Review of the importance of using the fracture risk assessment tool (FRAX) by primary health physicians to optimise diagnosis and management of osteoporosis in Qatar

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Abstract

Background: Osteoporosis is an increasing worldwide systemic skeletal disorder leading to fragility fractures, affecting approximately 200 million people globally, with 8.9 million fractures occurring annually (1).

The burden of osteoporotic fractures is significant, encompassing physical, emotional, and financial consequences associated with direct and indirect treatment costs.

In 2021, Qatar pioneered a national FRAX tool which is accessible for use by health care professionals and patients.

Primary care is a better place than many other specialities in providing an holistic approach in patient care. Early detection and management of osteoporosis through the help of primary care physicians is of paramount importance.

Methodology: This is a narrative review of published articles looking at using the FRAX tool in primary care to screen and detect osteoporosis in Qatar, using Google online search engine. I included reviews, clinical trials, systemic reviews concentrating on the most recent articles published in Qatar and neighbouring countries in the last 5 years.

Results: There is still a large treatment gap of osteoporosis, related to a low rate of osteoporosis diagnosis (2).

Most studies and guidelines recommend early detection and management of osteoporosis and the importance of screening postmenopausal and elderly men for osteoporosis.

Studies in Qatar and neighbouring countries demonstrated average levels of knowledge on osteoporosis, lack of knowledge on how to use the FRAX tool and lack of awareness about country-specific calculators of the FRAX tool among primary care physicians as well as difficulty of integrating the assessment in busy clinics (3).

Implications: We need to increase the awareness of osteoporosis and the use of the FRAX tool among primary care physicians in Qatar by providing educational and training sessions. We can also integrate the use of the FRAX tool into routine health check and screening of elderly patients. Further clinical trials and audits will help understand the obstacles in-depth and allow us to overcome them.

Conclusion: In conclusion primary care physicians can have an important role in early detection and management of osteoporosis by using the FRAX tool on a targeted population. There are limitations to the FRAX tool, because of the limited number and details of risk factors included in the assessment. Regional studies found that primary care physicians have difficulties in using the FRAX tool, partly from lack of knowledge of osteoporosis and the use of the FRAX tool, plus the lack of available time in busy clinics.

Keywords: Osteoporosis: FRAX tool: primary health care: Qatar

Introduction

Osteoporosis is a growing global health concern, due to increasing life expectancy. Primary prevention, early detection, and treatment of osteoporosis is of paramount importance in reducing disease burden due to complications and consequences on the individual, community, the healthcare system and the country in general.

In modern healthcare, the need for effective fracture risk assessment is vital, particularly in primary care settings as early intervention can significantly influence patient outcomes.

Osteoporosis treatment is cost-effective with favourable side-effect profile, plus other feasible treatment modalities making screening and early diagnosis of osteoporosis highly beneficial.

The FRAX tool's simplicity allows its use in primary care without bone mineral density (BMD) values, making it an ideal screening tool.

Primary care physicians must be familiar with FRAX tool to integrate it into routine clinical practice, thus enhancing the capacity to identify high-risk individuals. This facilitates patient education and osteoporosis awareness, as it is a screening, educational and counselling opportunity. In addition, it guides treatment decisions which can be initiated in primary care, such as lifestyle advice, prescribing nutritional supplements, exercise programmes or referrals to secondary care for further assessment and/ or treatment.

Studies demonstrate FRAX-based screening, with or without BMD, reduces hip fracture rates by 20% in the community. Between the year 2017 and 2019, over 380 osteoporotic hip fractures were diagnosed in Qatar.

Implementing the FRAX tool, will significantly help reduce this number through early detection as patients would be referred for appropriate treatment before the fractures occur. Moreover, it paves the way for further studies and research in this field, and develops advanced versions of the FRAX tool and other calculators to accommodate all possible risk factors; not to mention increased awareness of this increasing underdiagnosed health issue, among health workers and patients. Soon, it may be initiated by nurses or patients themselves before reporting to their medical appointments (4).

Development of FRAX tool:
The FRAX tool was developed in 2008 by the University of Sheffield University by the WHO (1).

In 2021, Hamad Medical Corporation's Rheumatology Osteoporosis team collaborated with Sheffield University to create a Qatar-specific FRAX tool, which suits the unique population demography in Qatar. According to the 2020 census the Qatari population was 2.8 million. The majority are expatriates and only 12% are Qatari citizens. Using data from neighbouring countries helped in formulating the Qatar specific tool (5).

The FRAX tool algorithm evaluates seven risk factors, most of which are accessible to primary care physicians: Age, body mass index (BMI), prior fracture, use of glucocorticoids, parental hip fracture, current smoking, alcohol intake and rheumatoid arthritis.

Now the FRAX tool is being developed further. FRAX-Plus calculates additional risk factors as well as more details of the previous risk factors. A second version of the core FRAX risk engine is under development (6,7).

A study found that vertebral fracture risk increases in individuals with type 2 Diabetes Mellitus which in turn increase mortality so type 2 Diabetes Mellitus can be an indicator of frailty; more research is needed in this area (8). Also results of a previous study showed that obese men with waist circumference (WC) over 102 cm had a significantly higher vertebral fracture incidence compared with normal weight (94 cm ≤ WC < 102 cm) and underweight (WC < 94 cm) men. Trunk fat mass, VAT mass, and limb fat mass were negatively associated with vertebral body BMD and geometry in men and women. BMD and geometry are related to vertebral strength, but they may not be directly related to the risk of fractures that are also influenced by other factors including biomechanical factor (9).

Longitudinal studies and regular audit cycles in Qatar are es-sential to assess FRAX's long-term effectiveness in reducing fracture rates, building on current evidence that FRAX-based screening reduces hip fracture rates by 20%. These studies could also aid the development of advanced FRAX versions, ensuring continuous improvement in osteoporosis management and reduction of disease burden.

The use of new and emerging technologies, such as AI-driven algorithms and mobile health applications, could further en-hance FRAX use by enabling patients to self-screen with inte-gration of real-time data, thus making screening more accessi-ble (10).

Limitations of FRAX tool:
Over the years, FRAX has been criticised for several issues. FRAX was designed to be a simple tool, accessible, and easy-to-use in primary care. Therefore, only a yes or no answer is accommodated in most questions in the tool. This means that risk factors that are number- or dose-dependent are not fully captured. Examples include the number of prior fractures, smoking pack-year history, the consumption of alcohol and the dose of glucocorticoids. The age of the parental fracture is also not considered. Recent studies have proposed arithmetic adjustments to the conventional FRAX probabilities to address some of these limitations. Recently, in the absence of a direct question related to falls history in FRAX and suggested potential adjustments, an analysis has provided probability ratios

or multipliers that can be applied according to the number of falls over the last year. The new FRAX plus website will permit modification of FRAX probability to account for a range of additional clinical considerations (1). However, limitations still exist as other risk factors such as Type 1 and 2 Diabetes Mellitus, Vitamin D deficiency, Vitamin K are still under investigation and not yet incorporated.

Other limitations are the lack of knowledge among primary care physicians on osteoporosis management guidelines, and the use of FRAX tool as well as lack of time to implement the screening in busy clinics.

Benefit of FRAX tool in primary care and family practice in Qatar:
The FRAX tool offers significant benefits in primary care by streamlining fracture risk assessment, thereby facilitating informed treatment decisions.

By providing a comprehensive estimate of a patient's 10-year probability of osteoporotic fractures, FRAX helps identify high-risk individuals who may require interventions or further diagnostic testing, optimize resource allocation, and improve patient outcomes.

Local guidelines emphasize the importance of the use of the age-dependent hybrid model of the Qatar fracture risk assess-ment tool for screening osteoporosis and risk categorization. The guideline is provided to all physicians across the country involved in the care of patients with osteoporosis and fragility; it includes screening, risk stratification, investigations, treatment, and monitoring of patients with osteoporosis (4).

Studies have noted positive behavioural changes in patients after the use of FRAX, though awareness still needs to be raised of the value of FRAX in osteoporosis prevention (11).

Furthermore, FRAX supports a personalized medicine approach, tailoring osteoporosis prevention strategies to individual risk profiles, addressing factors such as an increas-ingly aging population, sedentary lifestyles and managing co-morbidities such as diabetes or vitamin deficiencies.

To date, The FRAX tool is the most widely used fracture risk assessment tool throughout the world. It is presently used in many countries comprising about 80% of the world populations. The main objective of using the FRAX tool is to enable medical professionals especially in family practice and in primary care settings, to identify those patients who would benefit from pharmacological therapy in reducing fracture risk. However, like any other scientific tool, FRAX is beset with merits and limitations, as outlined above (12).

There are many studies including a cross-sectional study con-ducted in Jeddah, Saudi Arabia, intended to assess the aware-ness and usage of the FRAX tool among family physicians in Jeddah and to identify gaps in screening knowledge. The re-sults showed moderate awareness (88.20%). Of those aware of FRAX, only 57.20% reported using it in their practice, with the main barriers being a lack of a country-specific model, a busy practice, and not knowing how to use it. Targeted educational interventions and further studies are needed to overcome these barriers and to improve the tool's usage in clinical practice (13).

The FRAX tool also enhances patient education, allowing primary care physicians to use FRAX results to discuss osteo-porosis prevention and promote proactive health behaviours, such as adopting healthier lifestyles and adherence to treat-ment interventions.

Conclusion

In conclusion, the FRAX tool is the leading global tool for assessment of fracture risk, incorporated into over one hundred guidelines worldwide. It is a pivotal asset in primary care for the effective assessment of fracture risk and the guidance of treatment decisions. It not only tailors risk evaluation based on individual clinical factors but also provides a pragmatic approach to screening osteoporosis, especially in populations with limited access to advanced diagnostic methods like DEXA scans.

The new FRAX plus website will permit modification of FRAX probability to account for a range of additional clinical considerations (6).

Research demonstrates that the FRAX tool can successfully categorize patients into varying risk levels, as demonstrated by studies showing significant differences in fracture risk estimates compared to alternatives like CAROC (14), particularly in older adults who are often at higher risk. Moreover, the ability of FRAX to integrate both clinical risk factors and bone mineral density results facilitates comprehensive patient management, thereby optimizing health outcomes and resource allocation in settings facing economic constraints. Therefore, the implementation of FRAX in primary clinical practice in Qatar represents a strategic advancement in preventative healthcare, reducing the incidence of osteoporotic fractures and improving patient quality of life.

We should start educating primary care physicians about oste-oporosis and management guidelines and how to use the FRAX tool and to integrate the screening of osteoporosis for targeted population in routine health check clinics. This will al-low further studies and clinical trials to be conducted with the aim to have better understanding of the obstacles and improv-ing the outcome at different levels.

Conflict of interest:
No conflict of interest.

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