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Osteoporosis Knowledge Among the General Population in Jeddah, Saudi Arabia: A Cross-Sectional study

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Abstract— Background*:* Osteoporosis is a major chronic health issue that affects the patient's quality of life. Since most patients are asymptomatic, knowledge and awareness of osteoporosis and its risk factors are extremely important in disease progression and prevention. **Objectives*:*** This study aimed to estimate the level of knowledge about osteoporosis and its relation with age, gender, and educational level among the general population in Jeddah city, Saudi Arabia. **Methods*:*** A cross-sectional study was conducted from July to August 2020 and included 412 randomly selected participants. A self-reported validated questionnaire was distributed online through social media applications. The questionnaire was divided into two sections: demographic data and knowledge about risk factors and general knowledge of osteoporosis. ***Results:*** The majority of the participants were women (70.4%). Most participants were young adults (16–30-year-olds; 56.1%) and 59% had a bachelor's degree. Overall, 47.8% of the participants had good knowledge scores regarding osteoporosis. Pearson's chi-squared tests showed no association between the participants' level of knowledge about osteoporosis and their gender (p = 0.164), educational level (p = 0.425), or age (p = 0.346). The most commonly-known risk factor was vitamin D deficiency. **Conclusion*:*** Most of the representative residents of Jeddah had a good level of knowledge about osteoporosis, and there was no association between age, gender, or educational level and knowledge about osteoporosis. We recommend interventions to increase the level of knowledge about the disease.

Keywords: Osteoporosis, Knowledge, Risk Factors, Vit D, General population.

1. Introduction

Osteoporosis is one of the most common silent diseases worldwide.[1] It compromises bone strength and increases the chances of bone fractures.[2] In Saudi Arabia, osteoporosis affects one in three women and one in five men above the age of 50 years,[3] and has a female-to-male preponderance of 2:1.[4]Non-modifiable risk factors for osteoporosis include age, gender, family history, and race. Modifiable risk factors includevitamin D deficiency, low levels of sex hormones, and smoking.[1,5]The most common fracture sites are the forearm, spine, and hip.[6] Hip fractures usually affect the elderly causing debilitating pain and decrease in quality of life.[7]

Improving knowledge and awareness regarding osteoporosis may reduce the incidence and later complications as well as help improve the quality of patient care.[8] In 2017, a study conducted in Riyadh found that there was good knowledge (69%) about osteoporosis[9] and another study conducted in Abha showed that 52% had good knowledge about osteoporosis risk factors and symptoms.[10] In 2019, one study of university students and another of the general population of Jazan showed that there was good knowledge

and awareness about osteoporosis.[11,12]

However, no study has assessed the knowledge of osteoporosis among the general population in Jeddah. Therefore, this study aimed to estimate knowledge about osteoporosis and its relationship with demographic factors among the general population in Jeddah, Saudi Arabia

2. Methods

The study was approved by the Dr. Soliman Fakeeh Hospital Scientific Research Review Committee. A descriptive cross-sectional study was conducted in Jeddah, Saudi Arabia. Data were collected from July to August of 2020. All women and men aged 16 years or older were invited to participate in this study, and all responses that provided sufficient information were included in this study. The sample size was calculated using the Raosoft calculator,[13] and the study enrolled 385 randomly selected participants. Data were collected via a validated online questionnaire, which was translated into Arabic and then distributed through social media applications. After we assured confidentiality, the participants were asked to fill out the questionnaire after they provided informed consent and read the purpose of the study briefly.[14-18]

The questionnaire was divided into two sections. The first section dealt with demographic data, including gender, age, educational level, and region of residence in Jeddah city (South, North, Eastern, or Central region). The second section consisted of 28 short multiple-choice questions. Section 2-A evaluated the participants' knowledge about the risk factors of osteoporosis, and section 2-B evaluated their general knowledge. The choices were categorized as "agree," "disagree," and "don't know" (do not know). Correct answers received a score of 1 and incorrect answers or "don't know" answers received a score of 0. The level of knowledge was classified into 4 domains: poor (0–7 correct answers, 0%–25%), average (8–14 correct answers, 26%–50%), good (15–21 correct answers, 51%–75%), and high (22–28 correct answers, 76%–100%).

3. Statistical Analysis

The data were entered using Microsoft Excel 2013 (Microsoft Corporation, WA, USA) and analysed using the Statistical Package for Social Science program version 21 (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp). Descriptive statistics were reported as frequencies and percentages. Pearson's chi-squared test was used to test the relationship between the level of osteoporosis knowledge, gender, age, and educational level. A p-value < 0.05, was used as the cut-off value for statistical significance and a confidence interval of 95% was used.

4. Results

4.1 Participants' characteristics

In total, 412 responses were obtained and reported. The majority of the responses (70.4%) were from women, while 29.6% of responses were from men. Young adults (16 to 30-year-olds) constituted the major age group with a total of 231 responses (56.1%). The remaining responses were from middle-aged adults (31 to 45-year-olds) with 102 responses (24.8%), old-aged adults (46 to 65-year-olds) with 74 responses (18%), and the elderly (> 65 years old) with five responses (1.2%). Most of the participants had good education, with 243 (59%) having a Bachelor's degree. Only one participant of the total had not received formal education.

4.2 Knowledge of osteoporosis

Analysis of the participants' knowledge yielded a spectrum of results, with 47.8% having a good level of general knowledge regarding osteoporosis. Overall, the mean total knowledge score was 16.67 (±standard

deviation (SD) = 4.8), and the median score was 17 (from a total of 28). Most participants identified vitamin D deficiency as one of the leading causes of osteoporosis (93%). Additionally, most participants (78.9%) were aware of the preventive role of breastfeeding against osteoporosis. However, only 48.3% of the participants agreed that smoking was a risk factor for osteoporosis development, and 51.7% were also unaware that tea protects against osteoporosis.

4.3 Gender and osteoporosis knowledge

A Pearson's chi-squared test showed no relationship between the participants' gender and their level of osteoporosis knowledge (p = 0.164; Table 1).

Table 1: Level of osteoporosis knowledge among participants

Category	**Degree of knowledge**				***p*-value**
	Poor	**Average**	**Good**	**High**	
All respondents (412)	1.5%	33%	47.8%	17.7%	
Age group					0.346
Young adult (231)	2.2%	28.6%	51.5%	17.7%	
Middle-aged adult (102)	1%	40.2%	42.2%	16.7%	
Old-aged adult (74)	0.0%	37.8%	41.9%	20.3%	
Elderly (5)	0.0%	20%	80%	0.0%	
Gender					0.164
Male (122)	0.8%	35.2%	41%	23%	
Female (290)	1.5%	33%	47.8%	17.7%	
Educational level					
Uneducated (1)	0.0%	0.0%	0.0%	100%	0.425
Intermediate degree (5)	0.0%	40%	60%	0.0%	
Secondary degree (102)	2%	34.3%	50%	13.7%	
Diploma (33)	6.1%	42.4%	39.4%	12.1%	
Bachelor's degree (243)	0.8%	31.3%	47.7%	20.2%	
Master's degree (20)	0.0%	30%	45%	25%	
Doctorate(8)	0.0%	37.5%	62.5%	0.0%	

In the descriptive analysis of all questionnaire items in association with gender, we found that men had significantly higher knowledge about white individuals being more vulnerable to osteoporosis (p = 0.007). In contrast, women had more knowledge about osteoporosis risk factors such as vitamin D deficiency and menopause (p = 0.003 and 0.001, respectively; Table 2).

Table 2: Knowledge of risk factors for osteoporosis by (A) gender and (B) age

Question	A			B				
	Number (%) correctly answering each question							
	Male (n=122)	Female (n=290)	*p*-value	Young adult (n=231)	Middle-aged adult (n=102)	Old-aged adult (n=74)	Elderly (n=5)	*p*-value
Aging increases the chance of developing osteoporosis	102 (83.6%)	261 (90%)	0.116	209 (90.5%)	81 (79.4%)	69 (93.2%)	4 (80%)	0.001
Heredity plays a role in susceptibility to osteoporosis	87 (71.3%)	150 (51.7%)	0.001	159 (68.8%)	42 (41.2%)	32 (43.2%)	4 (80%)	0.001
Race and ethnicity play a role in susceptibility to osteoporosis	56 (45.9%)	102 (35.2%)	0.109	115 (49.8%)	24 (23.5%)	15 (20.3%)	4 (80%)	0.001
Skin colour plays a role in developing osteoporosis	33 (27%)	60 (20.7%)	0.049	66 (28.6%)	17 (16.7%)	10 (13.5%)	0 (0%)	0.001
People with white skin colour are more susceptible to osteoporosis than others	40 (32.8%)	58 (20%)	0.007	54 (23.4%)	25 (24.5%)	19 (25.7%)	0 (0%)	0.024
Vitamin D deficiency leads to developing osteoporosis	106 (86.9%)	277 (95.5%)	0.003	218 (94.4%)	90 (88.2%)	70 (94.6%)	5 (100%)	0.396
Lack of adequate sun exposure may increase the chance of developing osteoporosis	110 (90.2%)	269 (92.8%)	0.487	218 (94.4%)	90 (88.2%)	66 (89.2%)	5 (100%)	0.259
Sedentary lifestyle may increase the risk of developing osteoporosis	98 (80.3%)	231 (79.7%)	0.725	173 (74.9%)	91 (89.2%)	60 (81.1%)	5 (100%)	0.007
Drinking alcohol increases the risk of developing osteoporosis	68 (55.7%)	175 (60.3%)	0.046	137 (59.3%)	62 (60.8%)	44 (59.5%)	0 (0%)	0.177
Drinking coffee increases the risk of developing osteoporosis	27 (22.1%)	78 (26.9%)	0.593	57 (24.7%)	29 (28.4%)	19 (25.7%)	0 (0%)	0.608
High salt (table salt) intake increases the risk of developing osteoporosis	36 (29.5%)	75 (25.9%)	0.565	43 (18.6%)	45 (44.1%)	22 (29.7%)	1 (20%)	0.001
Smoking increases the risk of developing osteoporosis	62 (50.8%)	137 (47.2%)	0.800	120 (51.9%)	47 (46.1%)	30 (40.5%)	2 (40%)	0.312
Pregnancies increase the chance of developing osteoporosis	80 (65.6%)	189 (65.2%)	0.586	138 (59.7%)	72 (70.6%)	58 (78.4%)	1 (20%)	0.001
Menopause in women can increase women’s risk of	50 (41%)	187 (64.5%)	0.001	125 (54.1%)	52 (51%)	56 (75.7%)	4 (80%)	0.029

developing osteoporosis								
Thyroid-related diseases increase the chance of developing osteoporosis	63 (51.6%)	121 (41.7%)	0.166	117 (50.6%)	34 (33.3%)	32 (43.2%)	1 (20%)	0.005
Hormonal factors play a role in developing osteoporosis	74 (60.7%)	152 (52.4%)	0.302	147 (63.6%)	41 (40.2%)	38 (51.4%)	0 (0%)	0.001
Taking certain drugs may increase the chance of developing osteoporosis	87 (71.3%)	177 (61%)	0.081	171 (74%)	48 (47.1%)	44 (59.5%)	1 (20%)	0.001
Chemotherapy treatment may increase the chance of developing osteoporosis	81 (66.4%)	183 (63.1%)	0.227	161 (69.7%)	51 (50%)	48 (64.9%)	4 (80%)	0.021

Knowledge about complications such as bone fractures was more common among women (72.1%). Of the 325 respondents who agreed that breastfeeding infants is one of the preventive measures against future osteoporosis development, 217 were women ($p = 0.008$; Table 3).

Table 3: Knowledge of other aspects for osteoporosis by (A) gender and (B) age

Question	**A**			**B**				
	Number (%) correctly answering each question							
	Male (n=122)	**Female (n=290)**	***p*-value**	**Young adult (n=231)**	**Middle-aged adult (n=102)**	**Old-aged adult (n=74)**	**Elderly (n=5)**	***p*-value**
Osteoporosis is a common disease in Saudi Arabia	66 (54.1%)	217 (74.8%)	0.001	147 (63.6%)	78 (76.5%)	55 (74.3%)	3 (60%)	0.021
Sustaining bone fractures is related to osteoporosis	72 (59%)	209 (72.1%)	0.029	152 (65.8%)	65 (63.7%)	59 (79.7%)	5 (100%)	0.151
Back pain, difficulties in walking, and sustaining bone fractures are all signs of developing osteoporosis	79 (64.8%)	209 (72.1%)	0.134	163 (70.6%)	74 (72.5%)	47 (63.5%)	4 (80%)	0.139
Osteoporosis can affect dental health and cause teeth to fall out.	90 (73.8%)	216 (74.5%)	0.089	171 (74%)	81 (79.4%)	49 (66.2%)	5 (100%)	0.270
Drinking tea protects from osteoporosis	11 (9%)	11 (3.8%)	0.033	12 (5.2%)	7 (6.9%)	3 (4.1%)	0 (0%)	0.558
Regulating dietary habits has a role in preventing osteoporosis	110 (90.2%)	254 (87.6%)	0.630	197 (85.3%)	95 (93.1%)	67 (90.5%)	5 (100%)	0.451
Having dairy products plays a role in preventing osteoporosis	104 (85.2%)	213 (73.4%)	0.027	170 (73.6%)	88 (86.3%)	58 (78.4%)	1 (20%)	0.002
Breastfeeding may result in lower risk of developing	108 (88.5%)	217 (74.8%)	0.008	172 (74.5%)	87 (85.3%)	61 (82.4%)	5 (100%)	0.040

osteoporosis in the future								
Sports help maintain healthy bones and prevent problems that would happen from osteoporosis	118 (96.7%)	275 (94.8%)	0.691	219 (94.8%)	96 (94.1%)	73 (98.6%)	5 (100%)	0.824
There is a definitive treatment for osteoporosis	40 (32.8%)	115 (39.7%)	0.422	94 (40.7%)	36 (35.3%)	25 (33.8%)	0 (0%)	0.318

4.4 Age and Osteoporosis knowledge

A Pearson's chi-squared test showed that there was no relationship between the participants' age and their level of osteoporosis knowledge (*p* = 0.346; Table 1). None of the five elderly participants knew that being white and high coffee consumption were associated with a high risk of developing osteoporosis. However, most of the participants belonged to the young adult age group, and showed a high level of knowledge about risk factorsfor osteoporosis (Table 2) such as aging (90.5%), low vitamin D (94.4%), and inadequate sun exposure (94.4%).

4.5 Educational level and Osteoporosis knowledge

A Pearson's chi-squared test showed that there was no relationship between the participants' educational level and their level of osteoporosis knowledge (*p = 0.425*; Table 1).

Among participants with academic degrees, 40% of those with a master's degree and 28% of those with a bachelor's degree knew about the relationship between coffee consumption and osteoporosis development (*p* = 0.003; Table 4).

Table 4: Knowledge of risk factors for osteoporosis by educational level

Question	**Number (%) correctly answering each question**							
	Uneducated (n=1)	**Intermediate degree (n=5)**	**Secondary degree (n=102)**	**Diploma (n=33)**	**Bachelor's degree (n=243)**	**Master's degree (n=20)**	**Doctorate (n=8)**	***p*-value**
Aging increases the chance of developing osteoporosis	1 (100%)	4 (80%)	90 (88.2%)	27 (81.8%)	216 (88.9%)	17 (85%)	8 (100%)	0.271
Heredity plays a role in susceptibility to osteoporosis	1 (100%)	1 (20%)	66 (64.7%)	19 (57.6%)	132 (54.3%)	10 (50%)	8 (100%)	0.087
Race and ethnicity play a role in susceptibility to osteoporosis	1 (100%)	1 (20%)	45 (44.1%)	11 (33.3%)	90 (37%)	5 (25%)	5 (62.5%)	0.707

Skin colour plays a role in developing osteoporosis	0 (0%)	1 (20%)	27 (26.5%)	6 (18.2%)	55 (22.6%)	4 (20%)	0 (0%)	0.835
People with white skin colour are more susceptible to osteoporosis than others	0 (0%)	1 (20%)	30 (29.4%)	5 (15.2%)	56 (23%)	6 (30%)	0 (0%)	0.061
Vitamin D deficiency leads to developing osteoporosis	1 (100%)	4 (80%)	95 (93.1%)	30 (90.9%)	227 (93.4%)	18 (90%)	8 (100%)	0.926
Lack of adequate sun exposure may increase the chance of developing osteoporosis	1 (100%)	5 (100%)	94 (92.2%)	29 (87.9%)	224 (92.2%)	19 (95%)	7 (87.5%)	0.606
Sedentary lifestyle may increase the risk of developing osteoporosis	1 (100%)	4 (80%)	80 (78.4%)	23 (69.7%)	198 (81.5%)	15 (75%)	8 (100%)	0.496
Drinking alcohol increases the risk of developing osteoporosis	1 (100%)	4 (80%)	58 (56.9%)	14 (42.4%)	152 (62.6%)	12 (60%)	2 (25%)	0.054
Drinking coffee increases the risk of developing osteoporosis	1 (100%)	0 (0%)	23 (22.5%)	5 (15.2%)	68 (28%)	8 (40%)	0 (0%)	0.003
High salt (table salt) intake increases the	1 (100%)	1 (20%)	23 (22.5%)	8 (24.2%)	66 (27.2%)	10 (50%)	2 (25%)	0.372

risk of developing osteoporosis								
Smoking increases the risk of developing osteoporosis	1(100%)	4 (80%)	47 (46.1%)	7 (21.2%)	127 (52.3%)	10 (50%)	3 (37.5%)	0.046
Pregnancies increase the chance of developing osteoporosis	0 (0%)	2 (40%)	61 (59.8%)	17 (51.5%)	170 (70%)	16 (80%)	3 (37.5%)	0.028
Menopause in women can increase women's risk of developing osteoporosis	1 (100%)	4 (80%)	51 (50%)	16 (48.5%)	144 (59.3%)	16 (80%)	5 (62.5%)	0.542
Thyroid-related diseases increase the chance of developing osteoporosis	1 (100%)	2 (40%))	53 (52%)	10 (30.3%)	105 (43.2%)	8 (40%)	5 (62.5%)	0.466
Hormonal factors play a role in developing osteoporosis	1 (100%)	3 (60%)	65 (63.7%)	19 (57.6%)	126 (51.9%)	7 (35%)	5 (62.5%)	0.494
Taking certain drugs may increase the chance of developing osteoporosis	1 (100%)	3 (60%)	74 (72.5%)	18 (54.5%)	150 (61.7%)	14 (70%)	4 (50%)	0.405
Chemotherapy treatment may increase the chance of developing osteoporosis	1 (100%)	3 (60%)	69 (67.6%)	22 (66.7%)	152 (62.6%)	12 (60%)	5 (62.5%)	0.856

A significant relationship was also found between participants' level of education and knowing that smoking predisposes a person to osteoporosis development; 50% of participants with a master's degree and 37.5% of those with a doctoral degree (Ph.D.) agreed with the statement ($p = 0.046$; Table 4). Approximately 62% of

participants with a Ph.D., 20% of those with a master's degree, and 37.9% of those with a bachelor's degree responded that there is no definitive treatment for osteoporosis ($p = 0.03$; Table 5).

Table 5: Knowledge of other aspects of osteoporosis by educational level

Question	Number (%) correctly answering each question							
	Uneducated (n=1)	Intermediate degree (n=5)	Secondary degree (n=102)	Diploma (n=33)	Bachelor's degree (n=243)	Master's degree (n=20)	Doctorate(n=8)	*p*-value
Osteoporosis is a common disease in Saudi Arabia	1 (100%)	4 (80%)	57 (55.9%)	21 (63.6%)	179 (73.7%)	18 (90%)	3 (37.5%)	0.001
Sustaining bone fractures is related to osteoporosis	1 (100%)	4 (80%)	65 (63.7%)	20 (60.6%)	174 (71.6%)	12 (60%)	5 (62.5%)	0.498
Back pain, difficulties in walking and sustaining bone fractures are all signs of developing osteoporosis	1 (100%)	3 (60%)	65 (63.7%)	20 (60.6%)	184 (75.7%)	12 (60%)	3 (37.5%)	0.106
Osteoporosis can affect dental health and cause teeth to fall out.	1 (100%)	3 (60%)	78 (76.5%)	22 (66.7%)	183 (75.3%)	13 (65%)	6 (75%)	0.818
Drinking tea protects from osteoporosis	0 (0%)	0 (0%)	2 (2%)	4 (12.1%)	16 (6.6%)	0 (0%)	0 (0%)	0.124
Regulating dietary	1 (100%)	4 (80%)	89 (87.3%)	28 (84.8%)	214 (88.1%)	20 (100%)	8 (100%)	0.846

habits has a role in preventing osteoporosis				)				
Having dairy products plays a role in preventing osteoporosis	1 (100%)	3 (60%)	76 (74.5%)	24 (72.7%)	192 (79%)	18 (90%)	3 (37.5%)	0.133
Breastfeeding babies helps decrease their chances of developing osteoporosis in the future	0 (0%)	5 (100%)	73 (71.6%)	27 (81.8%)	195 (80.2%)	17 (85%)	8 (100%)	0.001
Sports help maintain healthy bones and prevent problems that would happen from osteoporosis	1 (100%)	5 (100%)	99 (97.1%)	32 (97%)	228 (93.8%)	20 (100%)	8 (100%)	0.962
There is a definitive treatment for osteoporosis	1 (100%)	0 (0%)	46 (45.1%)	7 (21.2%)	92 (37.9%)	4 (20%)	5 (62.5%)	0.030

5. Discussion

This study aimed to measure the degree of knowledge about osteoporosis among the residents of Jeddah city in Saudi Arabia. The results showed that 47.8% of respondents had a good level of knowledge about osteoporosis, with a mean total knowledge score of 16.7 (±SD = 4.8) out of 28.

The level of knowledge regarding osteoporosis has been previously evaluated in different regions. A study conducted in Riyadh, Saudi Arabia, revealed that 56.6% of the participants had a mean of knowledge score of 13.62 (±SD = 4) out of a maximum score of 24 [16]. Another study conducted among students from four universities in different cities in Saudi Arabia used the same questionnaire and scoring system as our study, and reported that 45.1% of the participants had a good level of knowledge.[19] Additionally, a similar study in Qatar used an arbitrary scoring system that marked participants who answered 75%–85% of the questionnaire correctly as having good knowledge, and showed that 47.3% of their participants had good knowledge of the disease.[20] These findings highlight similar knowledge levels regarding osteoporosis among most of the Gulf population.

A good level of knowledge about osteoporosis is acceptable, although the score was expected to be higher due to access to media, which makes it easier to access any information, as well as the fact that the majority of our participants (59%) had a bachelor's degree. However, we did not find an association between the participants' educational level and their knowledge level ($p = 0.425$). This result is similar to that of a study conducted in Majmaah City, Saudi Arabia, which noted no significant difference between educational level and knowledge about osteoporosis ($p = 0.111$).[21] In contrast, some previous studies have shown that a higher educational degree was associated with better knowledge about osteoporosis. A study conducted in Jazan city reported that participants with graduate degrees (above secondary degree) had significantly higher knowledge of osteoporosis than non-graduate participants ($p = 0.001$). Similar results have also been reported in studies conducted among women in Vietnam ($p < 0.01$) and South Poland ($p = 0.02$).[12,17,22]

Osteoporosis is a common disease in women, and women are definitely more predisposed to the disease, especially when accompanied by menopause.[23] This tends to translate into women knowing more about osteoporosis in general and about its risk factors. However, we found no difference in knowledge level between the genders ($p = 0.164$), which is consistent with a study conducted in Qatar ($p = 0.380$).[20] However, contrasting results have been reported in the literature. A 2019 study conducted in Malaysia showed that women had significantly higher levels of knowledge about osteoporosis than men ($p = 0.001$).[24] Furthermore, Chinese women aged more than 55 years were found to have significantly better knowledge about osteoporosis ($p < 0.001$).[25]

We found no significant difference in knowledge about osteoporosis between age groups ($p = 0.346$). This is consistent with the results of studies in Qatar and Riyadh that found no statistical difference between age groups ($p = 0.608$ and 0.472, respectively).[14,20]

When discussing risk factors such as smoking and alcohol consumption, 48.3% and 59% of respondents, respectively, agreed that excessive indulgence contributes to osteoporosisdevelopment. This finding was congruent with that of a study that reported high levels of knowledge about the association between smoking and alcohol consumption and osteoporosis manifestation.[9]

Despite the negative effects of excessive coffee consumption on bone health, 74.5% of our respondents did not know that there is an association between coffee consumption and osteoporosis. In comparison, a previous study conducted in Lublin, Poland, reported that 71.7% of participants were aware of this association.[26] A relationship between high caffeine consumption and an increased risk of future osteoporotic fractures was established in a study that followed up women with low calcium intake for 10.3 years ($p = 0.002$). However, there was no correlation between tea consumption and fractures.[27] Our results highlight a lack of knowledge about the association between coffee consumption and the risk of developing osteoporosis that needs to be addressed. In addition, the amount of daily coffee consumption that does not lead to osteoporosis should be assessed in future empirical studies.

Along with osteoporosis risk factors, 93% of our respondents knew about vitamin D deficiency being a leading cause of the disease, which demonstrates good overall knowledge in the Saudi community.Knowledge assessment of the role of vitamin D in disease prevention is essential, especially when the local population has a high prevalence of vitamin D deficiency according to prior research

conducted in Jeddah in 2017.[28] Moreover, 95.4% of our respondents agreed that exercise is one of the preventive factors of the disease. A 2017 study conducted in Abha city reported that 42% of the participants had good knowledge about the importance of physical activity in preventing osteoporosis.[10] These results highlight the increasing awareness among the population regarding the advantage of physical exercises in the prevention of most chronic diseases.

6. Limitations

The present study had some limitations. There were more women than men among the participants (2:1). The cross-sectional study design as well as the use of self-reported questionnaires also limit the power of the study.

7.Conclusion

Most of the population living in Jeddah had good knowledge about osteoporosis. We recommend the consistent provision of accurate information about osteoporosis risk factors and preventive methods through social media or educational programs and campaigns.

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