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Current Educational Practice in Physiotherapy Simulation-Based Education: A Scoping Review Protocol

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Abstract

Background:
Simulation-Based Education (SBE) is an educational technique that can provide a structured and individualised approach to skill development in physiotherapy students. A recent scoping review by Stockert et al. (2022) highlighted the widespread use of simulation in various content areas and settings for preregistration physiotherapy education. However, there was limited information available on the elements of simulation delivery and the curriculum frameworks that were chosen to design SBE to address the needs of the learners.

Objectives:
This scoping review aims to map research undertaken in the area of SBE in physiotherapy education according to the following objectives: (1) to delineate adherence to all elements of best practice for curriculum development guided by the Thomas and Kern framework, (2) identify the skills and competencies taught in simulation, (3) describe the details to operationalise SBE including pre-briefing and debriefing activities, amount of task practice, attributes of educators, and the types of simulator used (such as peer role-playing, simulated patients, or manikins) and its alignment with simulation activities.

Methods:
Arksey & O'Malley's scoping review methodology, refined by Levac et al. (2010) and Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR), will guide the conduct of this scoping review. Studies will be identified from the review by Stockert et al. (2022), which will be updated by a search of four databases (Ovid MEDLINE, CINAHL, Web of Science, and ERIC) between March 2022 to August 2023. Title and abstract of the search results will be screened, and full-text articles of those meeting the eligibility criteria will be retrieved. A charting form will be developed a priori, in line with the review's objectives.

Conclusion:
The insights gained from this review will inform educators, curriculum developers, and healthcare professionals in designing and implementing SBE programs for physiotherapy students to enhance the learning experience and foster the acquisition of competencies.

Troubleshooting

Introduction

1 Simulation is an educational technique used to substitute and augment real experiences with guided ones that are frequently ‘‘immersive’’ in nature and that accurately evoke or replicate significant features of the real environment in a fully interactive way (Gaba, 2004; Harder, 2010). Simulation in physiotherapy education offers a safe and controlled environment for students to practice and enhance their clinical skills, thereby ensuring patient safety and fostering increased confidence in real-life patient interactions (Mulyadi et al., 2021). Globally, educators in physiotherapy face challenges in meeting the demand for clinical placements to adequately prepare students for their professional roles due to the mismatch between the need for and availability of clinical placements (Hegge et al., 2010). Simulation-Based Education (SBE) has the potential to play an integral role in supplementing the provision of clinical training for physiotherapy students, as current training models struggle to provide students with sufficient opportunities to develop key competencies (Dennis et al., 2017).

Given the value of SBE in physiotherapy education, a body of research has explored simulation interventions in physiotherapy education. In 2022, Stockert et al. conducted a scoping review to describe and summarise the use of SBE among physiotherapy students in the international literature, with a secondary aim to examine the application and integration of the Standards of Best Practice (SOBP) for SBE in published physiotherapy education research. Stockert et al. (2022) identified 182 articles and reported that simulation was widely employed with physiotherapy students across various content areas and settings. Acute care (n = 69) and outpatient (n = 40) settings were frequently described for the simulation experiences. Common content areas identified were orthopaedics (n = 64), neurology (n = 40), cardiovascular (n = 37), and general medicine (n = 35), with fewer studies focused on integument (n = 5) and paediatrics (n = 5). Furthermore, the authors reported that only ten studies in their review included the three elements (a need assessment, pre-briefing and debriefing) of the SOBP developed by the International Nursing Association for Clinical Simulation and Learning (2016d, 2016c, 2016a, 2016e, 2016b, Stockert et al., 2022). While the review reported on the three elements of the SOBP, the authors did not report the in-depth details required to operationalise the delivery of simulation, including pre-briefing and debriefing activities (e.g. pre-briefing and debriefing methods employed), characteristics and training of simulation faculty, repeated task practice and simulator types used (such as peer role-playing, simulated patients, or manikins) and their alignment with learning outcomes. For educators and researchers to make informed decisions in designing simulation-based interventions and comparing outcomes across studies, it is vital to understand the simulator type used and the underlying rationale for its selection in the specific learning activity

(Battista and Nestel, 2018). Understanding the details of simulation delivery is important to replicate successful interventions, as they directly impact the resources required and the outcomes of SBE (Issenberg et al., 2005). A comprehensive understanding of simulation delivery in physiotherapy education will guide educators in designing and delivering future simulations effectively, ensuring consistency and promoting the transferability of successful approaches across different institutions and contexts (Benishek et al., 2015).

Despite the work done to date, a notable gap remains in our understanding of whether the simulation curricula have been effectively structured to address the unique needs of learners. As highlighted by Thomas et al. (2016), comprehensive curriculum development models guide educators in systematically creating and evaluating educational programs, ensuring alignment with learning objectives and the effective delivery of content. The application of these frameworks, rooted in evidence-based educational principles, equips educators with a structured approach to assess the quality, relevance, and effectiveness of SBE curricula. Thomas and Kern's six-step approach to curriculum development is a well-established framework for identifying and effectively addressing the learners' needs.

This scoping review aims to map research undertaken in the area of SBE in physiotherapy education according to the following objectives: (1) delineate adherence to all elements of best practice for curriculum development guided by the Thomas and Kern curriculum development framework, (2) identify the skills and competencies taught in simulation, (3) describe the details to operationalise SBE including pre-briefing and debriefing activities, amount of task practice, characteristics and training of faculty, and simulator type (such as peer role-playing, simulated patients, or manikins) and its alignment with simulation activities.

Methods

2 This review will be conducted in accordance with guidance from the Preferred Reporting Items for Scoping Reviews (PRISMA-ScR) (Tricco et al., 2018), the framework proposed by Arksey and O'Malley (2005), with methodological refinements suggested by Levac et al. (2010). This process comprises the following five key steps:

- Defining the research question.
- Identifying relevant studies.
- Study selection.
- Charting the data.
- Collating, summarising and reporting the results.

The protocol for this scoping review will be registered in Protocols.io

Search strategy:

Studies will initially be identified from the recent scoping review of SBE in Physiotherapists Professional Education conducted by Stockert et al. (2022), encompassing papers published until March 21, 2022. This will be supplemented by a search of four electronic bibliographic databases (Ovid MEDLINE, CINAHL, Web of Science, and ERIC) between March 2022 to August 2023 to identify papers published since the Stockert et al. (2022) review. The search strategies used by Stockert et al. (2022) will be used in the current review with guidance from an academic librarian. These strategies will be pilot-tested before implementation. The decision to use the same search string as Stockert et al. (2022) is based on its perceived completeness, ensuring that any relevant studies related to simulation in physiotherapy education would have been captured by their comprehensive search strategy. Reference lists of eligible studies will be hand-searched, citation tracking of these publications will be conducted, and a Google Scholar search will be performed to identify additional studies missed in the original searches. The results of the searches will be imported into Endnote 20 (The EndNote team, 2013), and any duplicate studies will be removed. Based on predefined eligibility criteria, the screening process will be conducted using Covidence systematic review software (Veritas Health Innovation, Melbourne, Australia) by a PhD student (YC) and an independent reviewer (OOS).

Study selection:

This review will include all forms of evidence published in the English Language (see inclusion criteria below). Two independent reviewers (YC and OOS) will screen titles, abstracts, and full-text papers of potentially relevant studies. Any disagreements will be discussed in consultation with a third reviewer (SMD). Data extraction from all the studies included in the analysis will be carried out by YQ. To ensure the accuracy of the extracted data, OOS will independently perform data extraction as a verification process in 10% of the studies.

Eligibility criteria:

Inclusion criteria will encompass randomised controlled trials, qualitative studies and cohort studies(retrospective and prospective) that explore the use of simulation with preregistered physiotherapy students. Simulation, in this context, refers to using manikins, simulated patients, task trainers, virtual reality applications, and virtual patient cases, irrespective of the educational setting or the stage within the physical therapy curriculum (Stockert et al., 2022). Specific amendments to the exclusion criteria will be made by excluding Interprofessional Education (IPE) studies due to their primary focus on communication skills among different healthcare professionals, lacking relevant data on physiotherapy-specific skills. Further, studies evaluating assessment tools will be excluded as their main objective is to establish the reliability and validity of these tools rather than providing pertinent information on simulation design and elements of the curriculum development framework. Exclusion criteria also encompass conference papers, systematic reviews, editorials, and dissertations.

Data charting process and data items:

We will use an established framework to develop a data extraction template, guided by the six-step Thomas and Kern curriculum development framework (Thomas et al., 2022) and the reporting guidelines for healthcare simulation research: extensions to the CONSORT and STROBE statements (Cheng et al., 2016). In each of the included studies, the following data will be extracted:
Study characteristics: First author's name, publication year, country where the study was conducted, and the research design employed. Additionally, information will be collected on the number of participants included in the study, the year of participants' training, the simulator type used (simulated peers, simulated patients, or manikin) and their alignment with simulation activities, the specific skills and competencies taught during the simulation session and how they align with the learning outcomes.
Simulation delivery elements: details required to operationalise SBE, including pre-briefing and debriefing activities and duration, reason for simulation activity repetition, amount of task practice and characteristics and training of faculty.
Application of the Thomas and Kern's six-step approach to curriculum development:

- Problem identification and general needs assessment: in this step, a rationale for developing a curriculum to address a current educational problem and general needs must be stated.
- Needs assessment of targeted learners: a rationale for developing a curriculum to address the needs of targeted learners must be clearly stated.
- Goals and objectives: the curriculum must include clear educational goals and learning objectives.
- Educational strategies: the curriculum must provide a clear educational strategy (content and method) to achieve the above-mentioned goals and objectives.
- Implementation: the curriculum must outline a plan for successful implementation.
- Evaluation and feedback: This step includes the assessment of individual learners (both formative and summative), the program, and the curriculum.

Collating and summarising results

A PRISMA flow diagram will be utilised to depict the sequential screening process, assessing the sources of evidence, and determining their eligibility for inclusion in the review, following the guidelines proposed by Tricco et al. (2018). The flow diagram will commence by depicting the studies included by Stockert et al. (2022) as the initial reference. Subsequently, it will incorporate any studies identified from the updated database search. Results will be synthesised in a descriptive narrative format aligned with the review's objectives and scope.

Ethics and dissemination

3 Since this is a review of the literature, ethics approval is not required. We will disseminate the findings from this study in publications in peer-reviewed journals.

References

4 ARKSEY, H. & O'MALLEY, L. 2005. Scoping studies: towards a methodological framework. International journal of social research methodology, 8, 19-32.

BATTISTA, A. & NESTEL, D. 2018. Simulation in medical education. *Understanding medical education: Evidence, theory, and practice*, 151-162.

BENISHEK, L. E., LAZZARA, E. H., GAUGHT, W. L., ARCARO, L. L., OKUDA, Y. & SALAS, E. 2015. The Template of Events for Applied and Critical Healthcare Simulation (TEACH Sim): a tool for systematic simulation scenario design. *Simul Healthc,* 10, 21-30.

CHENG, A., KESSLER, D., MACKINNON, R., CHANG, T. P., NADKARNI, V. M., HUNT, E. A., DUVAL-ARNOULD, J., LIN, Y., COOK, D. A., PUSIC, M., HUI, J., MOHER, D., EGGER, M., AUERBACH, M., FOR THE INTERNATIONAL NETWORK FOR SIMULATION-BASED PEDIATRIC INNOVATION, R. & EDUCATION REPORTING GUIDELINES,
I. 2016. Reporting guidelines for health care simulation research: extensions to the CONSORT and STROBE statements. *Advances in Simulation,* 1, 25.

DENNIS, D., NG, L. & FURNESS, A. 2017. First-year physiotherapy students who elect to participate in simulation-based learning activities benefit from the experience. *Focus on Health Professional Education: A Multi-disciplinary Journal,* 18, 90-102.

FRIEDERICHS, H., MARSCHALL, B. & WEISSENSTEIN, A. 2019. Simulation-based mastery learning in medical students: Skill retention at 1-year follow up. *Med Teach,* 41, 539-546.

GABA, D. M. 2004. The future vision of simulation in health care. *Qual Saf Health Care,* 13 Suppl 1, i2-10.

GREENWOOD, K. C. & EWELL, S. B. 2018. Faculty development through simulation-based education in physical therapist education. *Advances in Simulation,* 3, 1.

Hegge, M., Klawiter, R., Bunkers, S., Olson, R., Letcher, D., Tschetter, L., Craig, G.,& Winterboer, V. (2010). Clinical academic partnership: Mutual ownership for clinical learning. Nurse Educator, 35(2), 61-65.

HARDEN, R. M. 2007. Outcome-based education: the future is today. *Medical teacher,* 29, 625-629.

HARDER, B. N. 2010. Use of simulation in teaching and learning in health sciences: a systematic review. *J Nurs Educ,* 49, 23-8.

INACSL Standards of Best Practice. 2016a: SimulationSM Facilitation. *Clinical Simulation in Nursing,* 12, S16-S20.

INACSL Standards of Best Practice. 2016b: SimulationSM Participant Evaluation. *Clinical Simulation in Nursing,* 12**,** S26-S29.
INACSL Standards of Best Practice. 2016c: SimulationSM Professional Integrity. *Clinical Simulation in Nursing,* 12**,** S30-S33.
INACSL Standards of Best Practice. 2016d: SimulationSM Simulation-Enhanced Interprofessional Education (Sim-IPE). *Clinical Simulation in Nursing,* 12**,** S34-S38.
INACSL Standards of Best Practice. 2016e: SimulationSM Simulation Design. *Clinical Simulation in Nursing,* 12**,** S5-S12.
ISSENBERG, S. B., MCGAGHIE, W. C., PETRUSA, E. R., LEE GORDON, D. & SCALESE, R. J. 2005. Features and uses of high-fidelity medical simulations that lead to effective learning: a BEME systematic review. *Med Teach,* 27**,** 10-28.
LEVAC, D., COLQUHOUN, H. & O'BRIEN, K. K. 2010. Scoping studies: advancing the methodology. *Implementation science,* 5**,** 1-9.
MCGAGHIE, W. C. 2015a. Mastery learning: it is time for medical education to join the 21st century. *Acad Med,* 90**,** 1438-41.
MCGAGHIE, W. C. 2015b. When I say... mastery learning. *Medical education,* 49**,** 558-559.
MCGAGHIE, W. C., SIDDALL, V. J., MAZMANIAN, P. E. & MYERS, J. 2009. Lessons for Continuing Medical Education From Simulation Research in Undergraduate and Graduate Medical Education: Effectiveness of Continuing Medical Education: American College of Chest Physicians Evidence-Based Educational Guidelines. *Chest,* 135**,** 62S-68S.
MULYADI, M., TONAPA, S. I., ROMPAS, S. S. J., WANG, R. H. & LEE, B. O. 2021. Effects of simulation technology-based learning on nursing students' learning outcomes: A systematic review and meta-analysis of experimental studies. *Nurse Educ Today,* 107**,** 105127.
SABUS, C. & MACAULEY, K. 2016. Simulation in physical therapy education and practice: Opportunities and evidence-based instruction to achieve meaningful learning outcomes. *Journal of Physical Therapy Education,* 30**,** 3-13.
STOCKERT, B., SILBERMAN, N., RUCKER, J., BRADFORD, J., GORMAN, S. L., GREENWOOD, K. C., MACAULEY, K., NORDON-CRAFT, A. & QUIBEN, M. 2022. Simulation-Based Education in Physical Therapist Professional Education: A Scoping Review. *Physical Therapy,* 102.
THE ENDNOTE TEAM 2013. Endnote. Endnote 20 ed. Philidephia, PA: Clavirate.
THOMAS, P. A., KERN, D. E., HUGHES, M. T., TACKETT, S. A. & CHEN, B. Y. 2022. *Curriculum development for medical education: a six-step approach*, JHU press.

TRICCO, A. C., LILLIE, E., ZARIN, W., O'BRIEN, K. K., COLQUHOUN, H., LEVAC, D., MOHER, D., PETERS, M. D., HORSLEY, T. & WEEKS, L. 2018. PRISMA extension for scoping reviews (PRISMA-ScR): checklist and explanation. *Annals of internal medicine,* 169**,** 467-473.

Protocol references

ARKSEY, H. & O'MALLEY, L. 2005. Scoping studies: towards a methodological framework. International journal of social research methodology, 8, 19-32.

BATTISTA, A. & NESTEL, D. 2018. Simulation in medical education. *Understanding medical education: Evidence, theory, and practice*, 151-162.

BENISHEK, L. E., LAZZARA, E. H., GAUGHT, W. L., ARCARO, L. L., OKUDA, Y. & SALAS, E. 2015. The Template of Events for Applied and Critical Healthcare Simulation (TEACH Sim): a tool for systematic simulation scenario design. *Simul Healthc,* 10**,** 21-30.

CHENG, A., KESSLER, D., MACKINNON, R., CHANG, T. P., NADKARNI, V. M., HUNT, E. A., DUVAL-ARNOULD, J., LIN, Y., COOK, D. A., PUSIC, M., HUI, J., MOHER, D., EGGER, M., AUERBACH, M., FOR THE INTERNATIONAL NETWORK FOR SIMULATION-BASED PEDIATRIC INNOVATION, R. & EDUCATION REPORTING GUIDELINES, I. 2016. Reporting guidelines for health care simulation research: extensions to the CONSORT and STROBE statements. *Advances in Simulation,* 1**,** 25.

DENNIS, D., NG, L. & FURNESS, A. 2017. First-year physiotherapy students who elect to participate in simulation-based learning activities benefit from the experience. *Focus on Health Professional Education: A Multi-disciplinary Journal,* 18**,** 90-102.

FRIEDERICHS, H., MARSCHALL, B. & WEISSENSTEIN, A. 2019. Simulation-based mastery learning in medical students: Skill retention at 1-year follow up. *Med Teach,* 41**,** 539-546.

GABA, D. M. 2004. The future vision of simulation in health care. *Qual Saf Health Care,* 13 Suppl 1**,** i2-10.

GREENWOOD, K. C. & EWELL, S. B. 2018. Faculty development through simulation-based education in physical therapist education. *Advances in Simulation,* 3**,** 1.

Hegge, M., Klawiter, R., Bunkers, S., Olson, R., Letcher, D., Tschetter, L., Craig, G.,& Winterboer, V. (2010). Clinical academic partnership: Mutual ownership for clinical learning. Nurse Educator, 35(2), 61-65.

HARDEN, R. M. 2007. Outcome-based education: the future is today. *Medical teacher,* 29**,** 625-629.

HARDER, B. N. 2010. Use of simulation in teaching and learning in health sciences: a systematic review. *J Nurs Educ,* 49**,** 23-8.

INACSL Standards of Best Practice. 2016a: SimulationSM Facilitation. *Clinical Simulation in Nursing,* 12**,** S16-S20.

INACSL Standards of Best Practice. 2016b: SimulationSM Participant Evaluation. *Clinical Simulation in Nursing,* 12**,** S26-S29.

INACSL Standards of Best Practice. 2016c: SimulationSM Professional Integrity. *Clinical Simulation in Nursing,* 12**,** S30-S33.
INACSL Standards of Best Practice. 2016d: SimulationSM Simulation-Enhanced Interprofessional Education (Sim-IPE). *Clinical Simulation in Nursing,* 12**,** S34-S38.
INACSL Standards of Best Practice. 2016e: SimulationSM Simulation Design. *Clinical Simulation in Nursing,* 12**,** S5-S12.
ISSENBERG, S. B., MCGAGHIE, W. C., PETRUSA, E. R., LEE GORDON, D. & SCALESE, R. J. 2005. Features and uses of high-fidelity medical simulations that lead to effective learning: a BEME systematic review. *Med Teach,* 27**,** 10-28.
LEVAC, D., COLQUHOUN, H. & O'BRIEN, K. K. 2010. Scoping studies: advancing the methodology. *Implementation science,* 5**,** 1-9.
MCGAGHIE, W. C. 2015a. Mastery learning: it is time for medical education to join the 21st century. *Acad Med,* 90**,** 1438-41.
MCGAGHIE, W. C. 2015b. When I say... mastery learning. *Medical education,* 49**,** 558-559.
MCGAGHIE, W. C., SIDDALL, V. J., MAZMANIAN, P. E. & MYERS, J. 2009. Lessons for Continuing Medical Education From Simulation Research in Undergraduate and Graduate Medical Education: Effectiveness of Continuing Medical Education: American College of Chest Physicians Evidence-Based Educational Guidelines. *Chest,* 135**,** 62S-68S.
MULYADI, M., TONAPA, S. I., ROMPAS, S. S. J., WANG, R. H. & LEE, B. O. 2021. Effects of simulation technology-based learning on nursing students' learning outcomes: A systematic review and meta-analysis of experimental studies. *Nurse Educ Today,* 107**,** 105127.
SABUS, C. & MACAULEY, K. 2016. Simulation in physical therapy education and practice: Opportunities and evidence-based instruction to achieve meaningful learning outcomes. *Journal of Physical Therapy Education,* 30**,** 3-13.
STOCKERT, B., SILBERMAN, N., RUCKER, J., BRADFORD, J., GORMAN, S. L., GREENWOOD, K. C., MACAULEY, K., NORDON-CRAFT, A. & QUIBEN, M. 2022. Simulation-Based Education in Physical Therapist Professional Education: A Scoping Review. *Physical Therapy,* 102.
THE ENDNOTE TEAM 2013. Endnote. Endnote 20 ed. Philidephia, PA: Clavirate.
THOMAS, P. A., KERN, D. E., HUGHES, M. T., TACKETT, S. A. & CHEN, B. Y. 2022. *Curriculum development for medical education: a six-step approach*, JHU press.
TRICCO, A. C., LILLIE, E., ZARIN, W., O'BRIEN, K. K., COLQUHOUN, H., LEVAC, D., MOHER, D., PETERS, M. D., HORSLEY, T. &

WEEKS, L. 2018. PRISMA extension for scoping reviews (PRISMA-ScR): checklist and explanation. *Annals of internal medicine,* 169**,** 467-473