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Research Article

Clinical Practice of Orthopedic Registrars towards Osteoporosis Treatment and Preventive Measures in Sudan

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Abstract

Background: Osteoporosis is one of the most common bone disease in humans, representing a major public health problem. It is more common in Caucasians, women, and older people.

Aim: To assess the clinical practice of orthopedic registrars towards osteoporosis treatment and preventive measures in their rotation ship, in order to determine to what extend the osteoporosis issue is being addressed.

Methods: A descriptive cross-sectional study was conducted among orthopedic registrars who are working in Khartoum state, using a structured questionnaire. Data were obtained, entered, and analyzed using SPSS v 26 software.

Results: The mean age of the study participants was 31.5, 100% were males, 61.3% in the third year of rotation while 38.8% in the fourth year. Assessment of orthopedic registrars' knowledge about osteoporosis revealed that 36 (45%) of them had poor knowledge, 32 (40%) had moderate knowledge, and only 12 (15%) had excellent knowledge. 74 (92.5%) had positive attitude, only 6 (7.5) had negative attitude. majority 95% had moderate practice, only 2 (2.5%) had excellent practice and only 2 (2.5%) had poor practice. Comparison of knowledge, attitude and practice between orthopedic registrars in the 3rd and the 4th year of rotation with a P-value of (0.001), (0.07) and (0.02) consecutively, revealed significant difference in knowledge, and practice but not in attitude.

Conclusion: Although Sudanese orthopedic registrars showed positive attitude and moderately good practice regarding osteoporosis treatment and prevention, a gap in their knowledge is exist because of the great gap between the current clinical practice and the worldwide guidelines in diagnosis and management of osteoporosis, insufficient awareness among registrars, absence of clear local guidelines, absence of local specialized programs, inaccessible or unavailable accurate diagnostic tools including bone mineral density (BMD) measurement by dual energy x-ray absorptiometry (DXA) bone scan, and expensiveness of the medications, all contribute in under- management of osteoporotic patients and people at risk.

Keywords: *Orthopedic; Osteoporosis; Treatment; Preventive Measures*

Introduction

Osteoporosis is a disease that is characterized by low bone mass, deterioration of bone tissue and disruption of bone micro architecture that can lead to compromised bone strength and an increase in the risk of fractures [1]. Osteoporosis is the most common bone disease in humans, representing a major public health problem. It is more common in Caucasians, women, and older people. It is a silent disease until fractures occur most commonly at hips, vertebrae and wrist joint [2]. It was estimated that the number of patients worldwide with osteoporotic hip fractures is more than 200 million [3]. Bone tissue is continuously lost by re-sorption and rebuilt by formation; bone loss occurs if the re-sorption rate is more than the formation rate [4]. The bone mass is modeled (grows and takes its final shape) from birth to adulthood: bone mass reaches its peak at puberty; subsequently, the loss of bone mass starts. Menopause and advancing age can cause an imbalance between re-sorption and formation rates (re-sorption becomes higher than formation), thereby increasing the risk of fracture [5]. Certain factors that increase re-sorption more than formation leaving a weakened bone with significantly reduced mass; this leads to an increased risk of fracture [6]. There are many factors associated with an increased risk of osteoporosis related fractures. These are including general factors like aging and sex, steroid deficiency, as well as specific risk factors such as use of glucocorticoids [7,8].

DXA scan is usually performed in lumbar spine by measuring BMD from L2 to L4 and compiles scores and in hip by measuring BMD from femoral neck, trochanter, and intertrochanter region and compiles scores. BMD is absolute, patient-specific score determined from certain anatomic areas. T score is BMD relative to normal young matched controls (30-year-old women). Z score is BMD relative to similar aged patients. In osteopenia T score is -1 to -2.5 below the peak bone mass of a 25-year old individual. In osteoporosis T score is <-2.5 below the peak bone mass of a 25-year old individual [9]. Non operative management of osteoporosis include changing of life style, calcium and vit D supplements. Also, there are many drugs can be used for treatment like bisphosphonates (which consider the 1st line treatment), conjugated estrogen-progestin hormone replacement (HRT), estrogen-only replacement (ERT), Salmon calcitonin (Fortical or Miacalcin), Raloxifene (Evista) and Teriparatide (Forteo) [9].

Objectives of the Study

- To assess the clinical practice of orthopedic registrars towards osteoporosis treatment and preventive measures during their training program.
- To evaluate the knowledge of the orthopedic registrars about osteoporosis, concerning: 1. Risk factors, 2. Scanning and diagnosis, 3. Treatment, 4. Preventive measures.
- To evaluate the attitude of the orthopedic registrars towards osteoporosis and the risk groups.
- To evaluate the practices of the orthopedic registrars towards osteoporosis treatment and prevention.
- To identify barriers that might face the implementation of osteoporosis prevention and treatment guidelines.

Methodology

Cross sectional descriptive study was conducted in Khartoum state Orthopedic registrars working in Khartoum hospitals.

Inclusion criteria:

a. 3rd year of rotation orthopedic registrars.

b. 4th year of rotation orthopedic registrars.

Exclusion criteria:

a. 1st year of rotation orthopedic registrars.

b. 2nd year of rotation orthopedic registrars.

c. Non rotating registrars.

All orthopedic registrars who fulfill the inclusion criteria and presented to above mentioned study area during study period and gave consent obtained.

Data were collected by me, using a hard copy validated questionnaire that divided into 4sections; personal information, knowledge (about risk groups, diagnosis and screening, treatment and prevention); attitude (how they treat) and practice (what they do). The questionnaires distributed to the candidates, most of them were interviewed at the council, each candidate took about 20 - 25 minutes to complete filling the questionnaire, for candidates we couldn't meet, Google forms were sent and filled by them. Multiple reminders via phone calls and massages were sent to the candidates. Data were analyzed using Statistical Package of Social Sciences (SPSS). Results were displayed as diagrams, figures and tables.

Results

This study has included 80 orthopedic registrars registered in the Sudanese medical council, the mean age of the study participants was 31.5, all of them were males, 61.3% in the third year of rotation while 38.8% in the fourth year. Assessment of orthopedic registrars' knowledge about osteoporosis revealed that 36 (45%) of them had poor knowledge (scored less than 50 out of 100), 32 (40%) had moderate knowledge (scored 50 - 80 out of 100), and only 12 (15%) had excellent knowledge (scored 80 - 100 out of 100) Assessment of orthopedic registrars' attitude towards osteoporosis treatment and prevention revealed that 74 (92.5%) had positive attitude (scored more than 40), only 6 (7.5) had negative attitude. Assessment of practice revealed that majority 95% had moderate practice, only 2 (2.5%) had excellent practice (scored more than 80) and only 2 (2.5%) had poor practice (scored less than 40) (Table 1 and 2). Comparison of knowledge between orthopedic registrars in the 3rd and the 4th year of rotation revealed significant difference majority of 3rd year registrars showed poor knowledge 67.3%, while majority of 4th year registrars showed moderate knowledge 58.1%. No statistically significant difference was found regarding attitude (p-value 0.07). However, all 3rd year registrars had moderately good practice, while 4th year registrars showed various levels of practice (poor 6.5%, moderate 87.1%, and excellent 6.5% (Table 3).

		Yes	No	I don't know
2	Can the following symptoms indicate osteoporosis?			
A	Bone pain	72 (90)	3 (3.8)	5 (6.3)
B	Fatigue	42 (52.5)	18 (22.5)	20 (25)
3	Can the following signs indicate osteoporosis?			
A	Kyphosis	70 (87.5)	4 (5)	6 (7.5)
B	Loss of height	30 (37.5)	30 (37.5)	20 (25)
4	Are the following modalities useful for fracture risk prediction?			
A	Plain X-ray	76 (95)	2 (2.5)	2 (2.5)
B	CT scan	71 (88.8)	7 (8.8)	2 (2.5)
C	DXA scan (Dual-energy X-ray absorptiometry)	55 (68.8)	2 (2.5)	23 (28.7)
D	Bone MRI	25 (31.3)	20 (25)	35 (43.8)

Table 1: *Showing orthopedic registrars' knowledge about osteoporosis diagnosis and screening.*

	Count (%)
Which of the following is an important diagnostic method for osteoporosis?	
Plain X-ray	48 (60)
CT scan	44 (55)
DXA scan (Dual-energy X-ray absorptiometry)	44 (55)
Bone MRI	14 (17.5)
I don't know	5 (6.3)
Which of the following modalities accurately determine the BMD? (Bone Mineral Density) –choose only one answer-	
Plain X-ray	5 (6.3)
CT scan	32 (40)
DXA scan (Dual-energy X-ray absorptiometry)	43 (53.8)
Bone MRI	0
I don't know	0
Which of the following modalities is the single best imaging predictor of fracture risk? –choose only one answer-	
Plain X-ray	19 (23.8)
CT scan	4 (5)
DXA scan (Dual-energy X-ray absorptiometry)	40 (50)
Bone MRI	14 (17.5)
I don't know	3 (3.8)
Which of the following is the best predictor for future fracture risk?	

Table 2: *Showing orthopedic registrars' knowledge about osteoporosis diagnosis and screening (continue).*

		Year of rotation		Total
		3rd	4th	
Practice	Poor	0	2	2
		0.0%	6.5%	2.5%
	Moderate	49	27	76
		100.0%	87.1%	95.0%
	Excellent	0	2	2
		0.0%	6.5%	2.5%
Total		49	31	80
100.0%		100.0%	100.0%	
% within year of rotation		P- Value = 0.02		Chi-square = 6.6

Table 3: *Showing comparison of practice between orthopedic registrars in the 3rd and the 4th year of rotation.*

Discussion

Osteoporosis is one of the most common bone diseases in humans, representing a major public health problem. This study aim to assess the clinical practice of orthopedic registrars towards osteoporosis treatment and preventive measures in their rotation ship in order to determine to what extend the osteoporosis issue is being addressed. This study was conducted among orthopedic registrars registered in the Sudanese medical council, the mean age of the study participants was 31.5, 100% were males, 61.3% in the third year of rotation while 38.8% in the fourth year. Regarding knowledge about osteoporosis risk factors, smoking was identified by 83.8% of registrars but physical inactivity was only identified by 52.5%, consistently a high proportion of respondents believed in the preventive role of physical activity and cessation of smoking in Saudi Arabia [10]. In the present stud y old age, female gender, family history, alcoholism, prior minimal trauma fracture, and oral corticosteroids were commonly identified as risk factors, however, low salt in diet, low body weight, early menopause, bilateral oophorectomy, low calcium in diet, rheumatoid arthritis, caucasian or Asian race, and hypogonadism were not commonly identified by participants. The same gap in osteoporosis risk factors was found in Abha city as 18% of participants had poor knowledge regarding osteoporosis risk factors [11]. Knowledge about diagnosis and screening of osteoporosis showed variability, bone pain was identified as an indicative symptom of osteoporosis in 90% of study participants, but, fatigue was only identified by 52.5% of them.

Regarding signs, kyphosis was identified as an indicative sign by 87.5%, however, weight loss was only identified by 37.5%. majority of participants marked plain X ray and CT scan as useful for fracture risk prediction, however, 68.8% and 31.3% marked DXA scan and MRI as useful for fracture risk prediction. Regarding knowledge about DXA scan, 53.8% identified DXA scan as the single accurate modality to determine the BMD (Bone Mineral Density), and 50% identified it as single best imaging predictor of fracture risk, only 36.3% defined osteoporosis as a BMD T-score of less than or equal to -2.5. this level of knowledge is considered low compared to the counter Saudi physicians who showed only 12% of participants with poor knowledge about DXA scan and the rest with good, and excellent knowledge about DXA scan [11]. Regarding knowledge about treatment, 57.7% of Sudanese orthopedic registrars have indicated bisphosphonate as the recommended first line in the management of osteoporosis; a better insight than the Saudi physicians who showed 62% poor knowledge about osteoporosis treatment [11]. Also, hospital and primary care physicians in the United Arab Emirates showed low knowledge levels regarding osteoporosis treatment [12]. Regarding knowledge about osteoporosis prevention, Calcium and Vitamin D were the commonest identified preventive medications 91.3%, however, Raloxifene was only identified by 30% of participants in the present study. Consistently in the United Arab Emirates Many respondents recognized the frequency and importance of vitamin D [12]. Regarding knowledge about osteoporosis guidelines management in Sudan, it found that the majority of the candidates (60%) don't know if there is a special guideline for osteoporosis management in Sudan and about 60.3% don't know if there is a specialized program for osteoporosis management at work.

The overall assessment of orthopedic registrars' knowledge about osteoporosis risk factors, diagnosis, management and prevention revealed that 36 (45%) of them had poor knowledge (scored less than 50 out of 100), 32 (40%) had moderate knowledge (scored 50 - 80 out of 100), and only 12 (15%) had excellent knowledge (scored 80-100 out of 100). Compared to physician knowledge about osteoporosis in Abha (poor knowledge 25%, moderate 55%, and good 20%), Sudanese orthopedic registrars showed lower levels of knowledge. Assessment of orthopedic registrars' attitude towards osteoporosis treatment and prevention revealed that 74 (92.5%) had positive attitude, only 6 (7.5) had negative attitude. However, 50% agreed that osteoporosis has major impact on health of individuals and community, in Saudi Arabia and Germany higher proportions of physicians believed that osteoporosis has major impact on health of individuals and community [13]. Assessment of practice revealed that majority 95% had moderate practice, only 2 (2.5%) had excellent practice (scored more than 80) and only 2 (2.5%) had poor practice (scored less than 40). Only few participants were not asking about Back pain, History of fracture, Family history of osteoporosis, Current cigarette smoking, and daily calcium intake in diet. Also, few participants were never look for kyphosis and weight loss, in general a better practice than reported in the Saudi study [10] however, shared gaps in practice were found, only 5% of participants reported that they have access to perform BMD.

Conclusion

Although Sudanese orthopedic registrars showed positive attitude and moderately good practice regarding osteoporosis treatment and prevention, still a gap in their knowledge are exist. There is a great gap between the current clinical practice and the worldwide guidelines in diagnosis and management of osteoporosis. Starting from insufficient awareness among registrars, absence of clear local guidelines, absence of local specialized programs, inaccessible or unavailable accurate diagnostic tools including BMD measurement by DXA bone scan, and expensiveness of the medications, all contribute in under-management of osteoporotic patients and people at risk.

Recommendations

Provide better educational, motivational training program for orthopedic registrars to break down barriers towards optimum clinical practice. Customize a period of time in the training program in metabolic bone diseases and how to manage. Provide more lectures and meetings in the council or through the internet tools about metabolic bone diseases. Establishment of local guidelines for osteoporosis diagnosis, treatment and prevention. Provide sufficient diagnostic tools in easy access, which will facilitate case finding and promote proper management. Future work, to promote more researches in osteoporosis regarding the situation in Sudan, management and patients' awareness, to find out the needs and barriers that face the implementation of proper management. Further work to break down barriers of implementation of the treatment and prevention measures, especially the availability of the drugs, subjectively and financially.

Conflict of Interest

None to declare.

Statement of Informed Consent

Approval of this study was obtained from our institutional review board.

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