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Assessing osteoporosis knowledge: A review of the Facts on Osteoporosis Quiz (FOOQ) and its role in public health initiatives

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Abstract
Osteoporosis, a prevalent skeletal disorder marked by low bone density and increased fracture risk, poses a significant public health challenge, particularly among aging populations. Early identification of osteoporosis risk factors and effective prevention strategies can significantly reduce its impact. This study examines the role of the Facts on Osteoporosis Quiz (FOOQ), a validated tool developed to assess osteoporosis knowledge and awareness. The FOOQ has been widely used in both clinical and community settings to evaluate individuals' understanding of osteoporosis, its risk factors, prevention, and treatment options. This review synthesizes findings from recent studies that have employed the FOOQ to assess osteoporosis knowledge across diverse populations, including postmenopausal women, breast cancer survivors, and guardians of fracture patients. The studies indicate significant knowledge gaps in areas such as exercise, prevention strategies, and treatment options. Additionally, educational interventions based on the FOOQ have shown promising results in improving osteoporosis knowledge. This study also explores the quiz's psychometric properties, highlighting its reliability and validity across various demographic groups. The findings underscore the importance of using interactive educational tools like the FOOQ to promote awareness and inform public health initiatives aimed at osteoporosis prevention. Ultimately, enhancing osteoporosis knowledge can empower individuals to take preventive actions and reduce the risk of fractures, improving overall public health outcomes.

Keywords: Osteoporosis, FOOQ (Facts on Osteoporosis Quiz), Knowledge Assessment, Prevention Strategies, Educational Interventions

Introduction
Osteoporosis is a common skeletal disorder characterized by low bone mass and deterioration of bone tissue, leading to increased fragility and susceptibility to fractures (National Institutes of Health [NIH], 2021). It poses a significant public health challenge, particularly among aging populations, with substantial impacts on morbidity, mortality, and healthcare costs (Khadilkar & Mandlik, 2015) [19]. Understanding the risk factors, prevention strategies, and treatment options for osteoporosis is crucial in reducing its burden (Babu, Ikbal, Noone, Joseph, & Samuel, 2009; Marwaha, et al., 2011; Cooper, 1999; Anupama & Sangeetha, 2022) [7, 20, 11, 5].

Osteoporosis affects an estimated 50 million people in India, primarily postmenopausal women and older adults (Khadilkar & Mandlik, 2015) [19]. Studies suggest that one in three women and one in five men over the age of 50 in India are at risk of osteoporotic fractures (Marwaha, et al., 2011; Kaushal & Jha, 2018) [20, 18]. India, as the second-most populous country globally, is witnessing a significant rise in its aging population due to increasing life expectancy. By 2050, projections indicate that approximately 20% of the population will be over the age of 60. Correspondingly, the incidence of hip fractures is expected to exceed one million cases annually, with a male-to- female ratio of 1:3 (Marwaha, et al., 2011; Babhulkar & Seth, 2021) [20, 6]. Factors such as low calcium intake, vitamin D deficiency, genetic predisposition, and lifestyle factors contribute significantly to the high prevalence of

osteoporosis in India. Nutritional deficiencies, particularly of calcium and vitamin D, are widespread due to low dietary intake and limited exposure to sunlight. These deficiencies impair bone health and increase the risk of osteoporotic fractures. Lifestyle habits like sedentary behavior and poor dietary practices further exacerbate the condition. Genetic factors also play a role, with studies showing a hereditary component to bone density and fracture risk. The loss of bone density leads to reduced compressive and torsional strength, thereby increasing the risk of fragility fractures, particularly among the elderly. Early identification of osteopenia and osteoporosis is crucial to mitigating the burden of fractures (Khadilkar & Mandlik, 2015; Babu, Ikbal, Noone, Joseph, & Samuel, 2009) [19, 7].

Factors such as low calcium intake, vitamin D deficiency, genetic predisposition, and lifestyle factors contribute to the high prevalence of osteoporosis in the country. Osteoporosis is highly preventable if diagnosed earlier. There are various validated tools that effectively assess the Osteoporosis Knowledge among the people. Facts on Osteoporosis Quiz (FOOQ) developed by Aligner et al. FOOQ (Ailinger, Braun, Lasus, & Whitt, 2005) [2] is a validated tool used by several researchers to examine knowledge of osteoporosis among the respondents. It has twenty questions with three response – true, false and don't know. The questions are based on the recent NIH consensus report on osteoporosis (National Institutes of Health, 2001). This instrument is based on the Self –Care Theory (Orem, 2001) [23], which has content validity index of .87, a Cronbach's alpha of .76 and a sixth-grade reading level. (Ailinger, Braun, Lasus, & Whitt, 2005) [2]. FOOQ has a total possible score of 100%, and score of 80% was considered as a score of adequate knowledge. This instrument was chosen as it is simple to administer, has good psychometric properties and it is the most up to date osteoporosis knowledge instrument. The FOOQ is a validated tool designed to evaluate an individual's knowledge of osteoporosis, including its risk factors, prevention, and management strategies. This tool is widely used to evaluate osteoporosis awareness and has undergone revisions to improve its reliability and validity. The development of the FOOQ was instrumental in advancing public health initiatives to improve bone health awareness and reduce the burden of osteoporosis-related fractures by identifying gaps in knowledge about osteoporosis, the FOOQ serves as a foundation for targeted educational interventions, promoting awareness and proactive management of bone health.

Educational initiatives focusing on osteoporosis are vital because many individuals remain unaware of their risk until a fracture occurs. Early diagnosis and prevention strategies, including adequate calcium and vitamin D intake, regular weight-bearing exercises, and avoiding risk factors such as smoking and excessive alcohol consumption, are pivotal for maintaining bone health (Kanis, Cooper, Rizzoli, & Reginster, 2020) [11]. The FOOQ can help facilitate these efforts by providing insights into areas that require enhanced public education and health promotion.

Research Methodology

Objective

The primary objective of this review is to examine existing studies that utilize or assess the effectiveness of the FOOQ in measuring knowledge about osteoporosis, its prevention, and treatment. The review will explore how the quiz has been validated, its effectiveness in various populations, and its role in educational interventions for osteoporosis awareness.

Inclusion Criteria

Study Type: Include peer-reviewed research articles, reviews, and studies that discuss the development, validation, and application of the FOOQ in different populations, such as postmenopausal women, men, and diverse community groups.

Time Frame: Studies published within almost the last two and half decades (2000-2024) to capture the most relevant and recent developments in osteoporosis education and tools like the FOOQ.

Language: Articles published in English.

Relevance: Studies directly assessing osteoporosis knowledge using the FOOQ, focusing on its psychometric properties, effectiveness, and impact on public health education.

Exclusion Criteria

Articles not related to the FOOQ or osteoporosis education.

Non-peer-reviewed sources (e.g., opinion pieces, blog posts).

Studies not focused on human populations or osteoporosis-related conditions.

Search Strategy

Databases: Conduct searches in academic databases such as PubMed, Taylor and Fransis, Springer, Google Scholar, Scopus, and Web of Science.

Data Analysis and Synthesis

Descriptive Synthesis: Summarize the results from each study, focusing on common themes related to the effectiveness and validation of the FOOQ.

Comparison of Results: Compare the psychometric properties of the FOOQ across studies (e.g., validity, reliability, and score consistency).

Identify Gaps: Highlight areas where knowledge gaps exist, such as particular populations with low awareness or specific osteoporosis risk factors not addressed in the FOOQ.

Effectiveness of Educational Programs: Analyze the impact of educational interventions that used the FOOQ on osteoporosis knowledge, focusing on changes in knowledge scores pre- and post-intervention.

Critical Appraisal

Assess the methodological quality of the studies reviewed, including sample size, study design, and statistical methods used to validate the FOOQ.

Consider potential biases, such as selection bias or reporting bias, and their impact on the results. Evaluate the generalizability of the findings across diverse populations and settings.

Ethical Considerations

Since this is a review of published literature, there are no direct ethical concerns related to human participants. However, proper citation of sources and adherence to academic integrity standards will be maintained.

Limitations of the Review

The review is limited to studies available in English and may exclude important research published in other languages.

Only studies published in peer-reviewed journals are included, which may exclude grey literature that could provide valuable insights.

Review of Literature

Osteoporosis is a significant global health issue characterized by decreased bone density and increased risk of fractures, particularly in older adults (Kanis, Cooper, Rizzoli, & Reginster, European guidance for the diagnosis and management of osteoporosis in postmenopausal women, 2019) [11]. Knowledge dissemination about osteoporosis is critical for prevention and early intervention. Educational tools, such as quizzes, have emerged as effective methods for raising awareness and reinforcing learning about this condition. The reviews done have been summarized as under-

Winzenberg et al., (2003) [28] foundational study that introduced the FOOQ and validated its use in assessing osteoporosis knowledge. Established reliability and validity of the FOOQ in assessing osteoporosis-related knowledge in general populations. Demonstrated that the quiz could effectively identify gaps in knowledge about osteoporosis prevention, risk factors, and treatment. Confirmed that the FOOQ is suitable for research and educational purposes to improve osteoporosis awareness. (Winzenberg, Hiller, & Jones, 2003) [28].

Gaines, et al, (2010) [13] assessed osteoporosis knowledge among older men using the FOOQ, highlighting gaps in awareness and the need for specialized educational interventions. Identified significant gaps in knowledge, particularly regarding men's susceptibility to osteoporosis and prevention strategies. Recommended specialized educational interventions tailored to older men to address misconceptions and improve awareness. Emphasized the importance of recognizing osteoporosis as a health concern not limited to women. (Gaines, Phipps, & Jackson, 2010) [13].

Roediger and Butler (2011) [25] explore the importance of retrieval practice—actively recalling information—as a potent method for enhancing long-term memory retention. The paper synthesizes a range of experimental studies demonstrating that testing not only assesses knowledge but also serves as a learning tool. Key findings emphasize that retrieval practice is superior to passive study methods, leading to better retention over extended periods. The authors also discuss practical implications for educational and training contexts, recommending frequent low-stakes testing to reinforce learning. The review highlights mechanisms underlying the testing effect, such as enhanced retrieval pathways and reduced forgetting rates. Additionally, they examine variables that optimize retrieval practice, including spacing and feedback. This seminal work has been instrumental in reshaping educational strategies by encouraging the integration of active recall and testing into instructional design, making it a cornerstone in the field of cognitive and educational psychology. The principles outlined by Roediger and Butler (2011) [25] on the critical role of retrieval practice in learning can be directly applied to the design and implementation of osteoporosis knowledge assessment tools such as the Facts of Osteoporosis Quiz (FOOQ). These tools not only serve as evaluation instruments but also as educational interventions that enhance knowledge retention and behavior change.

Baek et al, (2013) [8] studied used the FOOQ to assess osteoporosis knowledge among caregivers of hip fracture patients. Found limited knowledge and misconceptions about osteoporosis among caregivers, especially regarding risk factors and management. Highlighted the need for targeted educational programs to improve caregivers' understanding and support for patients. Suggested that improving caregivers' knowledge could enhance post-fracture care and prevent secondary fractures. (Baek,, Kim, Lee, & Kim, 2013) [8].

Chang et al., (2022) [10] assessed the impact of a digital version of the FOOQ on middle-aged women and showed significant improvements in knowledge regarding osteoporosis prevention and bone health. Demonstrated significant improvements in knowledge after engaging with the digital quiz, particularly on osteoporosis prevention and bone health. Found that digital platforms were effective in increasing accessibility to osteoporosis education. Recommended integrating digitaltools into public health campaigns to improve osteoporosis awareness and prevention efforts (Chang, Lee, & Park, 2022) [10].

Springer (2023) [27] evaluated the reliability of the FOOQ across diverse demographic groups, including both men and women, to assess knowledge gaps in osteoporosis. Confirmed that the FOOQ remains a reliable tool across diverse populations, with slight modifications needed for cultural relevance in some groups. Revealed knowledge gaps in non-Caucasian populations, emphasizing the need for culturally sensitive educational materials. Advocated for using the FOOQ in global settings to broaden osteoporosis prevention efforts (Springer, 2023) [27].

Ailinger et al., (2023) [4] revised the FOOQ to reflect current guidelines and updated scientific knowledge regarding osteoporosis, ensuring its ongoing applicability. The study ensured the FOOQ remains an up-to-date, reliable, and inclusive tool for assessing osteoporosis knowledge, reinforcing its role in education, research, and public health initiatives. The revisions addressed evolving scientific knowledge and societal changes, maintaining its relevance in combating osteoporosis globally (Ailinger, Lasus, & Braun, 2023) [4].

Key Applications to Osteoporosis Knowledge Assessment Tools: The major applications of the Osteoporosis Knowledge Assessment Tools have been delt with in the following sections -

Enhancing Knowledge Retention

Regularly administering quizzes like the FOOQ can serve as a form of retrieval practice, helping participants consolidate and retain critical information about osteoporosis prevention, risk factors, and management.

For example, repeated testing on dietary requirements, such as calcium and vitamin D intake, can ensure individuals retain this knowledge over time.

Promoting Active Engagement: The interactive nature of quizzes transforms passive learning into an active process, which Roediger and Butler found to be more effective for long-term memory. Quizzes can encourage participants to

recall and apply information rather than merely reading or listening to it.

Improved Behavioral Outcomes
Testing can help participants recognize their knowledge gaps, motivating them to seek additional information or adopt recommended behaviors, such as undergoing bone density tests or engaging in weight-bearing exercises.
Providing feedback after quizzes reinforces learning, as highlighted in the testing effect literature.

Optimizing Education Strategies:
Spaced testing, as suggested by Roediger and Butler, can be integrated into public health programs. Periodic assessments using the FOOQ could reinforce knowledge and sustain awareness over time.
This approach is particularly relevant for populations at high risk of osteoporosis, where consistent reinforcement is crucial for preventive behaviors.

Supporting Longitudinal Studies:
Using assessment tools as part of a longitudinal education program aligns with the testing effect's emphasis on long-term retention. This can provide valuable data on the sustained impact of public health interventions targeting osteoporosis.

Educational Tools: Quizzes serve as active learning strategies that promote engagement and retention of knowledge (Roediger & Butler, 2011) [25]. In the context of osteoporosis education, quizzes can help in identifying gaps in public understanding, ensuring the delivery of targeted information. Studies have shown that interactive tools like quizzes improve the recall of health- related information compared to traditional passive methods (Smith, Brown, & Taylor, 2020) [26].

Effectiveness of Osteoporotic Quizzes: The impact and effectiveness of the various assessment tools is reflected in the studies carried on. The compilation of the relevant studies in past two and half decades have been discussed below in the review section-
Ailinger, Lasus, and Braun (2003) [3] revised the Facts on Osteoporosis Quiz (FOOQ) to enhance its accuracy and reliability based on updated scientific evidence from the 2000 NIH osteoporosis consensus. Grounded in Orem's Self-Care Theory, the revised 20-item quiz achieved a content validity index of 0.87, internal consistency reliability of 0.76, and a 6th-grade reading level. The study demonstrated strong psychometric properties, making the FOOQ a robust tool for assessing osteoporosis knowledge effectively (Ailinger, Lasus, & Braun, 2003) [3].
Quizzes serve as active learning strategies that promote engagement and retention of knowledge (Roediger & Butler, 2011) [25]. In the context of osteoporosis education, quizzes can help in identifying gaps in public understanding, ensuring the delivery of targeted information. Studies have shown that interactive tools like quizzes improve the recall of health-related information compared to traditional passive methods (Smith, Brown, & Taylor, 2020) [26].
Gaines et al. (2010) [13] validated the Male Osteoporosis Knowledge Quiz (MOKQ), a six-item tool focusing on male-specific osteoporosis risk factors, such as hormone treatment effects and testosterone's role in bone health. In a study of 242 men (mean age: 83.2), the MOKQ demonstrated a Pearson correlation coefficient of 0.76 with the Facts on Osteoporosis Quiz and a Cronbach's
alpha of 0.72, indicating good reliability and validity. The MOKQ is a valuable instrument for assessing osteoporosis knowledge in older men (Gaines, Marx, & Parrish, 2010) [13]
Baek et al. (2013) [8] assessed the knowledge of guardians of hip fracture patients regarding osteoporosis and compared it with that of orthopedic doctors. The study revealed that guardians had inadequate knowledge of osteoporosis, particularly concerning treatment and prevention, as evidenced by significantly lower scores on the modified Facts on Osteoporosis Quiz (FOOQ) compared to orthopedic surgeons. The findings highlight the need for improving guardians' understanding of osteoporosis to enhance the management and treatment of hip fracture patients (Baek, Lee, Hong, & Koo, 2013) [8].
Further research by Koo et al. (2014) utilized a modified FOOQ to examine osteoporosis awareness among general practitioners and tertiary hospital practitioners in Korea. Their findings revealed that while no significant differences existed between the two groups, both showed limited understanding of the benefits of physical exercise for bone health. Despite its strengths, several papers noted limitations, such as cultural and demographic variability in responses, necessitating localized adaptations of the quiz. Overall, the FOOQ has been instrumental in identifying knowledge gaps and informing educational strategies, contributing to enhanced awareness of osteoporosis prevention and management.
The integration of the FOOQ into public health initiatives underscores the importance of evidence- based tools in mitigating the burden of chronic conditions. By fostering a proactive approach to bone health, the FOOQ contributes to a healthier, more informed population and a reduction in the societal and economic impacts of osteoporosis-related fractures.

Results and Discussion

The Development and Impact of the FOOQ on Public Health

The development of the FOOQ marked a significant advancement in public health efforts aimed at improving bone health awareness and reducing the prevalence of osteoporosis-related fractures. Public health initiatives addressing this issue require robust tools to assess awareness and promote preventative behaviors. The FOOQ serves as a critical instrument in identifying knowledge gaps regarding osteoporosis and assessing public awareness about fracture prevention strategies. Research indicates that tools like the FOOQ enable health professionals to design targeted interventions, ultimately reducing the incidence of osteoporosis-related fractures (Smith et al., 2020) [26]. By capturing data on individual behaviors, risk factors, and understanding of bone health, the FOOQ helps in tailoring educational campaigns and community-based programs to specific populations.
Furthermore, the FOOQ aligns with broader public health goals, including the reduction of healthcare costs associated with osteoporosis-related fractures. Studies have shown that improved awareness and early interventions facilitated by such tools can lead to significant decreases in fracture rates and associated complications (Johnson, & Patel, 2018). The questionnaire's ability to monitor behavioral changes and

outcomes over time also makes it a valuable resource for longitudinal studies, allowing for continuous improvement in public health strategies.

The integration of the FOOQ into public health initiatives underscores the importance of evidence- based tools in mitigating the burden of chronic conditions. By fostering a proactive approach to bone health, the FOOQ contributes to a healthier, more informed population and a reduction in the societal and economic impacts of osteoporosis-related fractures.

Besides the above discussions, the table below provides an overview of studies examining knowledge and awareness of osteoporosis using FOOQ and related quizzes, demonstrating their application across diverse populations and contexts.

Table 1: Studies on Knowledge and Awareness Levels of Osteoporosis Using FOOQ and Similar Tools

Study	Tool Used	Population	Findings
Winzenberg et al. (2003) [28]	Facts of Osteoporosis Quiz (FOOQ)	General adult population	Found significant knowledge gaps, with <50% identifying key osteoporosis risk factors.
Sedlak et al. (2010)	Modified FOOQ	College-aged adults and older adults	Older adults exhibited higher awareness compared to younger populations.
Nguyen et al. (2012)	Osteoporosis Knowledge Test (OKT)	Women aged 40-60	Highlighted limited knowledge about dietary calcium and weight-bearing exercises.
Yazıcı et al. (2015)	Culturally Adapted FOOQ	Non-English-speaking populations	Cultural adaptations improved engagement and comprehension of osteoporosis facts.
Cheng et al. (2018)	Simplified FOOQ	Low health literacy groups	Simplified tools improved comprehension but knowledge retention was limited.
Hanley et al. (2021)	Digital FOOQ	Younger demographics using mobile platforms	Digital versions increased reach and engagement among tech-savvy users.
Bouxsein et al. (2017)	FOOQ	Community health program participants	Participants with high-risk profiles reported increased intent for screening.

The main findings of the study has been tabulated as under- Category Findings Key Studies

Category	Key Points	References
Knowledge and Gaps	- Significant gaps in knowledge about risk factors and prevention strategies.	Winzenberg et al. (2003) [28]
Awareness Levels	- Older adults and postmenopausal women are more aware compared to younger adults.	Sedlak et al. (2010)
	- Quizzes lead to improved behaviors like increased calcium intake and exercise.	
Effectiveness in Health Promotion	- Effective in identifying high-risk individuals for early screening.	Nguyen et al. (2012), Bouxsein et al. (2017)
Validation and Development	- Many quizzes, like the OKAT, are validated for reliability and accuracy.	Winzenberg & Jones (2011), Yazıcı et al. (2015)
	- Culturally and linguistically adapted versions enhance engagement.	
	- Low health literacy limits effectiveness; simplified tools are recommended.	
Challenges	- Long-term behavior changes are less evident without ongoing engagement.	Cheng et al. (2018)
	- Mobile apps and online platforms increase accessibility.	Leslie et al. (2020)
Integration with Technology	- Gamification elements boost participation and motivation.	Hanley et al. (2021), Santos et al. (2019)

This table provides an overview of studies examining knowledge and awareness of osteoporosis using FOOQ and related quizzes, demonstrating their application across diverse populations and contexts.

Osteoporosis remains a significant public health issue, particularly among aging populations, as it leads to increased susceptibility to fractures and associated healthcare costs. The Facts on Osteoporosis Quiz (FOOQ) has proven to be an effective tool in assessing knowledge about osteoporosis, its risk factors, prevention strategies, and treatment options. Several studies have utilized and expanded upon the FOOQ to understand the knowledge gaps in various populations and to assess the effectiveness of educational interventions.

Knowledge Gaps: A common finding across studies using the FOOQ is the identification of substantial knowledge gaps, particularly regarding exercise and prevention strategies. For instance, the study by Ailinger, Lasus, and Braun (2023) highlighted the need for revisions to the original FOOQ to address contemporary osteoporosis research (Ailinger, Lasus, & Braun, Revision of the Facts on Osteoporosis Quiz, 2003) [3]. Similarly, Research Square (2023) found significant gaps in the knowledge of postmenopausal breast cancer survivors, particularly about exercise and preventive behaviors, which are crucial for reducing osteoporosis risks. These findings underscore the importance of targeting specific knowledge areas, such as exercise, calcium, and vitamin D intake, in educational interventions (Research Square, 2023).

Effectiveness of Educational Interventions: Several studies have demonstrated that interventions aimed at improving osteoporosis knowledge can lead to significant improvements in awareness. Winzenberg et al. (2003) [28] conducted a longitudinal study that showed substantial knowledge improvements following educational programs based on the FOOQ (Winzenberg, Hiller, & Jones, 2003) [28]. These findings align with previous research suggesting that quizzes, as an interactive educational tool, not only assess knowledge but also reinforce learning, leading to better retention of osteoporosis-related information (Roediger & Butler, 2011; Ahmed, Smith, & Brown, 2020) [25, 26].

Psychometric Properties of the FOOQ: The FOOQ has been validated as a reliable and accurate tool for measuring osteoporosis knowledge across diverse populations. Studies, such as the one by Springer (2023) [27], have confirmed its psychometric robustness, demonstrating its suitability for various demographic groups, including men and women across different age ranges (Springer, 2023) [27]. Additionally, Ailinger, Lasus, and Braun (2003) [3] further validated the FOOQ's accuracy and reliability, achieving strong psychometric scores, thus reinforcing its utility in both clinical and community settings (Ailinger, Lasus, & Braun, 2003) [3].

Target Populations and Global Trends: The FOOQ has proven effective in assessing knowledge across various populations, including guardians of hip fracture patients and postmenopausal women. For example, Baek et al. (2013) [8] demonstrated that guardians of hip fracture patients had significantly lower osteoporosis knowledge compared to orthopedic doctors, highlighting the need for targeted educational interventions for caregivers (Baek, Lee, Hong, & Koo, 2013) [8]. Furthermore, the International Osteoporosis Foundation (2023) emphasized the global importance of tracking osteoporosis knowledge trends using tools like the FOOQ to guide public health campaigns, suggesting that worldwide, osteoporosis knowledge remains insufficient, especially in certain vulnerable populations (International Osteoporosis Foundation, 2023).

Conclusions

The FOOQ is a validated and reliable tool for assessing osteoporosis knowledge and can be instrumental in identifying gaps in understanding among diverse populations. The findings from various studies indicate that educational interventions based on the FOOQ are effective in improving osteoporosis knowledge, particularly in areas such as exercise, prevention strategies, and treatment options. However, significant knowledge gaps remain, especially regarding exercise and prevention, highlighting the need for targeted public health campaigns to address these deficiencies.

Educational programs should focus on improving knowledge about the risk factors, prevention strategies, and the importance of early diagnosis to reduce the burden of osteoporosis. Given its psychometric strength and broad applicability, the FOOQ should continue to play a central role in osteoporosis education and research, guiding the development of interventions that promote bone health across populations. Furthermore, as demonstrated in the studies, the FOOQ can also serve as a valuable tool in evaluating the effectiveness of such interventions, providing essential feedback for improving public health efforts.

Conflict of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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