Understanding of risk factors and preventive measures of osteoporosis in postmenopausal women among the general population in Aseer region, Saudi Arabia

Turki Ahmed Alqahtani [1], Majed Yahya M Alshahrani [2],
Abdulqader Oudah Dhafer Alshahrani [2], Feras Mohammed R Alqahtani [2],
Ziyad Saad A Alasmari [2], Yazan Ahmed A Almaker [2], Nasser Abdullah AlGhris [3]

(1) MD, Assistant Professor Orthopedic Department, KKU
(2) Medical Intern
(3) Resident Doctor, Orthopedic Department, Aseer Central Hospital

Corresponding author:
Turki Ahmed Alqahtani , MD
Assistant professor orthopedic department KKU,
Saudi Arabia
Email: Taq20@hotmail.com

Abstract

Millions of adults over the age of 50 suffer from devastating hip fractures each year, with millions more suffering from pelvic, spine, wrist, and shoulder fractures. Osteoporosis is a major public health concern around the world. In the United States, an estimated 10 million adults aged 50 and up had osteoporosis, with more than 5 million suffering from femoral neck osteoporosis, including 4.5 million women and 800,000 men.

Methods: In this cross-sectional study, data were collected by the purposely constructed questionnaire.

Results: Out of total 600 questionnaire distributed (Electronically and manually), 576 questionnaire were received , so the response rate was 96.0%, Cronbach alpha was 0.84. 42.6% were male respondents while 57.4% were females. Average age (S.D) was 35.6(12.5) .

Conclusion: Nursing staff should actively educate women, particularly postmenopausal women, about the importance of smoking cessation, walking/active lifestyle, and exercise regimens.

Keywords: preventive measures of osteoporosis, osteoporosis, postmenopausal

Introduction

Millions of adults over the age of 50 suffer from devastating hip fractures each year, with millions more suffering from pelvic, spine, wrist, and shoulder fractures. These fractures are not an accident; the underlying cause is most likely osteoporosis. Osteoporosis is the most common type of bone disease, characterized by low bone mass and bone tissue loss, which can result in weak and fragile bones. People who have osteoporosis are more likely to suffer from broken bones and fractures.

Osteoporosis and osteoporosis-related fractures have consumed significant health resources over time and are now regarded as a public health concern. The first step in preventing and managing any health condition is to gain adequate knowledge and correct beliefs about the condition. Proper knowledge provides an excellent platform for sharing ideas between the healthcare provider and the patient, which is the foundation of any consultation's success. Inadequate knowledge about a health condition, on the other hand, puts patients at risk of complications and a poor prognosis of a condition that would otherwise be easily preventable or treated.

Advanced age, glucocorticoid use, nutritional factors, a low body mass index, and genetic factors are all risk factors for osteoporosis.

Osteoporosis is a major public health concern around the world. In the United States, an estimated 10 million adults aged 50 and above had osteoporosis, with more than 5 million suffering from femoral neck osteoporosis, including 4.5 million women and 800,000 men. Among Arab countries, Kuwaiti women aged 50 years or more had a high prevalence of osteopenia and osteoporosis (26.8 percent and 9.9 percent, respectively), with even higher figures reported in the Kingdom of Saudi Arabia (KSA) among women of the same age-group, where 31 percent had osteopenia and 40 % had osteoporosis at the lumbar spine. These high rates in KSA highlight the importance of early detection of the silent disease and its underlying risk factors in order to plan preventive measures and control its progression.

Because osteoporosis is difficult to treat and still incurable, prevention is critical. It is, in fact, preventable by changing unhealthy lifestyle habits to increase bone mass density before it occurs. There is evidence that knowledge about osteoporosis is a major contributor to osteoporosis prevention behaviour. Estimating the population's level of knowledge can help guide public health programmes. The most important risk factors for osteoperosis are age, female sex , ethnic group, genetic factors, inherited factors, early menopause, slim silhouette and low body mass, diseases interfering with bone metabolism, some medications taken for a long time, insufficient physical activity, consumption of too little calcium and vitamin D, excessive alcohol, caffeine, cigarette smoking, and a protein-rich diet.

The main aim of this study is to find out the understanding of risk factors and preventive measures of osteoporosis in postmenopausal women among the general population in Aseer region, Saudi Arabia.

Methods

In this cross-sectional study, data were collected by a purposely constructed questionnaire. The questionnaire composed of the demographic items and items related to the understanding of risk factors and preventive measures of osteoporosis. The questionnaire was constructed after a series of discussions between a panel of experts. This panel was composed of a subject specialist, researcher, and language expert. Cronbach's alpha was calculated. The study was conducted in the Aseer region of Saudi Arabia.

After collection, data were coded and entered in the SPSS ver.20 software for analyses of descriptive statistics (mean standard deviation, frequencies, and %s were computed). To measure the significance differences t-test and chi-square test was used at 5% level of significance. Data was collected from the population who visited the primary health care centres . Ethical approval was obtained from King Khalid University, Saudi Arabia. The study duration was from January to April 2022.

Results

Out of total 600 questionnaires distributed (Electronically and manually), 576 responses were received, so the response rate was 96.0% , (Cronbach's alpha was 0.84). 42.6% were male respondents while 57.4% were females. The average age (S.D) of respondents was 35.6 (12.5).

In Table 2 we have compared demographic variables with the prevalence of osteoporosis> We found significant differences with gender, age and education status which have significant relationships while other variables have no significant relationships.

In Table 3 we have compared BMI and have observed that BMI does not produce any significant impact.

Table 1: Frequency of knowledge, awareness regarding osteoporosis

Do you think the taking hormone replacement therapy during the peri-menopausal period reduces the chance of developing osteoporosis?		
	Frequency	Percent
1	460	82.7
2	28	5.0
3	68	12.2
Do you think low intake of vitamin D in a diet & low vitamin D is a risk factor for osteoporosis?		
	Frequency	Percent
1.00	498	89.6
2.00	17	3.1
3.00	41	7.4
Do you think breast feeding increases the chance of developing osteoporosis?		
	Frequency	Percent
1.00	271	48.7
2.00	175	31.5
3.00	110	19.8
Do you think an inactive lifestyle increases the chance of developing osteoporosis?		
	Frequency	Percent
1.00	404	72.7
2.00	44	7.9
3.00	108	19.4
Do you think multiple births increase the chance of developing osteoporosis?		
	Frequency	Percent
1.00	371	66.7
2.00	71	12.8
3.00	114	20.5
Do you think low intake of calcium in a diet & low calcium is a risk factor for osteoporosis?		
	Frequency	Percent
1.00	472	84.9
2.00	34	6.1
3.00	50	9.0
Do you think reducing coffee / tea drinking is a preventative factor for osteoporosis?		
	Frequency	Percent
1.00	310	55.8
2.00	99	17.8
3.00	147	26.4
Do you think that quitting smoking is a preventative factor for osteoporosis?		
	Frequency	Percent
1.00	405	72.8
2.00	38	6.8
3.00	113	20.3
Do you think the early menopause increases the chance of developing osteoporosis?		
	Frequency	Percent
1.00	364	65.5
2.00	67	12.1
3.00	125	22.5

Table 1: Frequency of knowledge, awareness regarding osteoporosis (continued)

Do you think the excessive drinking of coffee/tea increases the chance of developing osteoporosis?		
	Frequency	Percent
1.00	249	44.8
2.00	161	29.0
3.00	146	26.3
Do you think exercising regularly and losing weight are preventing factor for osteoporosis?		
	Frequency	Percent
1.00	479	86.2
2.00	22	4.0
3.00	55	9.9
Do you think the long-term use of corticosteroids increases the chance of developing osteoporosis?		
	Frequency	Percent
1.00	254	45.7
2.00	30	5.4
3.00	272	48.9
Do you think the menopause increases the chance of developing osteoporosis?		
	Frequency	Percent
1.00	421	75.7
2.00	50	9.0
3.00	85	15.3
Do you think obesity increases the chance of developing osteoporosis?		
	Frequency	Percent
1.00	380	68.3
2.00	79	14.2
3.00	97	17.4
Do you think the seeing a doctor regularly in the peri-menopausal period has a role in preventing osteoporosis?		
	Frequency	Percent
1.00	449	80.8
2.00	23	4.1
3.00	84	15.1
Do you think smoking increases the chance of developing osteoporosis?		
	Frequency	Percent
1.00	374	67.3
2.00	41	7.4
3.00	141	25.4
Do you think taking calcium supplements and having a diet high in calcium during the peri-menopausal period reduces the chance of developing osteoporosis?		
	Frequency	Percent
1.00	403	72.5
2.00	39	7.0
3.00	114	20.5
Total	556	100.0

Table 2: Demographic variables

FHx of osteoporosis and Age					
		Age (years)			
		2.00	3.00	4.00	5.00
Do you have FHx of osteoporosis?	1.00	67	42	43	8
	2.00	188	63	39	4
	3.00	60	21	18	3

p=0.00001

FHx of osteoporosis and educational status					
		Educational status			Total
		1.00	2.00	3.00	
Do you have FHx of osteoporosis?	1.00	3	56	101	160
	2.00	3	140	151	294
	3.00	3	44	55	102

p=0.042

FHx of osteoporosis and marital status					
		Marital status			
		1.00	2.00	Total	
Do you have FHx of osteoporosis?	1.00	99	61	160	
	2.00	112	182	294	
	3.00	43	59	102	
Total		254	302	556	

p=0.00001

FHx of osteoporosis and smoking habits					
		Smoking status			Total
		1.00	2.00	3.00	
Do you have FHx of osteoporosis?	1.00	150	3	7	160
	2.00	254	10	30	294
	3.00	91	5	6	102

p=.109

FHx of osteoporosis and average age of menopause					
		What is the average age of menopause ?			
		1.00	2.00	3.00	4.00
Do you have FHx of osteoporosis?	1.00	5	75	57	23
	2.00	2	141	111	40
	3.00	1	43	39	19

p=0.368

Table 3: Comparison between BMI and Do you have FHx of osteoporosis?

Comparison between BMI and Do you have FHx of osteoporosis?									
	Levene's Test for Equality of Variances		t-test for Equality of Means						
Do you have FHx of osteoporosis?	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
BMI	1.336	.248	.094	452	.925	.13576	1.44409	-2.70	2.97

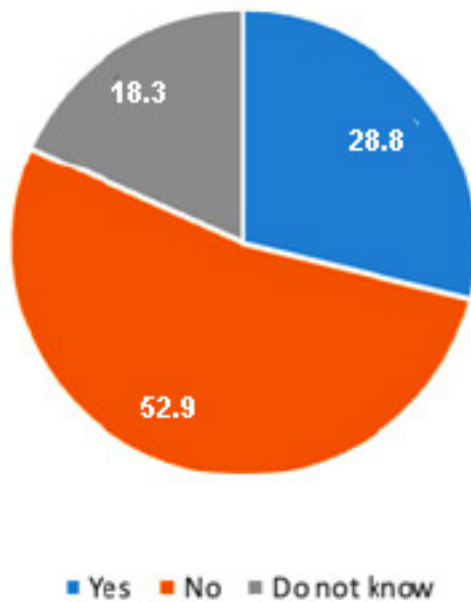**Figure 1: Prevalence of osteoporosis FHx of osteoporosis**

Figure 1 depictesthat 28.8% have FHx of osteoporosis

Table 4: Views and practices of the respondents

		Do you think obesity increases the chance of developing osteoporosis?		
		1.00	2.00	3.00
Do you have FHx of osteoporosis?	1.00	112	19	29
	2.00	203	47	44
	3.00	65	13	24
Total		380	79	97
p=0.280				

		Do you think the seeing a doctor regularly in the peri-menopausal period has a role in preventing osteoporosis?		
		1.00	2.00	3.00
Do you have FHx of osteoporosis?	1.00	125	5	30
	2.00	249	14	31
	3.00	75	4	23
Total		449	23	84
p=0.024				

		Do you think smoking increases the chance of developing osteoporosis ?		
		1.00	2.00	3.00
Do you have FHx of osteoporosis?	1.00	105	8	47
	2.00	206	27	61
	3.00	63	6	33
Total		374	41	141
p=0.047				

		Do you think excessive drinking of coffee / tea increases the chance of developing osteoporosis?		
		1.00	2.00	3.00
Do you have FHx of osteoporosis?	1.00	72	37	51
	2.00	139	98	57
	3.00	38	26	38
Total		249	161	146
p=0.001				

		Do you think exercising regularly and losing weight are preventing factors for osteoporosis?		
		1.00	2.00	3.00
Do you have FHx of osteoporosis?	1.00	135	7	18
	2.00	260	10	24
	3.00	84	5	13
Total		479	22	55
p=0.564				

		Do you think the long-term use of corticosteroids increases the chance of developing osteoporosis?		
		1.00	2.00	3.00
Do you have FHx of osteoporosis?	1.00	67	8	85
	2.00	146	19	129
	3.00	41	3	58
Total		254	30	272
p=0.115				

Table 4: Views and practices of the respondents (continued)

		Do you think the menopause increases the chance of developing osteoporosis?		
		1.00	2.00	3.00
Do you have FHx of osteoporosis?	1.00	136	5	19
	2.00	214	35	45
	3.00	71	10	21
Total		421	50	85
p=0.005				
		Do you think taking calcium supplements and having a diet high in calcium during the peri-menopausal period reduces the chance of developing osteoporosis?		
		1.00	2.00	3.00
Do you have FHx of osteoporosis?	1.00	118	9	33
	2.00	215	29	50
	3.00	70	1	31
Total		403	39	114
p=0.003				
		Do you think taking vitamin D supplements and a diet high in vitamin D during the peri-menopausal period reduces the chance of developing osteoporosis?		
		1.00	2.00	3.00
Do you have FHx of osteoporosis?	1.00	84	13	63
	2.00	189	22	83
	3.00	49	10	43
Total		322	45	189
p=0.023				
		Do you work or study in a health specialty ?		Total
		1.00	2.00	
Do you have FHx of osteoporosis?	1.00	52	108	160
	2.00	138	156	294
	3.00	39	63	102
Total		229	327	556
p=0.009				

Discussion

The main aim of the study was to find out the understanding of risk factors and preventive measures for osteoporosis in postmenopausal women among the general population in Aseer region, Saudi Arabia.

The current study found a link between the level of knowledge about osteoporosis and marital status, previous knowledge about osteoporosis, and the source of health information. According to the analysis, regardless of prior knowledge of osteoporosis, the majority of respondents had insufficient knowledge of osteoporosis and its prevention.

We discovered that less than half the patients could link caffeine, smoking, and alcohol consumption to an increased risk of osteoporosis. Smoking, caffeine and alcohol consumption have all been linked to lower bone mineral density . These findings suggest that raising awareness about risk factors for osteoporosis, such as low dietary calcium intake, caffeine consumption, early menopause, and sedentary lifestyle, may assist people at risk in taking steps to prevent disease occurrence. Individual and community awareness of all risk factors to the problem is critical for developing effective preventive methods for a specific disease.

Another significant finding reflected in the current study is the widely accepted fact that there is an inverse relationship between age and BMD in cases of osteopenia and osteoporosis, which is likely due to calcium mobilisation from bone. According to the current study, getting older increased the risk of osteopenia and osteoporosis.

In contrast to our findings, one Indian study discovered that in the views of the respondents there was no direct relationship between vitamin D levels and osteoporosis.
Women's health education campaigns demonstrating osteoporosis prevention measures, such as changing unhealthy lifestyles to maximize bone mass density, increasing calcium intake, and regular weight-bearing exercise, must be implemented.

This study recognises some limitations. However, the convenience sample is not representative of women outside of the selected region; additionally, the small sample size was another limitation that raised concerns about generalising its findings to Saudi Arabian women in general. It is suggested that future studies are conducted with larger sample sizes, including pre- and postmenopausal women from different regions of Saudi Arabia.

Conclusion

Osteoporosis is a serious public health issue that is currently causing worldwide concern. Because it is a silent and incurable disease, many people are unaware of it until complications arise. It is more prevalent in women after menopause. Because osteoporosis is difficult to treat and still incurable, prevention is critical. Overall, interprofessional team coordination is required to target the issue at the community level, which includes patient education and raising awareness through general practitioners. Social services can help reach out to specific populations and vulnerable groups.

Nursing staff should actively educate women, particularly postmenopausal women, about the importance of smoking cessation, walking/active lifestyle, and exercise regimens.
Referral to specialists is critical in preventing secondary osteoporosis in patients with non-modifiable risk factors, such as autoimmune diseases and long-term steroid use. Patient education and clear communication among members of interprofessional teams are critical for effectively assessing

References

Osterhoff G, Morgan EF, Shefelbine SJ, et al. Bone mechanical properties and changes with osteoporosis. Injury. 2016;47(Suppl 2):S11–20. doi: 10.1016/s0020-1383(16)47003-8. [PMC free article] [PubMed] [CrossRef] [Google Scholar]

2. Ji MX, Yu Q. Primary osteoporosis in postmenopausal women. Chronic Dis Transl Med. 2015;1:9–13. doi: 10.1016/j.cdtm.2015.02.006. [PMC free article] [PubMed] [CrossRef] [Google Scholar]

3. Liu X, Baylin A, Levy PD. Vitamin D deficiency and insufficiency among US adults: prevalence, predictors and clinical implications. Br J Nutr. 2018;119:928–36. doi: 10.1017/s0007114518000491. [PubMed] [CrossRef] [Google Scholar]

4. Black DM, Rosen CJ. Clinical practice. Postmenopausal osteoporosis. N Engl J Med. 2016;374:254–62. doi: 10.1056/NEJMcp1513724. [PubMed] [CrossRef] [Google Scholar]

5. Tella SH, Gallagher JC. Prevention and treatment of postmenopausal osteoporosis. J Steroid Biochem Mol Biol. 2014;142:155–70. doi: 10.1016/j.jsbmb.2013.09.008. [PMC free article] [PubMed] [CrossRef] [Google Scholar]

6. Park JS, Piao J, Park G, et al. Osteoporotic conditions influence the activity of adipose-derived stem cells. Tissue Eng Regen Med. 2020;17:875–85. doi: 10.1007/s13770-020-00289-x. [PMC free article] [PubMed] [CrossRef] [Google Scholar]

7. Osman AA. Assessment of osteoporosis KAP among women in Assir region, Saudi Arabia. J Med Medical Sci. 2013;4:50–5. [Google Scholar]

8. Ailinger RL, Lasus H, Braun MA. Revision of the facts on osteoporosis quiz. Nurs Res. 2003;52:198–201. doi: 10.1097/00006199-200305000-00010. [PubMed] [CrossRef] [Google Scholar]

9. Werner P. Knowledge about osteoporosis: assessment, correlates and outcomes. Osteoporos Int. 2005;16:115–27. doi: 10.1007/s00198-004-1750-y.

Vestergaard P. Discrepancies in bone mineral density and fracture risk in patients with type 1 and type 2 diabetes--a meta-analysis. Osteoporos Int. 2007;18:427–44. https://doi.org/10.1007/s00198-006-0253-4 . PMid:17068657. [PubMed] [Google Scholar]

19. Lo SS. Bone health status of postmenopausal Chinese women. Hong Kong Med J. 2015;21:536–41. PMid:26492837. [PubMed] [Google Scholar]

10. Lin LP, Hsu SW, Yao CH, et al. Risk for osteopenia and osteoporosis in institution-dwelling individuals with intellectual and/or developmental disabilities. Res Dev Disabil. 2014;36C:108–113. PMid:25462471. [PubMed] [Google Scholar]

11. Betancourt Ortiz SL. [Bone mineral density, dietary calcium and risk factor for presumptive osteoporosis in Ecuadorian aged women] Nutr Hosp. 2014;30:372–84. PMid:25208793. [PubMed] [Google Scholar]

12. Billington EO, Grey A, Bolland MJ. The effect of thiazolidinediones on bone mineral density and bone turnover: systematic review and meta-analysis. Diabetologia. 2015;58:2238–46. https://doi.org/10.1007/s00125-015-3660-2 . PMid:26109213. [PubMed] [Google Scholar]

13. Monami M, Cresci B, Colombini A, et al. Bone fractures and hypoglycemic treatment in type 2 diabetic patients. Diabetes Care. 2008;31:199–203. https://doi.org/10.2337/dc07-1736 . PMid:18024851. [PubMed] [Google Scholar]

14. Kumar BS, Ravisankar A, Mohan A, Kumar DP, Katyarmal DT, Sachan A, et al. Effect of oral hypoglycaemic agents on bone metabolism in patients with type 2 diabetes mellitus & occurrence of osteoporosis. Indian J Med Res. 2015;141:431–7. https://doi.org/10.4103/0971-5916.159287 . PMid:26112844. PMCid:PMC4510723. [PMC free article] [PubMed] [Google Scholar]

15. Chen H, Deng L, Li J. Prevalence of Osteoporosis and Its Associated Factors among Older Men with Type 2 Diabetes. International Journal of Endocrinology. 2013. p. 285729. https://doi.org/10.1155/2013/285729 . [PMC free article] [PubMed]

Knypl K. Osteoporozy – wybrane zagadnienia. Geriat Pol. 2005;1:43–46. [Google Scholar]

16. Chwojnowska Z, Charzewska J. Osteoporoza – aktualne wyzwanie. Żyw Człow. 2008;35:151–184. [Google Scholar]

17. Halaba Z. Profilaktyka osteoporozy. In: Pluskiewicz G, editor. Osteoporoza. Praktyczne zasady opieki lekarskiej nad chorym z osteoporozą. Warszawa: Med Trib Pol; 2010. pp. 67–70. [Google Scholar]

18. Nawrot-Szołtysik A, Żmudzka-Wilczek E, Doroniewicz I. Profilaktyka i usprawnianie ruchowe u chorych z osteoporozą Rehabil Prakt. 2010;1:21–24. [Google Scholar]

19. Akesson K, Marsh D, Mitchell PJ, et al. Capture the fracture: a best practice framework and global campaign to break the fragility fracture cycle. Osteoporosis Int. 2013;24:2135–2152