Editorial

The Role of Generative AI in Shaping the Future of Paediatric Practice

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Generative artificial intelligence (AI) is fundamentally reshaping healthcare landscapes by tackling multifaceted challenges and advancing diagnostic, therapeutic, and caregiving paradigms through sophisticated leveraging of clinical datasets. This technology demonstrably elevates patient outcomes while broadening equitable access to global healthcare systems. In practice, generative AI facilitates automated clinical documentation such as real-time synthesis of electronic health records, interactive medical education via immersive simulations, concise summarization of evidence-based literature for expedited clinical decision-making, and precision support for diagnosis, treatment planning, and prognostic modeling (1). In paediatric practice, this may lead to earlier identification of rare diseases, enhanced diagnostic precision, and more tailored care plans, especially for complex conditions like inborn errors of immunity, congenital disorders, and neurodevelopmental disorders. Nevertheless, AI-derived judgments in highly acute clinical environments remain contentious, chiefly attributable to inherent model hallucinations that compromise interpretability and erroneous outputs.

Healthcare professionals can enhance their capabilities by thoroughly integrating patient data, including medical histories and investigative findings, which can lead to improved diagnostic accuracy and more informed decision-making. These include medical imaging for enhanced visualization, real-time analytics with predictive forecasting (2). Remarkable advancements in image generation, restoration, and editing have transformed the capability to create realistic images and even building detailed anatomical diagrams. Another example is the utilization of machine learning that has influenced various use in clinical applications. These models derive insights from vast datasets that facilitate scenario simulations and outcome explorations without physical trials. Such capabilities deepen comprehension of pathophysiological mechanisms, refine diagnostic efficacy, and therapeutic strategies.

In addition to direct patient care, generative AI has the potential to significantly enhance paediatric education and training. Adaptive learning platforms customise educational content for medical students, trainees, and specialists, while AI-assisted simulation and case generation improve exposure to rare yet essential paediatric scenarios. In resource-limited settings throughout the Asia–Pacific region, these technologies present an opportunity to reduce educational disparities and enhance workforce capacity, contingent upon equitable and contextually suitable access. Generative AI, such as ChatGPT-3.5, aids in medical education by enabling students to complete task with support in grammar, accurate English translation, problem-solving exercises and query responses (3). AI applications can offer students feedback and personalized responses to their inquiries, generate articles, language revision, and efficient handling of repetitive administrative tasks. AI can assist healthcare professionals in paediatrics in developing lifelong learning and self-directed study skills, particularly while preparing for licensing examinations during or after their undergraduate education. General references to trusted sources, such as online textbooks and medical publications, assist learners in accessing accurate information (4).

In paediatrics, recognition and real-time data analysis to efficiently diagnose rare diseases in newborns is crucial. AI helps to automate genomic diagnosis by expediting diagnostic processes among neonates. Another useful application is the model to detect severe sepsis compared to traditional screening algorithms. Expansion of this application may also be suitable in image diagnosis such as fracture and injury detection and screening tool for

life-threatening diagnoses that need rapid intervention (5). Active paediatrician engagement with AI-based technologies will allow them to play a greater role in the implementation of AI in every aspect of health care.

The integration of generative AI into paediatric practice presents significant ethical, legal, and professional challenges that warrant careful examination. Data privacy, algorithmic bias, transparency, and accountability present significant challenges when addressing the needs of children. The excessive dependence on AI-generated outputs poses a risk of diminishing the skills of clinicians and could unintentionally weaken clinical judgement, particularly in the absence of strong governance and human oversight. Generative AI should be considered an adjunct rather than a replacement for paediatric expertise. Healthcare delivery models are constantly evolving, with AI set to shape the future of paediatric care. Despite some concerns related to ethical use and hallucination in data output, it has become the latest hot topic for discussion among medical fraternity. Medical informatics and telemedicine have been the subject of the past. Nowadays, AI-focused curricula and continuous training programs are essential for ethically preparing modern paediatricians and medical students to utilise new technologies. Through improved teaching, AI has the potential to augment clinical efficiency and broaden access to high-quality healthcare for the community.

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