Letter to the Editor / Editöre Mektup

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Turk J Osteoporos

High Visibility, Low Citability? The Challenge of Artificial Intelligence in Osteoporosis Research

Yüksek Görünürlük, Düşük Alıntılanabilirlik? Osteoporoz Araştırmalarında Yapay Zekanın Zorluğu

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Dear Editor,

Artificial intelligence (AI) is increasingly appreciated and there are many studies of AI in osteoporosis in the field of prediction of the disease, early diagnosis for personalized treatment planning and risk assessment (1). Utilization of AI may lead to better fracture risk prediction, enhanced evaluation of bone mineral density, and improved therapeutic decision-making with the help of machine learning algorithms, advanced deep learning models, and automated image analysis (1,2). With the increasing interest in AI-enabled advances in osteoporosis research, it is necessary to evaluate the academic landscape and the research impact of this emerging field. A bibliometric analysis was performed on the AI-related osteoporosis research indexed in Web of Science, which showed a total of 256 articles with 90 articles being included after the application of inclusion criteria. The selection of articles was based on their relevance to AI applications in osteoporosis research, particularly in terms of fracture risk assessment, bone mineral density analysis, and osteoporosis related clinical decision making.

The most cited study, "Evaluation of Transfer Learning with Deep Convolutional Neural Networks for Classifying Osteoporotic Vertebral Fractures" (2020) has 101 citations in total and 16.83 average citation per year (3). Conclusively, our study suggests the promise of deep learning in vertebral fracture classification with extensive academic acknowledgement. Yet despite the high citation impact, the paper has an Altmetric score of just 1.0, implying very little online interest. "The Machine Learning solutions for Osteoporosis—A review" (2021) is the paper with the highest citation index (18.6 citations per year) which indicates it as a prominent reference for AI-based osteoporosis studies (2). As a supplement to existing AI, radiology, and musculoskeletal literature, it has been referenced extensively in these fields, establishing strong foundations for future investigations. It's altmetric score (9.0), however, is modest, suggesting that AI in osteoporosis is still mostly an academic conversation rather than a clinical front-page issue.

A correlation analysis between total citations, average citation rate, and altmetric scores provides further insight into the relationship between academic influence and public engagement. The correlation of 0.96 between total citations and average citations per year indicates a very strong positive correlation, indicating that highly cited articles are consistently receiving references and reinforcing their academic impact in the long run. However, the correlation between Altmetric scores and total citations (r=0.048) is weak, indicating that articles with high online engagement do not necessarily receive high citations (4). Similarly, the correlation between Altmetric scores and yearly citations (r=0.075) remains low, suggesting that articles gaining media attention or social shares may not yet be widely cited in academic literature (Figure 1).

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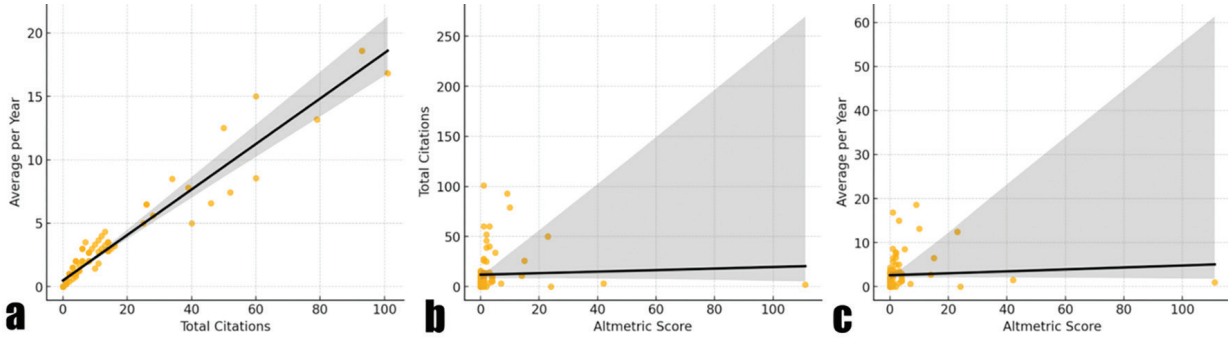

Figure 1. (a) Relationship between total citations and average citations per year, **(b)** Relationship between Altmetric scores and total citations, **(c)** Relationship between Altmetric scores and average citations per year

These findings underscore the discrepancy between AI's online engagement and its adoption within academic circles, underscoring the necessity for structured development in osteoporosis research and clinical contexts. In order to address this discrepancy, there is a necessity for the prioritisation of several high-impact strategies.

It is clear that AI models need to move from being tested in experiments to being used in the real world. This change is very important for improving how we combine clinical practice, which means moving from just trying things out to actually putting them into practice in the real world. Additionally, in the rapidly evolving field of AI, older research becomes outdated more quickly than other research. It is essential to maintain currency of information.

The establishment of consistent validation criteria is of highly importance in ensuring the uniformity and reliability of research outcomes. This methodological standardisation is a crucial aspect of scientific practice, as it fosters trust and reproducibility in research findings.

It is evident that there is a necessity for collaboration between AI researchers, clinicians, and policymakers in order to facilitate the adoption of AI.

AI-driven osteoporosis research is advancing rapidly; however, a disparity persists between its academic impact and public engagement. It is imperative that the Altmetric-Citation gap is closed through clinical validation, interdisciplinary collaboration, and methodological transparency in order to ensure the effective integration of AI into osteoporosis management.

Footnotes

Authorship Contributions

Concept: A.A., B.T.D., B.A., M.T.Y., Design: A.A., M.H.T., F.B., Data Collection or Processing: M.H.T., B.A., Analysis or Interpretation: A.A., B.T.D., B.A., F.B., Literature Search: M.H.T., M.T.Y., Writing: A.A., B.T.D., M.T.Y., F.B.

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