lower education. A cross-tabulation between

KAP dimensions and educational status revealed significantly better results (table-II). In knowledge and practice dimension, significant difference was found between the three groups when confirmed with Tukey HSD post-hoc test. But in attitude section there was no significant difference between subjects with <10th grade education and those with >14th grade education. Also there was no significant difference between individuals in 10-14 grade group and those in >14th grade group.

DISCUSSION

Osteoporosis is arising as one of the major health problems worldwide¹. A crucial step in prevention of osteoporosis is reducing the risk factors by making healthy lifestyle choices which can only be achieved by educating the masses. In order to formulate public awareness programs, it is imperative to have sufficient information about local population's knowledge and individuals' attitudes towards modifiable risk factors of the disease. Educating women of their higher risk for developing this systemic disorder will motivate them to adopt preventive behavior early on in life. This was a descriptive study with very high participation. It focused upon local women's knowledge, attitudes and behaviors regarding osteoporosis.

Out of total 422 women approached, only 02 had not heard about osteoporosis. The same was also observed in studies conducted on Canadian women¹⁹ and Turkish women⁶ where 90% had heard about the disease before. The most common source of information mentioned was books and teachers (34.6%) followed by television and radio (22.4%). In the Canadian¹⁹ and Iranian²⁰ women, television and radio were the main sources. This difference might be due to the rural settings of our study which has early sleeping habits and less room for electronic media entertainment.

The mean knowledge score was 5.12 ± 1.11 out of a possible 15 points (34.13%). Similar studies conducted in Taiwanese women²¹, and Turkish women⁶ revealed knowledge scores of 35%, and 63% respectively. The scores obtained

in all the cited studies are indicative of limited knowledge of the studied population. Regarding risk factors of osteoporosis, low calcium diet (95.1%), female gender (76.6%) and decreased physical activity (67.3%) were the most identified factors. Most women did not indicate family history, being underweight, low sunlight exposure, smoking, alcohol abuse and chronic corticosteroid use. Similar results were also reported in Americans where 68% were able to identify low calcium diet and lack of exercise¹⁹. In Singapore, low calcium diet was marked correctly by 86% of the study participants²². The knowledge on symptoms and complications was variable. All the women recognized fragility fractures as a potential presentation. Very few identified back pain and even less kyphosis. Similar results were reported in Turkish⁶ and Malaysian²³ women. The results of our study regarding predisposing factors and complications highlight the need to focus on specific aspects of osteoporosis. Unless there is enough emphasis on the risk factors and complications as serious threats to health, the individuals will not strive for prevention and treatment.

The mean score regarding attitude was 1.65 ± 0.67 out of a possible 4 (41.3%) whereas mean practice score was 3.79 ± 2.61 out of a total 8 (47.4%). Very low percentage of the studied sample reported regular physical activity and adequate calcium intake. Even a lower percentage (16.1%) practiced both actions. This figure was 0.6% in Iranians²⁰.

All the three dimensions i.e. knowledge, attitude and practice had significantly better results in women with higher educational status. This observation is similar to that seen in Vietnamese women²⁴ and Chinese women in Singapore²² where better education had a positive influence on the mean knowledge scores of the studied population.

The practical implications of poor knowledge and untoward attitudes revealed in our study suggest initiation of awareness programs on priority. Since modifiable risk factors can be tackled well in advance by

educating the masses, targeted intervention programs will help in internalization of knowledge and refinement in preventive behaviour.

CONCLUSION

It is concluded that women with higher education had significantly better knowledge, positive attitude, and healthier practice than those with lower education.

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

REFERENCES

- Spencer S. Lack of knowledge of osteoporosis: a multi-centre, observational study. *Scottish Medical Journal*. 2007;52 (1):13-6.
- Sultan A, Khan D, Mushtaq M, Hassan M. Frequency of osteoporosis and its associated risk factors in postmenopausal women in clinical practice at Rawalpindi. *Pakistan Journal of Pathology*. 2006; 17:115-8.
- Compston J. Assessment of fracture risk and its application to screening for postmenopausal osteoporosis (WHO Technical Report Series No. 843). *Annals of Rheumatic Diseases*. 1995;54(7):548-548.
- Kim D, Vaccaro A. Osteoporotic compression fractures of the spine; current options and considerations for treatment. *The Spine Journal*. 2006; 6(5): 479-487.
- Hafeez F, Zulfiqar S, Hasan S, Khurshid R. An assessment of osteoporosis and low bone density in postmenopausal women. *Pakistan Journal of Physiology*. 2009; 5(1): 41-44.
- Ungan M, Tumer M. Turkish women knowledge of osteoporosis. *Family Practice*. 2001; 18(2): 199- 203.
- Violeta Ribeiro, Judith Blakeley, M. Women's knowledge and practices regarding the prevention and treatment of osteoporosis. *Health Care for Women International*. 2000;21(4):347-353.
- Lau E. The Epidemiology of Osteoporosis in Asia. *IBMS Bone Key*. 2009; 6(5):190-193.
- Memon A. Incidence of hip fracture in Kuwait. *International Journal of Epidemiology*. 1998;27(5) :860-865.
- Committee to Review Dietary Reference Intakes for Vitamin D and Calcium, Food and Nutrition Board, Institute of Medicine. *Dietary Reference Intakes for Calcium and Vitamin D*. Washington, DC: National Academy Press, 2010.
- U.S. Department of Agriculture, Agricultural Research Service. 2011. *USDA National Nutrient Database for Standard Reference*, Release 24. Nutrient Data Laboratory Home Page, <http://www.ars.usda.gov/ba/bhnrc/ndl>.
- National Institute of Health. Exercise for your bone health. NIH Pub. No. 15-7879-E
- Nimitphong H, Holick M. Vitamin D status and sun exposure in southeast Asia. *Dermato-Endocrinology*. 2013;5(1):34-37.
- Holick M. Vitamin D Deficiency. *New England Journal of Medicine*. 2007; 357(3): 266-81.
- Webb A, Engelsen O. Calculated ultraviolet exposure levels for a healthy vitamin D status. *Photochemistry and Photobiology*. 2006; 82(6): 1697.
- Iqbal S, Dodani S, Qureshi R. Risk factors and behaviours for coronary artery disease (CAD) among ambulatory Pakistanis. *Journal of Pakistan Medical Association*. 2004; 54:261-266.
- Akhter P, Baloch NZ, Mohammad D, Orfi S, Ahmad N. Assessment of strontium and calcium levels in Pakistani diet. *Journal of Environmental Radioactivity*. 2004; 73: 247-256.
- Statistics by Country for Osteoporosis - CureResearch.com [Internet]. *Cureresearch.com*. 2016 [cited 18 March 2016]. Available from: <http://www.cureresearch.com/o/osteoporosis/stats-country.htm>
- Juby A, Davis. A Prospective Evaluation of the Awareness, Knowledge, Risk Factors and Current Treatment of Osteoporosis in a Cohort of Elderly Subjects. *Osteoporosis International*. 2001; 12(8): 617-622.
- Jalili Z, Nakhaee N. Knowledge, Attitude and preventive practice of women concerning osteoporosis. *Iranian Journal of Public Health*. 2007; 36(2): 19-24.
- Yu S, Huang Y. Knowledge of attitudes toward, and activity to prevent osteoporosis among middle-aged and elderly women. *Journal of Nursing Research*. 2003; 11(1): 65-72
- Saw S, Hong C, Lee J, Wong M, Chan M, Cheng A et al. Awareness and Health Beliefs of Women towards Osteoporosis. *Osteoporosis International*. 2003; 14(7): 595-601.
- Khan Y, Sarriff A, Khan A, Mallhi T. Knowledge, attitude and practice (KAP) survey of osteoporosis among students of a tertiary institution in Malaysia. *Tropical Journal of Pharmaceutical Research*. 2003; 13(1): 155.
- Nguyen N, Dinh T, Ngo Q, Tran V, Breitkopf C. Awareness and knowledge of osteoporosis in vietnamese women. *Asia-Pacific Journal of Public Health*. 2011; 27(2): NP95-NP105.