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Awareness of osteoporosis among general population in Ha'il city, Saudi Arabia

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ABSTRACT

Background: Osteoprosis is a common systemic disaes most prvalent in menopausal women. In absence of many studies from Saudi Arabia that have been published in this topic, we conducted this study to assess the public knowledge and awareness towards osteoporosis. *Methods*: This is a cross-sectional study that was carried out using a self-administered structured online survey tool through the "Google Forms" platform. The inclusion criteria were all individuals who agreed to participate in the study, aged ≥18 years, and residing orworking in Ha'il city. There were no restrictions on gender, eduaction, nationality, occupation, or socioeconomic level of the participants. All data were analyzed using Statistical Package for Social Science (SPSS) version 26.0. *Results:* A total of 701 valid responses were included in the final analysis, with a mean age of 32.64±10.38 years. Most of the participants were females (74.61%) and residing in Ha'il city (86.59%) and the majority of them were Saudi (97.72%). There was an obvious defect in the participants' total awareness, with a mean score of 11.56±3.66; out of 22 possible points. Moreover, there was no significant association between the total awareness score and age, gender, residence, nationality, educational level, employment, or marital status. *Conclusion*: Further approaches to increase the awareness levels among the general population are needed to intervene against the potential complications and enhance the prognosis.

Keywords: osteoporosis; Ha'il; awareness; Saudi Arabia

1. INTRODUCTION

Osteoporosis, which is characterized by the presence of a micro-architectural, low-bone mass deterioration, is a common systemic disorder of the skeletal system with a metabolic nature. It has been recently considered a major health issue due to its impact on the quality of life of the as a result of the limitation of movement and potential fractures (Klibanski et al., 2001). Such fractures commonly occur in the wrist, hip, or spine (Harvey et al., 2010). In addition, it has been classified together with cardiovascular diseases, diabetes, and obesity as an epidemic of the current century (Prevention, 2003) that attributes to many morbidities and mortalities among the elderly (Bliuc & Center, 2016;

von Friesendorff et al., 2016). The commonest risk factors in developing osteoprosis are inadequate nutrition, reduced vitamin D and calcium intake, genetics, smoking, and alcohol excessive consumption, and reduced production of sex hormones (Office of the Surgeon, 2003).

Previous estimates show that the disease affects around 200 million female patients globally with secondary 8.9 million bone fractures (Tomishige-Mukai et al., 2016). It is also projected that the risk of developing osteoporosis increases by the age of 50 years of age to one third and one fifth in female and male patients, respectively (Wark, 1999). Other projections also estimated that around half of osteoporosis patients are found in Asia, with the majority of these patients residing in China (Cooper et al., 1992). The prevalence of osteoporosis in Saudi Arabia is estimated to be 34-39.5% among female patients between 50 and 80 years of age while for male patients, the rate is 21.4-30.7% (Alwahhabi, 2015; Barzanji et al., 2013). Although Saudi Arabia is a sunny country, vitamin D deficiency is a common characteristic among Suadi patients, especially females (Albaik et al., 2016; Tuffaha et al., 2015).

Osteoporosis is underestimated and undertreated globally with noefficient public awareness on how it can induce serious complications (Harvey et al., 2017; Hernlund et al., 2013). Therefore, it is essential to raise the knowledge and awareness of the public towards osteoporosis for proper prevention and management. Previous studies showed that raising the public and physicians'awareness and knowledge about osteoporosis is effective in its management and intervention (Goelz et al., 2011; Shams et al., 2011). In the Middle East, Abushaikha et al., (2009) showed that approaches to increase public awareness and knowledge about osteoporosis were not effective in obtaining better outcomes. Besides, not many relevant studies from Saudi Arabia have been published in this field as a result of the reduced attention for patients suffering from osteoporosis (Saeedi et al., 2014). Thus, we conducted this study to assess the public knowledge and awareness towards osteoporosis.

2. METHODS

Study Design and Population

This is a cross-sectional study that was conducted by a self-administered structured online survey tool through the "Google Forms" platform. The inclusion criteria were all individuals who agreed to participate in the study, aged ≥18 years, and residing orworking in Ha'il city. There were no restrictions on gender, eduaction, nationality, occupation, or socioeconomic level of the participants. The exclusion criteria were all residents less than 18 years and those who refused taking part in the study.

Sampling and Data collection

All participants fulfilling the inclusion criteria were invited to participate. The sample size was calculated according to the specific country setting for this multinational study. Snowball sampling was used to select the study participants. An online link of the web-based questionnaire was developed using "Google Forms" for obtaining awareness data from November 2020 to December 2020. On the first page, a Plain Language Information Statement (PLIS) and Consent Form were placed with age emtry. Only the participants providing consent to participate in the study can move to the next section containing the screening questionnaire to confirm the age is consistent with the pre-defined criteria. Upon confirmation, the participants were moved to the next pages containing the self-administered questionnaire. The questionnaire was taken from a previously validated study by Almalki et al., (2016) with permission of use. Therefore, it was deemed valid and reliable.

Study tool

The final format of the survey tool consisted of 29 questions, which were divided into five different sections: (1) personal data (seven questions); (2) osteoporosis symptoms (two questions); (3) osteoporosis screening and prevention (seven questions); (4) treatment (two questions); and (5) risk factors (11 questions). For all that questions, the participants were given one point for every correct answer and zero for any wrong one. The entire questionnaire and scale are available in the supplementary data.

Ethical approval

The study has been conducted in alignment with outlined ethical principles in the Declaration of Helsinki and the known Ethical research and surveillance recommendations for emergencies and disasters. The study was approved by the ethical committee of University of Ha'il letter number Nr. 16784/5/42 project number H-2020-198. The survey link was available on the Google platform, and it did not require the participant to log in before filling the survey to ensure Anonymity and protect data confidentiality. The process did not gather IP addresses, web cache, or cookies. The Google platform was used to store the data during the availability period, and the final dataset was exported as a Microsoft Excel file.

Statistical analysis

All data were analyzed using Statistical Package for Social Science (SPSS) version 26.0. Standard descriptive were calculated for each question or item individually. For different awareness scores, data were represented with mean and standard deviation. Furthermore, a multivariable linear regression was performed to identify possible predictors for the total awareness score. A *p*-value of <0.05 was considered statistically significant.

3. RESULTS

A total of 701 valid responses were included in the final analysis, with a mean age of 32.64±10.38 years. Most of the participants were females (74.61%) and residing in Ha'il city (86.59%) and the majority of them were Saudi (97.72%). About two-thirds of the participants had a university degree or higher (73.47%) and were unemployed (65.19%) (Table 1).

Table 1 Baseline characteristics of the participants

Variables		Count	%
Age; mean±SD		32.64±10.38	
Gender	Female	523	74.61
	Male	178	25.39
Residence	Ha'il	607	86.59
	Outside Ha'il	94	13.41
Nationality	Non-Saudi	16	2.28
	Saudi	685	97.72
Educational level	Secondary school or less	186	26.53
	University degree or higher	515	73.47
Employment	Employed	244	34.81
	Unemployed	457	65.19
Marital status	Divorced	30	4.28
	Married	414	59.06
	Single	252	35.95
	Widow	5	0.71

SD: standard deviation

There was an obvious defect in the participants' total awareness, with a mean score of 11.56±3.66; out of 22 possible points. The best scores were observed in symptoms and screening/prevention items with mean scores of 1.59±0.54 (out of possible two points) and 4.12±1.59 (out of possible seven pints), respectively. In addition, the treatment and risk factors' awareness showed worse scores with 0.36±0.57 (out of possible two points) and 5.48±2.25 (out of possible 11 points) (Figure 1). As per the regression analysis, there was no significant association between the total awareness score andage, gender, residence, nationality, educational level, employment, or marital status (Table 2).

Table 2 Multivariate linear regression of different predictors to total awareness scores

Predictor	Estimate	SE	t	Standardized Estimate	95% Confidence Interval		P-value
					Lower	Upper	
Age	0.01	0.02	0.63	0.04	-0.07	0.14	0.528
Gender							
Female	*reference*						
Male	-0.62	0.34	-1.82	-0.17	-0.36	0.01	0.069
Residence							
Outside Ha'il	*reference*						
Ha'il	-0.36	0.4	-0.9	-0.1	-0.32	0.12	0.368
Nationality							

Non-Saudi	*reference*						
Saudi	0.27	1.15	0.24	0.08	-0.56	0.71	0.814
Educational level							
Secondary school or less	*reference*						
University degree or higher	-0.19	0.32	-0.59	-0.05	-0.23	0.12	0.553
Employment							
Unemployed	*reference*						
Employed	0.33	0.34	0.97	0.09	-0.09	0.28	0.331
Marital status							
Single	*reference*						
Divorced	-0.51	0.74	-0.69	-0.14	-0.55	0.26	0.492
Married	-0.25	0.4	-0.61	-0.07	-0.29	0.15	0.540
Widow	3.16	1.69	1.87	0.88	-0.04	1.81	0.062

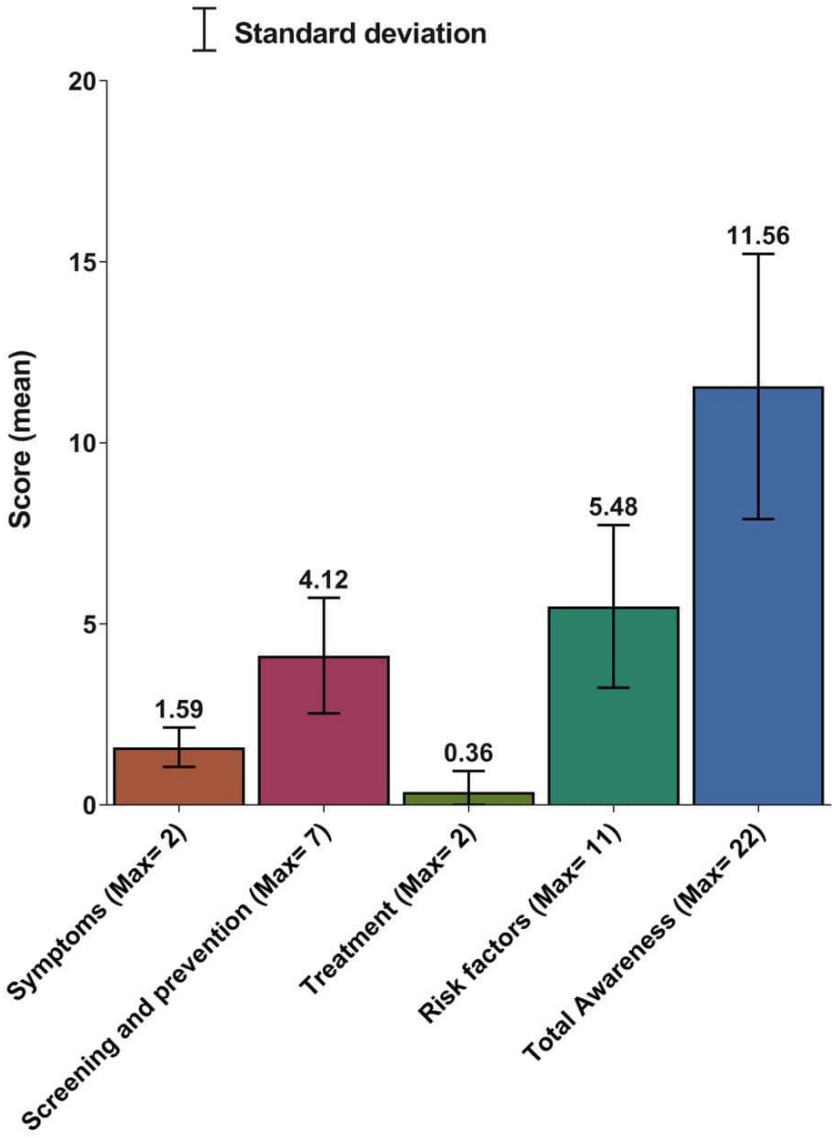

Figure 1 Mean values of the scoring system

4. DISCUSSION

In the present study, we have conducted a survey to investigate the awareness and knowledge of a Saudi general population towards osteoporosis. Our finding will introduce representative ideas about the status of awareness and knowledge of osteoporosis among the Saudi population in Ha'il city which will help the healthcare officials to construct effective management plans by achieving adequate interventions.

Our results showed that the total awareness score of osteoporosis is low. Besides, awareness of most of the assessed domains, including screening and prevention treatment and risk factors, is inadequate, while the mean scores of awareness were the highest in the present study. A previous study by Khan et al., (2019), which was conducted to assess the level of awareness among Saudi students, reported the level of awareness was good among their population. Good scores were also reported by a previous study from Saudi Arabia for university students (Barzanji et al., 2013; Saeedi et al., 2014). These results indicate that individuals with high levels of education might be more aware and knowledgeable about osteoporosis than others. This was indicated by many previous studies that reported that the level of awareness was positively significantly correlated with the participants' levels of education (Barzanji et al., 2013; Etemadifar et al., 2013; Khan et al., 2019; Van Minh et al., 2010).

The previous 2018 study that was conducted in Taif by Alharthi et al., (2017) also reported that the included participants were not aware of all the awareness domains of osteoporosis and suggested the application of effective approaches to raise public awareness towards the disease. Compared to other countries, a Turkish study reported that the level of awareness about osteoporosis among their rural female population was low (Gemalmaz & Oge, 2008). Even within osteopenic, and osteoporotic populations, Gopinathan et al., (2016) reported that none of these groups of postmenopausal women showed significantly higher awareness levels than normal individuals. Moreover, Janiszewska et al., (2016) conducted a polish study on men to find the level of awareness and risk factors of osteoporosis in their population. The authors reported that the level of awareness was deemed average, but not sufficient and further approaches to increase the level of awareness are needed. The inadequacy of knowledge about osteoporosis was indicated by Gaines & Marx, (2011) that conducted a systematic review of 13 studies and reported that most of these studies showed men's knowledge about osteoporosis is low. These results indicate that the low awareness about osteoporosis is a common phenomenon among the general population.

We have also assessed the different factors that can affect the level of awareness among our population. However, none of the investigated factors were significantly associated with the level of awareness which is inconsistent with the results of many previous studies. Alharthi et al., (2017) reported that highly educated female individuals had higher awareness levels than other individuals while age was inversely proportional to it. The level of education and general condition were also significantly associated with increased awareness levels of osteoporosis as reported by Janiszewska et al., (2016). Magnus et al., (1996) also reported that being in contact with an osteoporosis patient was correlated with increased levels of knowledge and awareness about osteoporosis. Although we did not find any risk factor for the poor levels of awareness about osteoporosis, we indicate the urgent need for educational programs for the public and patients at risk according to previous studies. Mass screening should also be encouraged for early interventions and proper management. However, such approaches should be conducted using laboratory tests and not patients' self-reporting. This can be indicated by the results from previous studies which showed that the prevalence of osteoporosis was high when screening was done by the dual-energy X-ray absorptiometry and bone mineral density compared to patients' self-reporting (Gourlay et al., 2015; Kling et al., 2014). Regarding the study limitations, the limited number of included patients were relatively small and therefore might not be represantative of the whole population. Secondly, the potential bias from the way of data collection, which was based on patients' reporting can have an effect.

5. CONCLUSION

The level of knowledge and awareness about osteoporosis among the studied population is low. We did not find any significant factor to be associated with such levels. Further approaches to increase the awareness levels among the general population are needed to intervene against the potential complications and enhance the prognosis.

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Author Contributions

All the authors contributed evenly with regards to data collecting, analysis, drafting and proofreading the final draft.

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Conflict of Interest
The authors declare that there are no conflicts of interest.

Informed consent
Informed consent was obtained from all individual participants included in the study.

Ethical Consideration
The study acquired the ethical approval from the ethical committee at the College of Medicine, University of Hail (letter number Nr. 16784/5/42 project number H-2020-198).

Data and materials availability
All data associated with this study are present in the paper.

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