Assessing the Applicability of Artificial Intelligence (AI) in Fabrication and Plagiarism of Scientific Literature in the Field of Orthodontics

Saeed N. Asiri[1], Anwar S. Alhazmi[2], Vini Mehta[3]

[1]Department of Pediatric Dentistry, College of Dentistry, Prince Sattam Bin Abdulaziz University, Saudi Arabia
[2]Department of Preventive Dentistry, College of Dentistry, Jazan University, Saudi Arabia
[3]Department of Dental Research Cell, Dr. D. Y. Patil Dental College and Hospital, Dr. D. Y. Patil Vidyapeeth (Deemed to be University), Pimpri, Maharashtra, India

Abstract

Objectives: The study aims to evaluate the applicability of Chat Generative Pre-trained Transformer (ChatGPT-4) to fabricate an orthodontic research paper and assess the ability of human reviewers (clinicians and academic reviewers) and artificial intelligence (AI) detection tools to identify such fabricated content.

Methods: This study employed a descriptive exploratory research design. ChatGPT-4 was used to generate a research paper on the orthodontic topic. A search strategy was used to extract relevant research studies from three databases, then rewritten using ChatGPT-4. A panel of 10 orthodontic experts were given a mix of AI-rewritten and human-written abstracts to identify fake and real ones. Additionally, AI detection tools were tested for their efficiency in identifying AI-generated content. The results were analyzed using descriptive statistics and comparative percentages.

Results: Orthodontic experts and researchers correctly identified only 68% of AI-generated abstracts as fake, while 86% of human-written abstracts were recognized as real. Online AI detection tools demonstrated weak performance, with overall sensitivity and specificity of just 89% and accuracy of 44.5%. GPTZero had 100% specificity and 100% predictive values, along with the highest sensitivity and accuracy compared to others. However, writers AI demonstrates the poorest performance, indicating 0 predictive values in identifying AI-fabricated research works.

Conclusions: Reviewers experienced difficulties in distinguishing between AI-generated abstracts and those written by humans due to the substantial resemblance to real papers. To safeguard scientific integrity, it is crucial to use measures such as improving detection tools, refining peer review, and creating a transparent culture around AI use.

Keywords: artificial intelligence, chatGPT, orthodontics, plagiarism, scientific integrity