

Dear Editor,

Osteoporosis is a significant public health issue that leads to substantial morbidity and mortality.¹ Early diagnosis is crucial to mitigate life-threatening complications, such as fragility fractures. However, timely detection remains a formidable challenge, particularly in low-to-middle-income countries like Pakistan.² This difficulty is attributed to the limited availability of DEXA scanners, insufficient physician training, and the complexity of the FRAX tool for predicting fracture risk.³

Given the considerable health burden posed by osteoporosis, there is an urgent need for feasible and innovative diagnostic methods. Recent advancements in artificial intelligence and machine learning models offer substantial promise in this regard. For instance, plain radiographs and CT scans have been used opportunistically as training data to detect bone density, potentially eliminating the need for DEXA scans.⁴ Similarly, blood tests, demographic information, and BMI have been utilized as parameters to develop patterns through machine learning models to detect osteoporosis.^{5,6} These models have demonstrated some accuracy in predicting bone density. Despite these advances, a comprehensive predictive model for detecting osteoporosis risk is still lacking. A holistic approach that considers multiple parameters may enhance the validity and reliability of these models. Therefore, future research should focus on integrating demographic, imaging, blood, and disease parameters to develop a robust machine-learning model. Such a model could be employed effectively to detect and manage osteoporosis.

To further this goal, collaborative efforts between researchers, healthcare providers, and policymakers are essential. Implementing machine learning models in clinical practice requires not only technological innovation but also adequate training for healthcare professionals and accessibility to necessary diagnostic tools. Moreover, public health strategies should aim to increase awareness and screening for osteoporosis, particularly in underserved populations.

While significant strides have been made in the early detection of osteoporosis through innovative diagnostic methods, more comprehensive and integrative approaches are needed. By leveraging the power of artificial intelligence and machine learning, we can develop more accurate and accessible tools to combat this pervasive disease, ultimately improving patient outcomes and reducing the global burden of osteoporosis.

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