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Evaluation of knowledge about osteoporosis risk factors among adults above 40 years of age in Qassim region, Saudi Arabia

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Abstract. – OBJECTIVE: Osteoporosis is a bone disease that develops when bone mineral density and bone mass decrease, or when the quality of bone changes. It is the most common bone disease, representing a major public health problem. This study aimed to assess the knowledge of risk factors for osteoporosis among adults above 40 in the Qassim region, Saudi Arabia.

SUBJECTS AND METHODS: This is a cross-sectional study conducted among adults who were above 40 years of age and living in the Qassim region, Saudi Arabia. A survey questionnaire was distributed to respondents while they attended primary health care as well as online via social media.

RESULTS: 390 participants responded to our survey (65.6% females *vs*. 34.4% males). The most common age group was 41 to 50 years (59.7%). The prevalence of participants who were having information about osteoporosis was 59%. Overall, the knowledge of participants about osteoporosis was good (63.1%), 33.3% had moderate knowledge and only 3.6% were assumed to have a poor knowledge level. Factors associated with increased knowledge was being a female and being an employee.

CONCLUSIONS: Although the knowledge of the adult population aged above 40 years old seems adequate, there is still room for improvement. Female participants who were currently employed demonstrated a better understanding of osteoporosis than other adults. Further research is warranted to establish the effect of advanced age on their level of understanding regarding osteoporosis and its risk factors.

Key Words:
Osteoporosis, Risk factors, Knowledge, Adults.

Introduction

Osteoporosis is a disease that develops when bone mass decreases, and a deterioration in the microarchitecture of bones occurs[1]. It has a silent and progressive course[2]. It is commonly associated with low-impact and fragility fractures which can significantly reduce the quality of life of an individual[1-3]. Increased morbidity, mortality, and disability are also associated with this disease[2,4]. Multiple risk factors were established, including increasing age, female sex, White population, removal of the ovaries at an early age, prolonged immobility, and prolonged use of corticosteroids[3]. Osteoporosis is categorised as primary (including: type I and type II) and seondary. Primary osteoporosis develops in postmenopausal females, males and females older than 70 years old due to aging. Secondary osteoporosis is due to some diseases, medications or unknown factors. Systemic illness, endocrinopathy, and cancer are included in the diseases that lead to secondary osteoporosis[5,6]. In order to recognize osteoporosis, a couple of parameters are used for the diagnosis. Bone mineral density (BMD) was measured by dual-energy X-ray absorptiometry (DXA) at various skeletal sites. The WHO criteria determined that patients with T- scores of at least -2.5 standard deviations or more below the average value for young, healthy women (a T-score of< -2.5 SD) would meet the diagnosis of osteoporosis. It can be considered the method of choice. A different method using ultrasound is the speed of sound (SOS) in the tibia[7]. Based on a 2021 meta-analysis study[4] about osteoporosis prevalence worldwide, the estimated prevalence of this issue was reported to be 18.3 (95% CI 16.2-20.7), 23.1 for females (95% CI 19.8-26.9) and for males it was found to be 11.7 (95% CI 9.6-14.1). The analysis was based on 40 studies and a sample size of 453,964 men. In Saudi Arabia, postmenopausal Saudi women showed 24.3% osteoporosis at age 50-59 years, 62% at age 60-69 years, 73.8% at

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age 70-79 years[5], while it was present in 21.4% of Saudi men[6]. This study aims to assess awareness, knowledge of risk factors for osteoporosis among adults above 40 years old in the Qassim region as it is a common issue affecting the community in both women and men.

Subjects and Methods

Study Design, Area, Population, and Sampling

This is a cross-sectional study conducted among adults who were above 40 years of age and living in the Qassim region, Saudi Arabia, ambulatory and willing to give consent to participate. A survey questionnaire was designed and distributed to respondents while they attended primary health care as well as online *via* social media. The questionnaire was composed of socio-demographic characteristics (i.e. age, gender, etc.), and a 10-item questionnaire to assess the knowledge about osteoporosis. Patients below 40 years of age were excluded from the study.

Methods for Data Collection

The data was collected from respondents *via* a survey questionnaire while they attended primary health care as well as online. Ethical approval was obtained by the Qassim Regional Research Ethics Committee for the implementation and publication of the study.

Statistical Analysis

The knowledge of the population toward osteoporosis risk factors was drawn from 10 questions; "yes" coded as 1 and "no" coded as 0 were the answer options. The total knowledge score has been calculated by adding all 10 items and a score range from 1 to 10 points has been generated, indicating that the higher the score the higher the knowledge of osteoporosis risk factors. By using 50% and 75% to determine the level of knowledge, participants were considered as poor knowledge if the score was below 50%, 50% to 75% were considered moderate, and above 75% good level of knowledge.

Descriptive statistics were summarized as numbers, percentages, mean and standard deviation. The differences in the score of knowledge according to the socio-demographic characteristics of the participants has been calculated using the Mann-Whitney Z test and Kruskal-Wallis H test. The normality test was performed using the Shapiro-Wilk test and Kolmogorov-Smirnov test. The knowledge score was determined as abnormal distribution. Thus, non-parametric tests were applied. A p-value of 0.05 was considered statistically significant. The data were analyzed using Statistical Packages for Social Sciences (SPSS) version 26 (IBM Corp., Armonk, NY, USA).

Results

This study enrolled 390 participants. As described in Table I, 59.7% were aged between 41 to 50 years old with females being dominant (65.6%). Respondents who were living in Alrass constituted 40.5%. With regards to marital status, 82.1% were married. With respect to education, nearly three-quarters (72.6%) were university degree

Table I. Participants' socio-demographic characteristics (n=390).

Study variables	N (%)
Age group	
41-50 years	233 (59.7%)
51-60 years	125 (32.1%)
>60 years	32 (08.2%)
Gender	
Male	134 (34.4%)
Female	256 (65.6%)
City	
Buraydah	110 (28.2%)
Onaizah	20 (05.1%)
Alrass	158 (40.5%)
Badayea	48 (12.3%)
Bukayriyah	11 (02.8%)
Riyadh Khabra	31 (07.9%)
Other	12 (03.1%)
Marital status	
Single	39 (10.0%)
Married	320 (82.1%)
Divorced	13 (03.3%)
Widowed	18 (04.6%)
Educational level	
Uneducated	04 (01.0%)
Primary school	23 (05.9%)
Middle school	20 (05.1%)
High school	60 (15.4%)
University	283 (72.6%)
Job nature	
Health field	17 (04.4%)
Military field	26 (06.7%)
Academic field	195 (50.0%)
Retired	64 (16.4%)
Unemployed	88 (22.6%)
Having information about osteoporosis	
Yes	230 (59.0%)
No	160 (41.0%)

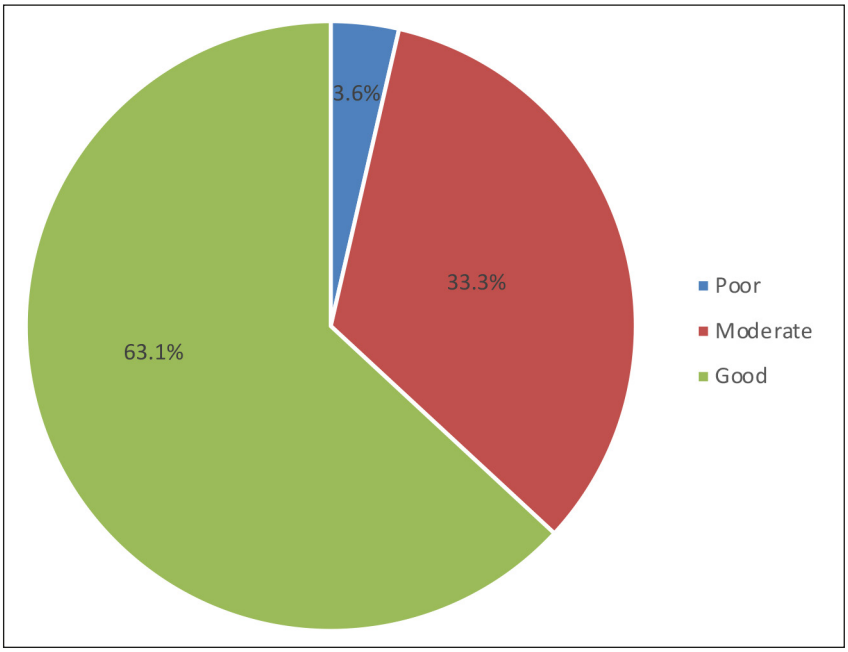

Figure 1. Level of knowledge regarding osteoporosis risk factors.

holders. Half of the respondents were employed in the academic field. The proportion of respondents who had information about osteoporosis was 59%.

Regarding the assessment of the knowledge of osteoporosis risk factors (Table II), most of them (96.9%) knew that calcium depletion increases the risk of osteoporosis. They were also confident that limiting exposure to the sun increases the risk of the disease (93.3%) and most (92.8%) believed that walking reduces the possibility of osteoporosis. A great proportion (90.5%) believed that vitamin D deficiency increases the risk of the disease. However, nearly 80% disagreed that osteoporosis was more common in males. The proportion of respondents who believed that corticosteroids, menopause, and obesity increase the risk of osteoporosis were 79.7%, 74.6%, and 73.3%, respectively. However, a lack of knowledge was noted regarding the presence of fractures that may cause osteoporosis (53.6%) and the knowledge that hormonal therapy protects against osteoporosis was also suboptimal (45.6%). The overall mean knowledge score was 7.84 (SD 1.57) with good, moderate, and poor knowledge detected among 63.1%, 33.3%, and 3.6%, respectively (see also Figure 1).

Table II. Assessment of knowledge on osteoporosis risk factors (n=390).

Knowledge questions	Yes (%)
1. Calcium depletion increases the risk of osteoporosis	378 (96.9%)
2. Decrease exposure to the sun increases the risk of osteoporosis	364 (93.3%)
3. Walking reduces the possibility of osteoporosis	362 (92.8%)
4. Vitamin D deficiency increases the risk of osteoporosis	353 (90.5%)
5. Osteoporosis was more common in males‡	324 (83.1%)
6. Corticosteroids increase the risk of osteoporosis	311 (79.7%)
7. Menopause increases the risk of osteoporosis	291 (74.6%)
8. Obesity increases the risk of osteoporosis	286 (73.3%)
9. The presence of fractures causes osteoporosis	209 (53.6%)
10. Hormonal replacement therapy protects against osteoporosis	178 (45.6%)
Total knowledge score (mean ± SD)	**7.84 ± 1.57**
Level of knowledge	
- Poor	14 (3.6%)
- Moderate	130 (33.3%)
- Good	246 (63.1%)

†Variable with multiple response answers. ‡Indicates reverse answer.

Table III. Difference in the score of knowledge according to participants' socio-demographic characteristics (n=390).

Factor	Knowledge Score (10) Mean ± SD	Z/H-test	*p*-value
Age group[a]			
41 – 50 years	7.77 ± 1.63	Z=0.837	0.402
>50 years	7.94 ± 1.47		
Gendera			
Male	7.46 ± 1.72	Z=3.102	0.002**
Female	8.04 ± 1.45		
Cityb			
Buraydah	7.81 ± 1.61	H=0.220	0.896
Alrass	8.00 ± 1.56		
Others	7.89 ± 1.43		
Marital statusa			
Unmarried	7.56 ± 1.82	Z=1.251	0.211
Married	7.89 ± 1.50		
Educational levela			
High school or below	7.92 ± 1.45	Z=0.381	0.703
University degree	7.81 ± 1.61		
Job naturea			
Unemployed	7.64 ± 1.49	Z=2.298	0.022**
Employed	7.96 ± 1.61		
Having information about osteoporosisa			
Yes	7.92 ± 1.52	Z=1.193	0.233
No	7.72 ± 1.63		

[a]*p*-value has been calculated using Mann-Whitney Z-test. [b]*p*-value has been calculated using Kruskal-Wallis H-test. **Significant at $p<0.05$ level.

When measuring the differences in the score of knowledge in relation to the socio-demographic characteristics of participants (Table III), it was found that a higher knowledge score was more associated with being female ($Z=3.102$; p-value $=0.002$) and being an employee ($Z=2.298$; p-value$=0.002$) while the differences in the score of knowledge among the age group, residence city, marital status, educational level, and having information about osteoporosis did not reach statistical significance (p-value >0.05).

Discussion

The present study is carried out to determine the level of knowledge on osteoporosis risk factors among the adult population aged more than 40 years old. The knowledge of the population regarding the disease was adequate. The mean score of knowledge was 7.84 (SD 1.57) out of 10, total score points with 63.1% assumed to have good knowledge, 33.3% were moderate and only 3.6% were poor knowledge levels. Several published papers[8-13] reported sufficient knowledge among adult women[8-10], adult over 40 years old[11], university students[12], or healthcare providers[13]. However, in a study[14] conducted among young adults living in Riyadh, Saudi Arabia, the reported knowledge was low and a considerable number of adult males and females were unaware of osteoporosis. They further concluded that there was a deficiency in the knowledge and poor application of the preventive action. Therefore, education programs are needed to improve awareness and motivate healthy behavior. It is necessary to maintain the perceived knowledge of the adult population regarding the disease as this could translate to better dealing with the disease.

Data in our study suggests that adult females exhibited better knowledge about osteoporosis risk factors. This is consistent with the report of Alqahtani and Alghamdi[10] as well as the study done by Khan et al[12], where females showed better understanding than males. Contradicting these reports, a study[11] conducted in Hafar Al-Batin region indicated that male and educated participants had significantly more knowledge than their counterparts. However, a study[13] in Bisha region found no significant difference in osteoporosis knowledge between males and females. The misconception that osteoporosis only affects women

was well documented and the greater influence of media played a significant role in this false impression[15]. More investigations are required to establish the influence of media on the knowledge and perception of males and females regarding osteoporosis.

Moreover, the knowledge of employed participants was significantly better than those who were not working. A similar finding[8] was also reported among the general population, where occupation showed a positive association with the knowledge. They also reported age, educational level, income, and residence as factors of increased knowledge. This has been concurred by the study of Barzanji et al[14], where they found significant differences in knowledge according to employment, education, income, and residence. In our study, however, age group, living city, and educational level were not relevant factors of knowledge that likely supersede our results. However, a study[13] conducted among physicians and nurses found no significant differences in osteoporosis knowledge between healthcare professionals' subgroups. The study concluded that the gaps in knowledge are needed to be addressed by adopting educational programs for health professionals to provide robust patient care and decrease the burden caused by the disease.

In our study, nearly 60% knew some information about osteoporosis and they were mostly aware of the most common risk factors of the disease such as calcium depletion (96.9%), limited exposure to the sun (93.3%), sedentary lifestyle (92.8%), vitamin D deficiency (90.5%), taking corticosteroids (79.7%), menopausal (74.6%), obesity (73.3%). However, the ratings about the risk factor related to the presence of fractures (53.6%) and the fact that the hormonal replacement therapy alleviate osteoporosis (45.6%) were suboptimal. The practice of adult women regarding the prevention of osteoporosis relates to our results. For instance, adult women were sometimes exposed to the sunlight (37.4%) and ate vitamins and calcium-rich food (50.8%), however, they rarely engaged in physical activities (35.4%). Furthermore, more than half were aware of the risk of osteoporosis and correctly answered the question of whether osteoporosis was common among women or men with most of them having heard about osteoporosis (83.3%) and their sources of osteoporosis mostly coming from the media[9]. Extensive efforts should be done to improve the knowledge of the adult population regarding osteoporosis risk factors and prevention.

Conclusions

Although the knowledge of the adult population aged above 40 years old seems adequate, there is still room for improvement. Female participants who were currently employed demonstrated a better understanding of osteoporosis than other adults. Increasing age would likely have a detrimental effect on the level of knowledge. Hence, continuous education is necessary to maintain their level of knowledge and ultimately prevent any signs of developing osteoporosis.

Conflict of Interest

The Authors declare that they have no conflict of interests.

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Informed Consent

Informed consent in the local language was taken from the participants before the start of the study.

Ethics Approval

Ethics approval was obtained by the Qassim Regional Research Ethics Committee for the implementation and publication of the study.

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