Balkan Med J 2025;42:86

Artificial Intelligence in Pediatric Nail Diseases: Limitations and Prospects

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We are writing in response to your recent editorial, which was published in the Balkan Medical Journal, regarding the promising application of artificial intelligence (AI) in nail diseases.[1] Although the advancements in AI for diagnosing conditions such as onychomycosis and nail psoriasis are indeed encouraging, I would like to emphasize two critical limitations that could potentially affect the broader applicability and effectiveness of AI in dermatology: The underrepresentation of pediatric data and the absence of ethnic diversity-based data in the datasets employed to train these AI systems.

As your editorial underscores, dermatology is particularly well-suited for AI applications due to the abundance of visual data that are available for training these models. Nevertheless, the dearth of pediatric-specific data in these datasets is of profound concern. Pediatric patients frequently present distinctive clinical characteristics that vary substantially from those of adults, necessitating distinct diagnostic approaches. However, the current AI models, which are primarily trained on datasets pertaining to adults, may not perform optimally when applied to pediatric cases. The importance of this issue is highlighted by the fact that, among the more than 200 commercial AI tools cataloged by the American College of Radiology's Data Science Institute AI Clearinghouse, only 4% are approved for pediatric use, and none are specifically developed for thoracic imaging in children.[2] This severe underrepresentation highlights the urgent necessity for more focused efforts to incorporate pediatric data into AI development.[3]

Apart from the pediatric data deficiency, another significant challenge is the inadequate representation of many ethnic groups in AI training datasets. Because different ethnic groups have diverse skin types and genetic histories, dermatological disorders might present differently in each group. Furthermore, several AI models are trained primarily on data from lighter-skinned individuals, resulting in potential biases in diagnosis and treatment recommendations for patients with darker skin tones. This lack of ethnic diversity in training data can lead to misdiagnoses and suboptimal care for non-white patients, aggravating already-existing health disparities.[4]

To resolve these critical gaps, future AI research must prioritize the inclusion of both pediatric and ethnically diverse datasets. Collaborative efforts are required to gather high-quality, standardized data from a diverse array of pediatric and ethnic populations. This approach will not only enhance the accuracy and dependability of AI systems in dermatology but also ensure that these tools are inclusive and advantageous for all patient populations.

Moreover, it is essential to exercise caution when integrating AI into clinical practice. Ethical considerations, such as patient consent, data privacy, and the responsible use of AI, must be prioritized to preserve trust and efficacy in these emerging technologies. By targeting these limitations and fostering the development of more inclusive AI systems, we can progress toward the full potential of AI in dermatology, thereby improving patient outcomes across all demographics.

In conclusion, although AI has the potential to transform dermatology, it is critical that we address these gaps to ensure that the advantages of AI are equally distributed across all patient populations, irrespective of age or ethnicity.

Authorship Contributions: Concept- G.M., V.F., S.C., A.P; Supervision- G.M., V.F., S.C.; Materials- G.M., V.F., S.C.; Literature Search- G.M.; Writing- G.M., V.F., S.C., A.P.

Conflict of Interest: No conflict of interest was declared by the authors.

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Received: August 28, 2024 **Accepted:** 09 September, 2024 **Available Online Date:** January 02, 2025 • **DOI:** 10.4274/balkanmedj.galenos.2024.2024-8-122

Available at www.balkanmedicaljournal.org

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Cite this article as: Mondillo G, Frattolillo V, Colosimo S, Perrotta A. Artificial Intelligence in Pediatric Nail Diseases: Limitations and Prospects. Balkan Med J.; 2025; 42(1):86.