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Osteoporosis and Its Management: Knowledge, Attitudes and Practices of Physicians in United Arab Emirates

Salem A. Beshyah, Wafa Al Mehri, Ali B. Khalil

Center for Diabetes and Endocrinology, Sheikh Khalifa Medical City, Abu Dhabi, United Arab Emirates

Corresponding author: Dr. Salem A. Beshyah Email: Beshyah@yahoo.com
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Abstract

Background: Awareness among physicians is essential for early detection and timely treatment. **Aim:** To assess physicians' attitudes and knowledge to management of osteoporosis. **Methods:** A descriptive study using a questionnaire. The group studied consisted of a convenience sample of hospital and primary care physicians in the United Arab Emirates. **Results:** Responses were obtained from 173 physicians (49.7% female, 50.2% male). Over half were senior physicians (87) with the majority practicing in public institutions (158). The majority of the respondents thought that osteoporosis was an important clinical problem, and appreciated the fact that women in the Middle East are at an increased risk of osteoporosis. They thought that anti-osteoporosis management should be covered by national medical insurance schemes. However, more than 75% were unaware of the presence of regional guidelines on osteoporosis. Many respondents recognized the frequency and importance of vitamin D deficiency in non-skeletal health issues, though not all realized the need for higher doses in people with lower levels of sun exposure. A high proportion of respondents encouraged physical activity and cessation of smoking for all women. However, their use of medications was variable and not compatible with current guidelines. A relatively low level of knowledge was found regarding adequate dosing of several pharmacological treatments. **Conclusions:** Gaps in knowledge of physicians about bone health were identified. There is a need to extend medical knowledge regarding the contemporary management of osteoporosis and its risk factors.

Key words: Bone Health, Education, Fractures, Osteoporosis, Physicians' Awareness, Vitamin D.

Introduction

Osteoporosis is the most common bone disease in man. It affects over 200 million people worldwide, and represents a significant health and cost burden. Though it has been rec-

ognized for decades, it was formally defined by the World Health Organization in 1993, and updated in 2007 (1,2).
Despite improved knowledge about osteoporosis, it remains a neglected area in clinical medicine. In addition, it still is not yet linked to any one specific conventional medical subspecialty. It appears to be mostly managed by endocrinologists and rheumatologists. There are numerous international, regional and national guidelines for diagnostic and screening strategies, and evidence-based management guidelines for osteoporosis, which are of varying details (3-6). Three sets of guidelines were published in our Middle East and North Africa (MENA) region, taking into consideration geographical, economic and cultural peculiarities (7-9). It has been well established that proper diagnosis may minimize harm and disability which often complicates low energy fractures. Risk of fracture can now be readily assessed by conventional clinical risk factors even without bone mineral density (BMD) measurements (10). However, fracture risk reduction will depend to a great extent on the knowledge and attitudes of primary care and specialist physicians toward case finding, confirmation, and timely management (11). Consequently, increasing studies of the knowledge, attitudes and practices of physicians and other health care professionals have been reported from various parts of the world (12-16). Several studies have suggested an increased risk of poor bone health in the MENA region. These include demonstration of increased fractures (16-19), low bone density (20-26), and low vitamin D levels (27-31). However, data on knowledge and practices of physicians regarding diagnosis and management of osteoporosis are sparse. This study was undertaken to assess attitudes, knowledge and practices regarding the diagnosis of osteoporosis among physicians practicing in Abu Dhabi, United Arab Emirates.

Subjects and Methods

Study protocol

This survey was conducted in Abu Dhabi, United Arab Emirates between July 2010, and June 2011. Ethical approval was obtained from the Institutional Review Board, Sheikh Khalifa Medical City, Abu Dhabi (Ref RS-111). The primary aim of the study was to assess the level of knowledge of physicians about osteoporosis. Participants gave informed consent and were reassured of complete anonymity of the data collection.

Study sample

A convenience sample of 173 physicians was included. Eligible subjects consisted of practicing physicians in all medical specialties. Participants were approached during educational events and at their work environments. Informed consent was obtained by one of the contributing investigators. A total of 58% of physicians who were approached agreed to participate. They were served the study instrument and returned the completed questionnaire.

Characteristics of participants

Characteristics of the participants are summarized in Table 1 and shows that men and women were represented equally. There was also a good mixture of senior practitioners as well as those in the training grades. The majority received their primary qualifications in the MENA region, many of them within the UAE itself. Those in "consultant" grades would have acquired such status by virtue of the American Board Certification, European Certificate of Completion of Specialist Training, or the equivalent. Those graded as "specialists" would have had additional postgraduate training with formal qualification (mostly the "Arab Board," or other regional postgraduate specialist qualifications). Most of the respondents practiced in public hospitals and primary care centers (Table 1). Most respondents practiced in the general or special internal medical specialty, or in family medicine.

The survey instrument

A purpose-designed, self-administered questionnaire "The Physicians' Knowledge, Attitudes and Practices Survey" was used. It was developed from review of published literature with additional specific concerns for this region (7-9, 17-31). It combined multiple-choice questions, numerical scales, and yes/no responses, and consisted of five sections. It took less than 10 minutes to complete. Information about nine items on demographic and professional status were collected including age, gender, year of graduation, region where he/she graduated, current specialty, years of experience in current specialty, title of current professional grade (consultant, specialist, medical practitioner, resident or any other). The type of practice in terms of primary care clinic or secondary/tertiary hospital, and whether it was public or independent was also documented.

The research questions

Participants were asked to express their attitude towards osteoporosis by circling on a scale of 0-10 their response to the following statements: "Osteoporosis is an important clinical problem," "women in the Middle East are at an increased risk of osteoporosis," and "anti-osteoporosis management should be covered by national medical insur-

Table 1. Summary of the demographic and professional characteristics of the 173 responding physicians

Physicians' Characteristics		Details
Age:	Mean ± Standard Deviation	39.9±10.9
Gender:	Women (%)	86 (49.7%)
Years in specialty	Median (Interquartile Range)	10.7 (1-40)
Professional Grade:	Independently-Practicing (Senior or Experienced) Physicians: Consultants Specialists	 45 (26.0%) 49 (28.3%)
	Mostly Supervised (Junior) Physicians: Practitioners Residents Others	 33 (19.1%) 41 (23.7%) 5 (2.9%)
Region of primary medical training:	Middle East and North Africa	88 (50.9%)
	United Arab Emirates	30 (17.3%)
	Asia (Indo-Pakistani Subcontinent)	32 (18.5%)
	North America and Europe	18 (10.4%)
	Not Stated	5 (2.9%)
Specialty:	General internal medicine	66 (38.2%)
	Other medical specialties	50 (28.9%)
	Family medicine	33 (19.1%)
	General practice	20 (11.6%)
	Surgical specialty	4 (2.3%)
Place of work:	Hospital Primary Health Care Center Other	117 (67.6%) 54 (31.2%) 2 (1.2%)
	Public (Government) Sector Private (Independent) Sector	158 (91.3%) 15 (8.7%)

ance schemes." Additionally, they were asked about their awareness of existence of a MENA consensus statement on osteoporosis (12). The views of the participants were sought regarding vitamin D in health and disease. They were asked to respond on a scale of 0-10 to such statements as: "vitamin D deficiency is common among Arab women" , "vitamin D deficiency has more than just classical musculoskeletal effects" and "increased vitamin D doses are needed when sun exposure is reduced". The knowledge and practices of participants with regard to the clinical management of osteoporosis were assessed. Four different scenarios of clinical patient histories adopted from previous published works were given. Participants were asked to provide information about their prescribing habits or what they considered as an appropriate prescribing practice. The four patient scenarios varied in terms of patient age, family history of osteoporosis, and magnitude of bone loss (Table 2). In their responses, participants were required to recommend any one or more of 12 actions. It was stated that the choices were not mutually exclusive, and participants may be able to mark any or all of the choices that might apply, as deemed appropriate. The 12 choices included two lifestyle modifications and ten pharmacological measures (Table 3). Participants' knowledge was further assessed regarding the

Table 2. The varied range of severity in terms of selected clinical risk factors (age, family history, menopause and prior fracture) and the degree of bone mass loss expressed as T-score in the four clinical case scenarios. These will be referred to in text and in Table 3 as cases A, B, C and D.

Scenario	Age (year)	Clinical Risk Factors	BMD T Score
A	40	An otherwise healthy female with family history of osteoporosis, regular menstrual periods.	-2.0
B	50	An otherwise healthy female with family history of osteoporosis one year after menopause.	-1.5
C	65	An otherwise healthy female.	-3.0
D	75	An otherwise healthy female with a hip fracture.	-2.0

Table 3. Percentage of respondents recommending one or more specific therapeutic measures for four different clinical case scenarios*.

Options of Management Recommendations	Clinical Case Scenarios of Osteoporosis**			
	Case A	Case B	Case C	Case D
Encourage physical activity	94.2%	91.3%	79.2%	53.8%
Encourage smoking cessation	90.2%	86.7%	84.4%	78.6%
Vitamin D supplements	75.2%	79.8%	75.1%	74.0%
Anabolic steroids	4.0%	4.0%	3.5%	6.9%
Estrogen replacement therapy	6.4%	32.9%	17.3%	17.3%
1-alpha hydroxyl Vitamin D3	16.2%	22.5%	29.5%	34.1%
Alendronate	28.9%	38.2%	67.6%	65.3%
Zoledronate	2.9%	3.5%	11.0%	19.1%
Selective estrogen receptor modulators (SERM)	3.5%	11.0%	14.5%	11.6%
Teriparatide (PTH 1-34)	0.6%	1.2%	2.9%	5.8%
Injectable Calcitonin	6.4%	8.1%	16.8%	17.9%
Nasal Calcitonin Spray	1.2%	2.9%	5.8%	17.9%

** The percentage reflects the numbers of positive response/ total number of respondents (173). Responses were not mutually exclusive (i.e. choose all those apply)*
*** Clinical scenarios are detailed in Table 1.*

most appropriate pharmacological dosing for treatment of osteoporosis. The drugs were given in table format and participants were asked to identify whether the stated dosage of a given treatment was adequate, under- or over-dosed, or whether the drug would not be recommended at all by the respondent (Table 4).

Table 4. Percentage of respondents reporting the most appropriate pharmacological dosage for treating osteoporosis

Dosage regimen	Respondent' comment on the specified dosage				
	Adequate dose	Under-dose	Over-dose	Does not recommend	No response
Calcium (500-1,000 mg/day)	61.2%	69.9%	1.2%	1.2%	6.9%
Vitamin D (400-1,000 units/day)	58.4%	28.9%	1.2%	4.1%	7.5%
1-alpha D3 (0.5 ug/day)	46.8%	11.6%	8.1%	13.3%	20.2%
Vitamin D (500,000 units/month)	31.2%	14.5%	31.8%	9.8%	12.7%
Alendronate (5-10 mg/day)	57.2%	13.3%	3.5%	10.4%	15.6%
Calcitonin nasal spray (200 units/day)	39.3%	4.1%	5.8%	27.7%	23.1%
Conjugated estrogen (0.625 mg/day)	42.2%	4.6%	1.2%	39.9%	12.1%

Data analysis

Responses were transferred to an electronic spreadsheet (MS Excel, MS Office, 2010, Microsoft, USA). Mean±standard deviation and/or median (range) was calculated for descriptive characterization of the groups.

Results

Attitudes to osteoporosis and bone health

Perceptions of the respondents of the size of the problem of osteoporosis are graphically depicted in Figure 1. The majority of respondents thought osteoporosis was an important clinical problem [mean score of 8.9±1.7 on a scale of 1-10]. They thought that women in the Middle East were at an increased risk of osteoporosis [mean score 8.6±1.9 on a scale of 1-10]. They also thought that anti-osteoporosis management should be covered by national medical insurance scheme [median score 9.1±1.6 on a scale of 1-10]. However, only 23.7% of the respondents were aware that there had been a published MENA regional consensus on osteoporosis since 2007. The majority agreed that vitamin D deficiency is common among Arab women (9.0±1.9 out of 10) and that its deficiency may have more than just the classical musculoskeletal effects [mean score 9.0±1.8 out of 10]. However, a slightly lower proportion [7.4±3.2 out of 10] recognized that higher than usual vitamin D doses may be needed when sun exposure was reduced (Figure 2).

Clinical management of osteoporosis

The responses of the physicians with regard to their choice of therapeutic interventions in the four clinical scenarios (A, B, C and D) outlined above (Table 2) are given in Table 3. Most doctors recommended lifestyle changes to include increased exercise and cessation of smoking for all patients. However, the former was recommended more often than the later in older patients. Exercise recommendations seemed more assertive in younger (A & B) than in older patients (C & D). Vitamin D was recommended by three quarters of the participants uniformly to all the age groups. One alpha-D3 seemed a popular choice, and it increased with age from group A to group D, being recommended to more than one third of the patients in group D. Anabolic steroids were recommended by a minority although this has increased in the older group (D). Surprisingly, Estrogen and SERMS were recommended by a minority to pre-menopausal women. Estrogen was recommended by one third, and selective estrogen receptor modulators (SERM) by about one tenth of the respondents to the early postmenopausal woman (scenario B). However, both continue to be recommended by approximately 11-17% of respondents to the older female patient in scenarios C and D. Alendronate was recommended by nearly one third (28.9%) in the young group A, and over one third in group B of postmenopausal osteopenia, but only for two thirds for higher risk groups C

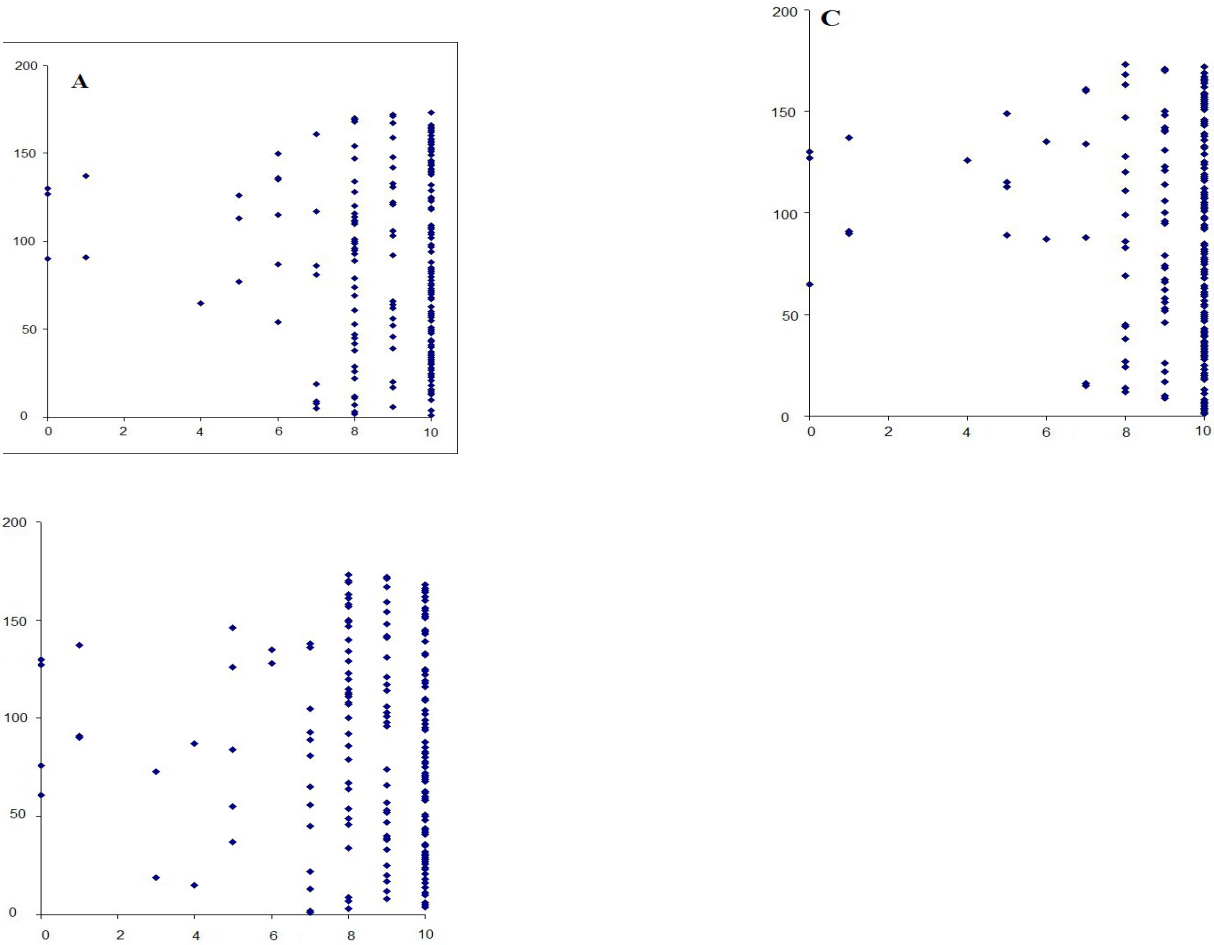

Figure 1. The perceptions of the respondents of the size of the problem of osteoporosis expressed (numbers on the Y-axis) on a score of 0-10 (0 disagree and 10 strongly agree on the X-axis) to the following statements:
A. "osteoporosis is an important clinical problem"
B. "women in the Middle East are at an increased risk of osteoporosis"
C. "Anti-osteoporosis management should be covered by national medical insurance schemes"

and D. There was a major discrepancy between recommendations of Alendronate (more often) and Zoledronate (less often). PTH was not particularly a popular recommendation, although that option increased in the older age group with fracture and osteoporosis (D). Both nasal and injectable calcitonin was recommended to 17.9% of the older patients' group (D) but in the younger groups, less nasal Calcitonin was recommended.

Knowledge of the anti-osteoporotic drugs

The proportion of physicians identifying the appropriate dosage of anti-osteoporotic medications is shown in Table 4. About 60% of respondents identified the current internationally accepted correct dosing of calcium and daily vitamin D supplements. Less than one-third (31.8%) could identify that a monthly dose of 500,000 units of vitamin D was excessive, over a quarter (31.2%) thought it to be adequate, and indeed 14.5% considered it inadequate. The standard daily dose of alendronate was recognized by 57.2%, but 13.3% and 15.6% thought it to be inadequate or abstained respectively. One dose of alpha D3 was prescribed by 46.8%. Only 42.2% and 39.3% identified the correct dose of conjugated estrogens and calcitonin, and 39.9% and 27.7% stated that they do not recommend them.

Discussion

Osteoporosis has been justifiably labeled as the silent disease. Fractures are its clinical consequence, and are a

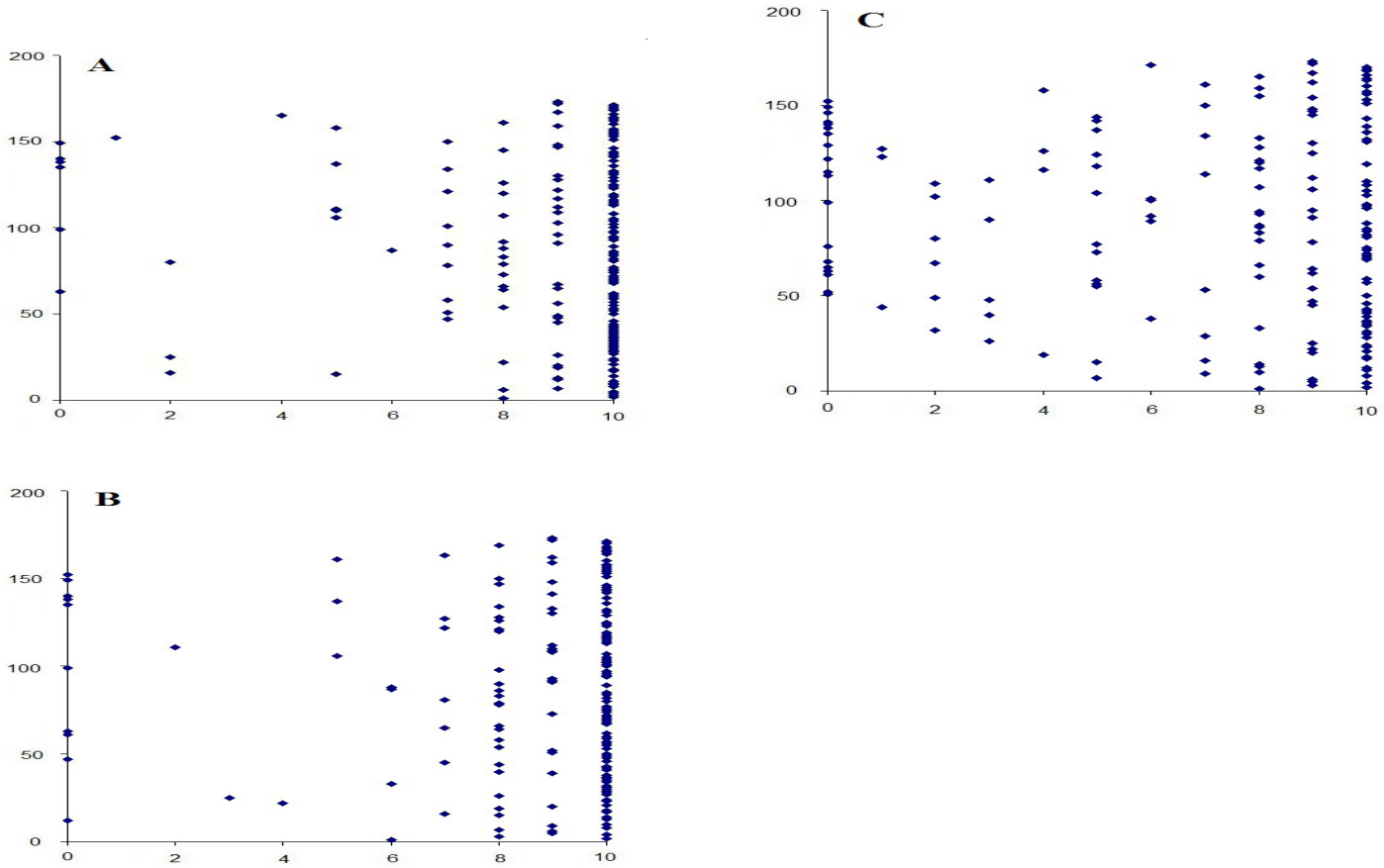

Figure 2. The views of respondents on the vitamin D deficiency in health and disease. Responses are expressed (numbers on the Y-axis) on a scale of 0-10 (0 disagree and 10 strongly agree) on the X-axis to the following statements:
A. "vitamin D deficiency is common among Arab women"
B. "Vitamin D deficiency may have more than just the classical musculoskeletal effects"
C. "higher than usual vitamin D doses may be needed when sun exposure is reduced"

major cause of morbidity and mortality worldwide. Treatments have been shown to decrease the risk of fracture. Problems arise in identifying individuals at higher risk of fracture so that intervention can be effectively initiated. Its timely recognition and effective management poses a challenge to practicing clinicians (32). Lack of knowledge and/or motivation (clinical inertia) has been proposed as possible causes for suboptimal management of osteoporosis (39-41). Hence, guidelines from many professional groups have been published with the view of dissemination of evidence-based principles and how best to translate them into clinical practice (5-10). How much filters into the front line workers and their subsequent response can sometimes be cause for concern. Consequently, several studies have been undertaken to assess health care professionals' attitudes towards osteoporosis (10-14,32-36).

The present study showed several important facts relating to physicians' knowledge and attitudes of the management of osteoporosis. First, they gave osteoporosis a high level of importance and supported its inclusion in standard medical coverage. Secondly, there was a low-level knowledge of dosing of important agents such as Vitamin D and other commonly used medications. Thirdly, there was an outdated approach to management of osteoporosis and the use of appropriate medications in different scenarios. Examples of this are treating non-osteoporotic pre-menopausal women, and the excessive use of estrogen replacement therapy (ERT) in both younger and older patients. These findings stress the need to extend physicians' knowledge regarding contemporary management of osteoporosis and its risk factors, and to translate evidence into practice.

The methods used were based on real life experiences

of four different hypothetical cases of differing age, menopausal status, fracture history, and bone density (Table 2).All potential medications were listed equally for all the cases to give no hint to the respondents (Table 3). In addition, we quizzed the respondents about commonly used medications. We specifically reported lack of response as a separate category (distinguishing it from *"not used"*) since this most likely reflected lack of knowledge (Table 4). The sampling method suffered from the recognized limitations of convenience sampling methodology. However, we hoped that the relatively large sample would compensate for this. The majority of respondents being either family physicians or internal medicine and its subspecialties may be an advantage as these are more likely the disciplines that would be asked to manage osteoporosis. Lack of orthopedic surgeons was noted. It is possible our orthopedic surgeons may be less keen on osteoporosis management than elsewhere. It has been reported that the majority of orthopedic surgeons involved in management of fractures believe that they should expand their role in the medical treatment of patients with osteoporotic fractures. However, many others did not initiate medical treatment, and thought that the patient's primary care provider should be responsible for medical care. (14,15). In addition, a survey was conducted of doctors involved in hip fracture treatment which attempted to establish medical beliefs about effective management of osteoporosis in minimal trauma hip fracture patients. This survey showed a lack of ownership for investigation and beliefs influencing treatment choices (16). The survey instrument was based on previous publications (with minimal updates and minor additions related to regional concerns). We did not include a pilot phase, however, informal review of the first 30 responses failed to indicate the need for any changes in the questionnaire (data were not reported). We did not feel it was appropriate to incorporate the FRAX model into any of the questions as there are no local data to enable its use in the Arab Gulf region (10), although we acknowledge it has already reached three countries the Middle East. The questions related to dosing used unambiguous cut-off values to prevent confusion. Also, it included 'no response' as one marking option during data analysis rather than in the questionnaire, to avoid providing an escape option.

The research question of our study has been previously addressed by several studies which demonstrated similar or contrasting findings among different professional groups. However, no similar data was reported from our Gulf region where bone health seems to suffer, particularly among women (17-26). Previous studies included both hospital specialist and primary care doctors. Similarly, we ended up with a fair mix of both hospital and primary care physicians, as well as senior versus junior doctors. Thus hopefully our review gives a representative sample of practitioners and a reasonable basis for comparison with other studies. Taylor et al. (11), reported that London general practitioners had a considerable awareness of the importance of preventing osteoporosis. They were active in identifying groups at risk, particularly those aged 40 years and older. However, two-thirds of general practitioners remain unconvinced about the efficacy of drug therapy. They were aware of the public health impact of this condition, similar to views of our own sample of physicians. Spanish primary care providers were reported to be in a good position to assess risk factors and recommend prevention strategies, as well as to play an active role in the diagnosis, care, and follow-up of patients with osteoporosis (12). In both of these studies, practitioners of younger age and relatively fewer years of practice were those with more up-to-date information regarding the disease (11,12). This was, however, not particularly evident in our study. Economides et al (13), described how information provided by bone densitometry did not affect management in a substantial percentage of patients. A considerable percentage of patients underwent no further investigation to elucidate a secondary cause of osteoporosis. As more than one variable changed between cases, we could not be sure in our study how the respondents were influenced by the DEXA scan results. On the other hand, Richardson et al. (35), indicated that GP's find it difficult to decide who and when to use DEXA scanning for, despite readily available guidelines for primary care. Other factors may be implicated as barriers to good clinical management. Both German and Chinese GP's were reportedly well aware of osteoporosis, but in the former group over half do not seem to adhere to national guidelines, and the later group suffers from lack of resources (36, 37).

Our clinical case scenarios focused on postmenopausal osteoporosis being by far the most common. We recognize that we should have included some assessment of the management of circumstances where gaps in knowledge and clinical practice have been identified, such as glucocorticoid-induced osteoporosis (33,34) and osteoporosis in men (38). The women's health initiative study and its recommendations concerning cardiovascular prevention changed the management of postmenopausal women by restricting indications for hormone therapy, decreasing both its duration of use and dosing (39). However, there were higher than expected requests from our sample calling for further

educational programs to address this.

In conclusion, despite the limitations acknowledged above, the present study identified as serious the lack of specific management skills needed for timely recognition and adequate and effective management of osteoporosis. This was observed despite a high rate of recognition by these professionals as to the size of the problem and its justifiable high position among health care professionals. Therefore, there is already a receptive audience for experts to offer needs-based educational and skill-transfer sessions. These would need to focus primarily on the practical issues and expertise needed for diagnosis and treatment of osteoporosis by interactive, case-based workshops (40). Perhaps, better knowledge and motivation may improve cooperation between primary and secondary care, which will consequently lead to methods of breaking down barriers to change in clinical practice and promoting the fully integrated care of patients with osteoporosis.

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