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Screening to prevent osteoporotic fractures in Egypt: a position statement of the Egyptian Academy of Bone Health

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Abstract

Background By 2030, approximately 22.6 million individuals in Egypt will be older than 50 years and prone to develop osteoporosis and are at risk of sustaining a fragility fracture. Osteoporotic fragility fractures, and in particular hip fractures, are associated with enduring pain, physical disability, poor quality of life, and loss of independence. Mortality rates are also high in this cohort of patients. Over the coming years, the potential preventable burden is likely to surge, particularly with the aging of the Egyptian population. The aim of this work was to determine the age onset of screening for risk of fragility fracture among Egyptians.

Results A convincing evidence was found that fracture risk assessments are accurate and can be applicable in standard practice to identify individuals at high/very high risk of developing fragility fractures. A tremendous increase in the risk of fragility fracture at the age of 60 (RR = 33.5 for men and 20.2 for women). As interventions to either treat osteoporosis or to modify behavioral risk factors in terms of healthy eating and physical exercise would take years to change this risk, it was recommended to start screening for fragility fracture at the age of 50 for both men and women.

Conclusion All Egyptian men and postmenopausal women 50 years of age or older should be evaluated/screened for their risk of sustaining a fragility fracture risk. The consequences of failing to identify and treat women and men who are prone to sustain a fragility fracture are considerable. In contrast to DXA scanning, screening with FRAX is cost-effective (time and effort required by patients and the health care system).

Keywords Osteoporosis, Egypt, Primary prevention, Secondary prevention, FRAX, DXA, Fractures, Position statement, Egyptian Academy of Bone Health

Background

By 2030, there will be approximately 10,802,554 men and 11,841,133 women above the age of 50 years old [1]. Egyptians older than 50 years are projected to develop osteoporosis. Whilst 53.9% of Egyptian women and 26% of Egyptian men are estimated to have osteopenia, the prevalence of osteoporosis in Egypt has been estimated at 28.4% in women and 21.9% in men. It is estimated that during their lifetime, one-half of all osteoporotic postmenopausal women will have an osteoporosis-related fracture; 25% of these women will experience a vertebral

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deformity, and 15% will develop a hip fracture [2]. Therefore, approximately 3,362,881.8 women and 2,365,759.3 men are expected to have osteoporosis. Of these, about 1,681,440.9 women are expected to sustain a fragility fracture. As the incidence of hip fracture in Egypt is 55.19 for men and 123.34 for women per 100,000 [3], this would equate to approximately 6070.9 men and 14800.8 women are expected to have hip fractures. Osteoporotic fractures, particularly hip fractures, are associated with persistent pain decreased quality of life, and disability, loss of autonomy, and heightened rates of mortality. Although women are more likely to sustain hip fractures than men, more than one-third of the men who experience a hip fracture die within 1 year [4].

The recent recognition of interventional threshold as a separate parameter in osteoporosis management that is different from diagnostic threshold has paved the way for a revolution of osteoporotic patients to be managed in standard practice [5]. The implication is that intervention thresholds (i.e., a level of FRAX probability) are not equivalent to the diagnostic thresholds ($T\text{-score} \leq -2.5$) as there is marked variation of the range of the fracture risk for any given BMD. There is convincing evidence that assessment of the 10-year probability of fracture risk can predict the long-term osteoporotic fracture risk in both women and men, whereas BMD assessment can predict short-term osteoporotic fracture risk [6].

Early detection and early intervention have been supported by the convincing evidence that medical therapies lessen the risk of developing fractures [7]. Life expectancy at birth for men is about 67.94 years on average while life expectancy at birth for women in Egypt is about 72.61 years. International recommendations advise screening for osteoporosis by the age of 65 years old in women aged 65 years or older. Therefore, the age of 65 as a cut-off point for screening for osteoporosis-associated fractures would not be applicable given the relatively shorter life expectancy in Egypt. This represented a knowledge gap, that mandated an evidence-based recommendation leading to an endorsed position statement which was the aim of this work.

Methods

The research design was divided into two phases: (1) a review of the literature for the evidence on screening for and management of osteoporotic fractures in both women and men, tools for risk assessment, efficacy of screening, screening intervals, and treatment in subdivisions. (2) Collective data from the national register on the incidence of major hip fractures in Egypt was used for the purpose of this work. The evidence-based component of the manuscript conformed to the preferred reporting items for systematic reviews and meta-analysis guidelines

for reporting systematic reviews [8]. The project was an initiative led by the Egyptian Academy of Rheumatology.

Statistical analysis

The relative risk of sustaining a fragility fracture in comparison to baseline age was assessed based on the calculated incidence of hip fracture in Egypt. Poisson regression and chi-square for trend were conducted to determine the age point where a significant increase in the risk of fragility fracture has been obtained. As management of osteoporosis and behavioral modification would necessitate a long-term schedule, it was recommended to start screening before the age onset of fragility fracture by a maximum of 10 years. Significant data if $p \leq 0.05$.

Results

Evidence

The evidence on screening for and management of osteoporotic fractures in both women and men, as well as tools for risk assessment, efficacy of screening, screening intervals, and treatment in subdivisions, was reviewed. A recent publication revealed the “crude annual incidence of low-energy hip fracture in individuals aged 40 years or more in Egypt 2022–2023” [3]. Table 1 shows the incidence of hip fractures per 100,000 population at risk in Egypt in both men and women. This indicates the occurrence of osteoporotic hip fractures started as early as 50 years old, and even before the age of 50 years old. This was supported by assessing the relative risk (RR) of sustaining a fragility fracture in comparison to baseline age 40 years (Table 2) ($p < 0.0001$).

Using chi-square for the trend, assessment of the risk ratio in comparison to the baseline (age 40-) revealed a tremendous, highly significant ($p < 0.0001$) increase in the

Table 1 National register: incidence of hip fracture in Egypt per 100,000

Years groups	Incidence of hip fracture in Egypt per 100,000 population*	
	Male	Female
40-	3.8	9.56
45-	16.6	14.78
50-	7.10	38.27
55-	14.5	49.6
60-	127.0	193.2
65-	82.0	317.87
70-	186.5	437.5
75+	393.1	761.2
Total	55.19	123.34

* Of the same age group

Table 2 National register: relative risk (RR) of sustaining a fragility fracture in comparison to baseline age 40 years

Years groups	Incidence of hip fracture in Egypt per 100,000 population			
	Male	RR compared to baseline (40-)	Female	RR compared to baseline (40-)
40-	3.8	1	9.56	1
45-	16.6	4.38	14.78	1.55
50-	7.10*	1.87	38.27	4.00
55-	14.5	3.82	49.6	5.19
60-	127.0	33.53	193.2	20.24*
65-	82.0	21.64	317.87	33.35
70-	186.5	49.26	437.5	45.96
75 +	393.1	104.04	761.2	80.21
Extended Mantel–Haenszel chi-square for linear trend =	1291.36		2803.97	
*p value (1 degree of freedom)	< 0.0000001		< 0.0000001	

* Significant data if $p \leq 0.05$

risk of hip fracture starting at the age of 50- and consequently older age groups from baseline (40 years). This was observed in both men and women (Table 3).

Position statement

Screening for osteoporotic fragility fractures should be considered for all women and men aged 50 years or older.

Population

This recommendation applies to older adults Egyptians who do not have a past history of an osteoporotic fracture, secondary osteoporosis to another disorder, or other definite clinical indications for bone measurement assessment.

Recommendation

Screening for osteoporotic fracture risk (using the Egyptian FRAX)

Screening for fracture risk probability and the possibility of sustaining an osteoporosis-associated fragility fracture is recommended in both women and men aged 50 years or older.

Screening for fracture risk probability and the possibility of sustaining an osteoporosis-associated fragility fracture is recommended for younger women and men if they have a past history of an osteoporotic fracture, other risk factors for fragility fracture(s), and secondary osteoporosis to another disorder.

Intervals

There is no specific time for repeating the fracture risk calculation. Assessment of the fracture risk should be

considered in view of the individual patient's risk factor(s) for developing fragility fractures.

BMD assessment

BMD testing by DXA should be advised for all men and women aged 50 years or older who have high or very high 10 years FRAX risk of fracture probability at either hip or spine calculated using the Egyptian FRAX.

BMD testing by DXA should be advised for younger women if they are postmenopausal and have other risk factors for fracture and/or a high 10-year FRAX risk of fracture at either hip or spine, or other definite clinical indications for bone measurement assessment.

BMD testing by DXA should be advised for younger men if they have other risk factors for fracture and/or a high 10-year FRAX risk of fracture at either hip or spine or other definite clinical indications for bone measurement assessment.

Intervals

DXA can be repeated at intervals not more frequently than every 2 years.

Age limits

No specific upper age limit for screening in men or women has been identified as the risk of sustaining a fracture continues to increase with age, and possible harms linked to the treatment remain low. In patients with significant illness, the patient's remaining lifespan should be considered by the treating HCP when deciding whether to screen. In the Fracture Intervention Trial [9], the treatment benefits were recorded 18 to 24 months after commencement of therapy.

Table 3 National register: increase in the risk of hip fracture starting at the age of 50- and consequently older age groups from baseline

Sex				Hip fracture		Total	Prevalence
				No	Yes		
Male	Age group	= < 50	Count	1	4	5	4.1%
			% within age group	20.0%	80.0%	100.0%	
		51-	Count	5	17	22	17.9%
			% within age group	22.7%	77.3%	100.0%	
		60-	Count	4	31	35	28.5%
			% within age group	11.4%	88.6%	100.0%	
		70+	Count	3	58	61	49.6%
			% within age group	4.9%	95.1%	100.0%	
	Total		Count	13	110	123	
			% within age group	10.6%	89.4%	100.0%	
Female	Age group	= < 50	Count	6	3	9	3.8%
			% within age group	66.7%	33.3%	100.0%	
		51-	Count	15	23	38	16.2%
			% within age group	39.5%	60.5%	100.0%	
		60-	Count	19	62	81	34.6%
			% within age group	23.5%	76.5%	100.0%	
		70+	Count	10	96	106	45.3%
			% within age group	9.4%	90.6%	100.0%	
	Total		Count	50	184	234	
			% within age group	21.4%	78.6%	100.0%	
Total	Age group	= < 50	Count	7	7	14	3.9%
			% within age group	50.0%	50.0%	100.0%	
		51-	Count	20	40	60	16.8%
			% within age group	33.3%	66.7%	100.0%	
		60-	Count	23	93	116	32.5%
			% within age group	19.8%	80.2%	100.0%	
		70+	Count	13	154	167	46.8%
			% within age group	7.8%	92.2%	100.0%	
	Total		Count	63	294	357	
			% within age group	17.6%	82.4%	100.0%	

Management

Recommend Egyptian-approved guidelines [10] for women and men with a high or very high 10-year probability of fracture risk, BMD diagnostic of osteoporosis or those with osteopenia and 10-year FRAX probability of major osteoporosis risk $\geq 20\%$ or hip fracture risk $\geq 3\%$

Discussion

Targeted case-finding for osteoporosis, fracture, and fall risk; have become the main pillars of osteoporosis management. This comes because osteoporosis is quite preventable and treatable. Once identified, fracture risk can be significantly mitigated with medical therapies and lifestyle modification. Considering that management of osteoporosis and behavioral modification would necessitate a long-term schedule, and the finding

of a highly significant, increase in the risk of fragility fractures at the age of 60 years from baseline (40 years) observed in both men and women, this work recommended that all postmenopausal women and men aged 50 years or older should be screened/evaluated for their risk of sustaining a fragility fracture risk. This comes in contrast to the statement released by the U.S. Preventive Services Task Force (USPSTF) [7] which stated that women aged 65 and older be screened routinely for osteoporosis. This can be attributed to the difference in life expectancy being much shorter in Egypt.

In an effort to address cost barriers, preventive care provisions are in favor of using fracture risk assessment as a screening tool. The consequences of failing to identify and treat women and men who are prone to sustain

a fragility fracture are considerable [11]. In contrast to DXA scanning, screening with FRAX is cost-effective (time and effort required by patients and the health care system). This highlights the need to change trends in osteoporosis screening and assessment. Nationally, osteoporosis screening rates have been very low and this has been reflected in the wide osteoporosis treatment gap in Egypt [2].

The impact of setting up the assessment parameters according to the national measures would have a significant impact on the service provided by the health authorities in Egypt as well as management approaches. Harms of osteoporosis medical therapies should be linked to the specific medicine used. There is satisfactory evidence that the harms of bisphosphonates, the most commonly recommended osteoporosis medication, are no greater than small [10]. Convincing evidence shows small to moderate links to estrogen and selective estrogen receptor modulator therapy [12]. Summary guides for clinicians and patients on fracture prevention treatments for postmenopausal women with osteoporosis have been published by the Egyptian Academy of Bone Health [10].

Limitations of the work: The current statement provides strong evidence that screening, based upon the FRAX probability of hip fracture in Egyptians at the age of 50 years old or older, would be of help to prevent fragility fractures and represent an efficient use of health care resources, the cost-effectiveness of the approach has not been included and will be studied separately.

Conclusion

All men and postmenopausal women aged 50 years or older should be evaluated/screened for their risk of sustaining a fragility fracture risk. The inclusion of musculoskeletal healthcare and fragility fracture screens in the national care program for older adults in Egypt supported by performance improvement strategies/incentives are suggested preliminary steps to optimize musculoskeletal health in Egypt.

Abbreviations

DXA	Dual X-ray absorptiometry
FRAX	Fracture Risk Assessment
HCP	Health Care Professionals

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None.

Authors' contributions

All authors contributed to the study methodology, analysis, and interpretation of the data and outcomes as well as the manuscript writing, reading, and approval of the final version.

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Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

This statement is based on the outcomes of previous studies that were carried out in agreement with the ethical guidelines of the Declaration of Helsinki and following the ethical standards of the Tanta Faculty of Medicine, with the institution's ethics board approval number 33997/8/20.

Consent to participate

Not applicable.

Consent for publication

Not applicable.

This work is one of the Egyptian guidelines series to be published in ERAR (one of the thematic articles).

Competing interests

The authors declare that the corresponding author Yasser El Miedany, Naglaa Gadallah, Waleed Hassan, and Safaa A Mahran are editorial board members of the Egyptian Rheumatology and Rehabilitation Journal. And Mohamed H. Abu Zaid is an associate editor. All other authors declare that they have no competing interests.

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