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Review

Screening for Osteoporosis in Men Over Fifty With No Fracture History

Mohammed Ahmed Jumah[1*], Renad Mohammed Alharbi[2], Abdullah Khalid Alsalhi[3], Saud Abdulaziz Almutairi[3], Omar Awwad Algharbi[4], Raghda Khaled Tayeb[5], Haidar Abdullah Alhulaili[6], Khalid Sulaiman Alharbi[7], Nada Sadiq Alnemer[8], Alhussain Mohammed Makki[7], Abdulaziz Hassan Muathin[7]

[1] *Department of Family Medicine, Prince Abdulmajeed Center, Al Thager Hospital, Jeddah, Saudi Arabia*
[2] *College of Medicine, Imam Mohammad Ibn Saud Islamic University, Riyadh, Saudi Arabia*
[3] *College of Medicine, Shaqra University, Riyadh, Saudi Arabia*
[4] *College of Medicine, University of Hail, Hail, Saudi Arabia*
[5] *Rehabilitation Center, King Abdulaziz Hospital, Jeddah, Saudi Arabia*
[6] *Department of Emergency Medicine, Ministry of Health, Safwa, Saudi Arabia*
[7] *Department of Physiotherapy, United Doctors Hospital (Enaya company), Jeddah, Saudi Arabia*
[8] *Primary Healthcare Center, Ministry of Health, Dammam, Saudi Arabia*

Correspondence should be addressed **Mohammed Ahmed Jumah**, Department of Family Medicine, Prince Abdulmajeed Center, Al Thager Hospital, Jeddah, Saudi Arabia, Email: jom3ah@gmail.com

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Abstract

Osteoporosis is a major public health concern that affects both men and women, yet it remains significantly underdiagnosed in men over fifty, particularly those without a prior history of fractures. While the risk of osteoporotic fractures increases with age, screening guidelines have primarily targeted postmenopausal women, leaving a gap in early detection and preventive care for older men. Despite evidence indicating high morbidity and mortality associated with fractures in men, routine screening is not consistently recommended or implemented in this demographic. Risk assessment tools such as FRAX are commonly used to estimate fracture probability, but their performance in asymptomatic men without fracture history has shown limitations. These models often rely on data derived from predominantly female populations and may not account for male-specific risk factors like testosterone deficiency, comorbidities, or subtle declines in bone quality. Furthermore, inconsistencies in guideline recommendations across organizations contribute to clinical uncertainty and variation in practice. Some advocate for screening men over seventy, while others suggest screening only in the presence of identifiable risk factors, leaving many men untested despite being at elevated risk. Early detection strategies, including the integration of clinical risk profiling into routine care and opportunistic screening during chronic disease management, offer a pathway to improved outcomes. Community outreach programs and technological advances in imaging and biomarker analysis may also support broader identification of at-risk individuals. A more unified and evidence-based approach to screening men over fifty, regardless of fracture history, may improve diagnosis rates and reduce long-term complications. Addressing current limitations in screening protocols and enhancing risk assessment accuracy are key steps toward closing the gap in osteoporosis care for older men.

Keywords: *Osteoporosis, screening, men over fifty, fracture risk, bone density*

Introduction

Osteoporosis is a chronic metabolic bone disease characterized by low bone mineral density (BMD) and structural deterioration of bone tissue, leading to increased bone fragility and susceptibility to fractures. While it is often perceived as a condition primarily affecting postmenopausal women, an increasing body of evidence indicates that men, particularly those over the age of fifty, are also at significant risk for osteoporotic fractures. In fact, approximately one in five men over the age of fifty will experience an osteoporotic fracture in their lifetime, with higher mortality rates following hip fractures compared to women of the same age group (1).

The current paradigm for osteoporosis screening and management has largely focused on women, partly due to the earlier and more rapid decline in estrogen levels that women experience during menopause. In men, the loss of bone mass tends to occur more gradually, which can delay diagnosis until a fracture occurs. Moreover, many clinical guidelines prioritize screening for individuals with established fracture risk factors, often excluding men without a history of fractures. This exclusion creates a gap in preventive care, as many men with undiagnosed osteoporosis may not be identified until they present with a fragility fracture, at which point the disease has already progressed significantly (2).

Several clinical tools have been developed to estimate fracture risk, including the Fracture Risk Assessment Tool (FRAX), which incorporates age, sex, family history, smoking status, and other variables to estimate 10-year fracture probability. While FRAX is widely used, its predictive accuracy in men without prior fractures has shown variability. Moreover, bone densitometry using dual-energy X-ray absorptiometry (DEXA) remains the gold standard for diagnosing osteoporosis. However, in clinical practice, DEXA screening is far less commonly recommended or utilized in men compared to women, particularly among those without overt risk factors (3). The hesitancy to screen men may stem from a lack of large-scale studies specific to male populations, as well as lingering misconceptions about the clinical significance of osteoporosis in men.

Compounding this issue is the fact that fractures in men are associated with higher post-fracture morbidity and mortality than in women. This is particularly concerning given that men tend to be older at the time of first fracture and often have more comorbid conditions. Additionally, men are less likely to receive pharmacologic treatment for osteoporosis after a fracture, suggesting both a lack of awareness and potential gaps in the healthcare system's approach to managing osteoporosis in this demographic (4).

Review

Screening men over fifty for osteoporosis, particularly those without a history of fractures, remains a debated yet critical aspect of preventive health care. Although fractures are often the first clinical manifestation of osteoporosis, many men remain undiagnosed until such an event occurs. This delay not only limits treatment opportunities but also increases morbidity and mortality. Evidence suggests that early identification through screening could reduce fracture rates by enabling timely intervention (5). However, current guidelines differ significantly in their recommendations for male screening, often emphasizing age or secondary risk factors while overlooking asymptomatic individuals without prior fractures. Another challenge is the underuse of diagnostic tools such as DEXA scans in men. Even when risk factors are present, men are less frequently referred for BMD testing than women, which may reflect both clinician bias and gaps in awareness (6). Moreover, tools like FRAX, although widely used, may underestimate fracture risk in men without previous fractures, further complicating screening decisions. Optimizing screening strategies for men over fifty could help bridge this gap in care, ensuring earlier diagnosis and treatment, and ultimately reducing the burden of osteoporosis-related fractures in this population.

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Limitations of Current Guidelines

Osteoporosis screening recommendations for men over fifty remain inconsistent across major health organizations, creating uncertainty in clinical decision-making. While the U.S. Preventive Services Task Force (USPSTF) recommends routine bone density screening for women aged 65 and older, it does not extend the same clarity to men, instead suggesting individualized consideration based on risk profiles. This language leaves much to interpretation and contributes to underutilization of screening in male populations. In contrast, organizations such as the National Osteoporosis Foundation and the Endocrine Society have provided broader guidance by recommending BMD testing in men aged 70 and older, or younger men with clinical risk factors. Yet even within these frameworks, the threshold for initiating screening is loosely defined, and variations in application among providers are common (7).

These inconsistencies stem partly from the scarcity of male-specific evidence in osteoporosis research. Historically, clinical trials and epidemiological studies have predominantly focused on postmenopausal women, shaping diagnostic criteria and screening strategies accordingly. Men, although experiencing slower bone loss, are still vulnerable to fragility fractures, and their risk increases substantially after age fifty. However, since most guidelines rely on data derived from female populations, the extrapolation of these findings to men lacks precision and may limit the effectiveness of existing recommendations (8).

Economic evaluations have also influenced guideline development, especially concerning cost-effectiveness of screening interventions. In populations without a prior fracture history, such as healthy men over fifty, the perceived benefit of routine BMD testing may not meet the economic thresholds established in certain healthcare systems. This has led to cautious or even absent recommendations regarding early screening, despite studies indicating that male hip fracture mortality rates exceed those in women. The consequences of this conservative stance manifest in missed opportunities for early intervention and preventive care, particularly since first fractures often serve as the only signal for diagnosis (9).

Compounding the problem is the under-recognition of nontraditional risk factors in men. Current screening algorithms tend to prioritize conventional factors such as age, smoking, glucocorticoid use, or low body weight. Yet there is growing evidence suggesting that men with comorbidities like type 2 diabetes, chronic kidney disease, or hypogonadism may carry considerable fracture risk even in the absence of classical indicators. Most guidelines do not adequately incorporate these variables into risk assessment models, which can lead to underestimation of true risk. Furthermore, some tools used in clinical practice, including FRAX, do not adjust for male-specific physiological and hormonal differences, potentially affecting accuracy when applied to asymptomatic men without prior fractures (10).

Role of Risk Assessment Tools

Risk assessment tools are central to osteoporosis screening strategies, especially in populations not routinely evaluated through BMD testing. For men over fifty with no history of fractures, these tools are often the first line of evaluation, guiding decisions on whether further diagnostic testing is warranted. The most widely used tool in clinical settings, FRAX (Fracture Risk Assessment Tool), calculates the 10-year probability of hip and major osteoporotic fractures based on factors such as age, sex, body mass index, prior fracture, glucocorticoid use, and smoking. Though FRAX includes male-specific data inputs, its predictive accuracy in men without previous fractures remains a topic of ongoing scrutiny. Studies show that FRAX may underestimate fracture risk in certain male subpopulations, especially those with nontraditional risk profiles or mild osteopenia not captured by BMD thresholds alone (11).

The structure of FRAX relies heavily on epidemiological data, and for men, these data are relatively sparse compared to what exists for women. While the algorithm has been validated in multiple cohorts, its calibration can vary across regions and populations. In some cases, men

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identified as low risk by FRAX later present with fragility fractures, suggesting that current inputs may not reflect the full spectrum of risks unique to older males. For example, conditions such as low testosterone, reduced muscle mass, and chronic inflammation are not included in the calculation, despite their documented influence on bone health. As a result, clinicians relying exclusively on FRAX might overlook patients whose risk would be more accurately revealed through a combination of clinical judgment and supplementary screening approaches (12).

Other tools, such as the Osteoporosis Self-assessment Tool (OST) and the QFracture algorithm, offer alternatives to FRAX, each with their own strengths and limitations. OST uses age and weight to estimate osteoporosis risk, making it simple and cost-effective for initial screening. However, it lacks the specificity required for confident decision-making in older men, especially those with comorbidities. QFracture, developed in the United Kingdom, incorporates a wider range of clinical variables, including comorbidities and medication use. Despite its expanded model, QFracture is less commonly adopted in clinical practice outside of its country of origin, limiting its influence in broader guideline development (13).

Across these tools, a recurring challenge is the underrepresentation of male-specific clinical markers. The tools are often adapted from datasets in which men form a minority, which introduces limitations in their applicability. Furthermore, tools that do not incorporate BMD values may not perform well in populations with subclinical osteoporosis. When BMD is available, FRAX with BMD input improves fracture prediction, yet this assumes prior access to DEXA scanning, which many men do not receive. Thus, the effectiveness of risk tools often depends on the broader screening infrastructure in which they are embedded (14).

Strategies for Early Detection

Identifying osteoporosis in men over fifty before fractures occur requires a shift toward proactive detection models that balance practicality with predictive accuracy. Traditional reliance on fracture history as the primary indicator of underlying bone fragility has delayed diagnosis in many men. Incorporating early detection strategies within routine healthcare visits could enhance timely intervention. For instance, primary care providers can implement brief screening protocols using clinical checklists that flag risk factors such as smoking, excessive alcohol intake, reduced physical activity, and family history of osteoporosis. These factors are easy to assess without specialized equipment and can serve as preliminary indicators warranting further evaluation. Simple interventions like risk-factor questionnaires or point-based scoring systems could facilitate targeted referrals for bone mineral density testing, especially in resource-limited settings (15).

Men frequently present with non-skeletal complaints that may obscure the presence of low bone mass. Early detection strategies should, therefore, include opportunistic screening during evaluations for related chronic conditions. Men with type 2 diabetes, chronic obstructive pulmonary disease, rheumatoid arthritis, or hypogonadism are known to carry elevated fracture risks, yet these associations are often missed unless bone health is specifically considered. Integrating osteoporosis screening into chronic disease management could help identify men whose fracture risk is not immediately apparent. Electronic health record systems may assist in flagging such patients by generating automated prompts based on comorbidity profiles or medication histories, streamlining referrals for DEXA scanning (16).

Community-based initiatives also hold potential in expanding early detection efforts. Pharmacy-led screening, mobile densitometry units, and workplace health campaigns can extend outreach to men who seldom engage with traditional healthcare services. These programs can increase access and awareness, particularly among those who do not perceive themselves as at risk. Health professionals in these settings can offer basic assessments and education, helping normalize the conversation around bone health for older men. Moreover, population-based screening programs in some European countries have shown that when men are

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included systematically, detection rates rise, and treatment is initiated earlier. Translating these models to broader contexts will require local adaptation but offers a promising route toward earlier diagnosis (17-19).

Imaging strategies beyond DEXA are also emerging in research as viable detection methods. Techniques such as trabecular bone score (TBS) and high-resolution peripheral quantitative computed tomography (HR-pQCT) can assess bone microarchitecture, offering insight into fracture risk that BMD alone may not reveal. While these modalities are not yet widely used in routine practice, they may eventually enhance early detection in men with normal BMD but elevated clinical risk. Additionally, biochemical markers of bone turnover, though variable in reliability, are being studied as noninvasive tools that could support risk stratification when imaging access is limited. Research suggests that certain serum markers, when interpreted alongside clinical data, could inform decisions about who might benefit from DXA or specialist referral (20, 21).

Conclusion

Osteoporosis in men over fifty without prior fractures remains under-recognized despite its significant clinical impact. Current guidelines, risk tools, and screening practices lack consistency and sensitivity for this population. Enhancing early detection strategies and refining assessment models can close critical gaps in care. A more inclusive and proactive approach is essential to reduce fracture-related morbidity in older men.

Disclosure

Conflict of interest

There is no conflict of interest.

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Data availability

All data is available within the manuscript.

Author contribution

All authors contributed to conceptualizing, data drafting, collection and final writing of the manuscript.

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