Enhancing global surgical education through equitable simulation training: a critical analysis of technological integration and international collaboration

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Dear Editor,

We read the recent article 'The transition of surgical simulation training and its learning curve: a bibliometric analysis from 2000 to 2023'[1] presented in the *International Journal of Surgery*, offering a substantial analysis of trends over the past decades. While the authors provide a detailed narrative of the quantitative growth in surgical simulation, certain aspects require further elucidation to appreciate the nuances of global contributions and the evolution of training modules.

One critical area that appears underexplored is the contribution and challenges of developing countries outside China in integrating surgical simulation into their training protocols. The focus on China, while noteworthy, overshadows other nations that are also making strides under different constraints. The discussion skims over the potential contributions of these countries, which could offer a more diversified understanding of global trends in surgical education. A more balanced view could highlight strategies that different countries have adopted to overcome infrastructural and financial limitations, contributing uniquely to this field's body of knowledge[2].

Furthermore, the manuscript points to a significant increase in publications and interest in surgical simulation from 2014 onward, attributed primarily to new technologies like laparoscopy and robotic surgery. However, the analysis does not sufficiently delve into the underlying reasons for this spike, which might include advancements in virtual reality (VR) and artificial intelligence (AI) that have been pivotal. An in-depth examination of these technologies could reveal their profound impact on the learning curves and training effectiveness, which are critical for understanding the dynamics at play [3].

Moreover, while the article excellently captures the quantitative growth of surgical simulation training, it somewhat overlooks the qualitative aspects of how these training modules have evolved. As surgical procedures grow in complexity, so too must the training modules evolve to meet these new challenges. There is a need to develop high-fidelity simulators that replicate complex surgical scenarios more realistically, providing trainees with a more effective and immersive learning experience.

The brief mention of the importance of international collaboration in enhancing the research output and quality in surgical simulation is another point that merits expansion. Effective collaboration frameworks could be structured not only to benefit well-established ecosystems but also to bolster burgeoning ones in developing countries. Sharing best practices, joint research initiatives, and funding opportunities are areas that could be elaborated upon to foster a more inclusive global research environment.

In conclusion, the discussion on surgical simulation training in developing countries, the role of cutting-edge technologies, and the depth of international collaboration offer fertile ground for further research. Future studies could focus on developing more sophisticated simulation tools and fostering international partnerships that enhance global surgical education's inclusivity and effectiveness.

Ethical approval

No ethical approval and patient consent were required for all analyses based on literature research.

Source of funding

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Author contribution

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Conflicts of interest disclosure

The authors declare that they have no conflicts of interest.

Research registration unique identifying number (UIN)

Not applicable.

Guarantor

Guobin Liu.

Role of the funder/sponsor

The funder of the study had no role in the study design, data collection, data analysis, data interpretation, or writing of the manuscript. The corresponding author had full access to all the data in the study and has final responsibility for the decision to submit for publication.

Data availability statement

The data in this study is not sensitive in nature and is accessible in the public domain. The data is therefore available and not of a confidential nature.

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