Empathy and High-Fidelity Human Patient Simulators: A Critical Analysis of Undergraduate Nursing Education

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Cover Page Footnote

High-fidelity simulation, heralded as a catholicon for the challenge of finding clinical placements and as a proactive approach to patient safety concerns, has been entrenched in nursing education (Lemermeyer, 2020; Yuan et al., 2012). Although classifications of different types of simulation are heterogenous, high-fidelity simulation generally integrates high-fidelity human patient simulators that can communicate with learners and emulate lifelike conditions (Seropian et al., 2004), such as blinking eyes and responsive vital signs, emulating clinical reactions and physiological symptom to enhance learning experiences (Koukourikos et al., 2021; Lemermeyer, 2020). Since high-fidelity human patient simulators can communicate with learners and respond to student actions (Lemermeyer, 2020; Seropian et al., 2004), they are considered particularly useful for representing complex patient conditions and allowing students to practise a range of clinical interventions. While the efficacy of simulation is contentious, its use as a pedagogical tool in nursing clinical education is climbing (Lemermeyer, 2020; Ward, 2016; Yuan et al., 2012). In the last few years, rapid nursing educational transitions triggered by the global COVID-19 pandemic, that is, from in-person clinical placements to diverse simulation modules, became worldwide phenomena (Aslan & Pekince, 2020; Michel et al., 2021; Younis et al., 2021).

Incorporating a competency-based curriculum in undergraduate nursing education aims to support students in acquiring essential competencies, such as clinical skills, critical thinking, and empathy. Empathy is fundamental to nursing and health care practice because it plays a pivotal role in beneficial health outcomes (Cho & Kim, 2024; Dean et al., 2015; Hojat et al., 2001; Trzeciak et al., 2017). A growing body of evidence identifies high-fidelity simulation as a complementary intervention for empathy development (Chua et al., 2021; Levett-Jones et al., 2019). Simulation-based interventions have been believed to effectively enhance empathy among undergraduate nursing students (Cho & Kim, 2024; de Lima & Osório, 2021; Yu & Kirk, 2009). In this discussion paper, we engage with the ongoing debate on the role of high-fidelity human patient simulators in empathy development within undergraduate nursing programs through a critical analysis. We first provide an overview of simulation and then argue that while high-fidelity human patient simulators are increasingly employed as a solution to clinical placement challenges and patient safety concerns, their role in fostering essential empathic skills among nursing undergraduates is limited. We explore the historical evolution of empathy in health care, the impacts of neo-liberal policies, and the broader implications of reliance on simulation technology in nursing education. We advocate for balanced educational strategies that prioritize authentic patient interactions and reflect on the challenges and prospects of measuring and developing empathy within contemporary nursing curricula. We propose an integrated approach that combines technical skill development with human-centric methods, particularly mid-range and low-fidelity simulations involving standardized patients and role-play (Canadian Association of Schools of Nursing [CASN], 2015), to enhance empathy development in undergraduate nursing education.

Overview of Simulation

Simulation in clinical nursing education aims to emulate clinical practice closely (Koukourikos et al., 2021). It involves guided experiences that imitate real-world scenarios in an interactive way. Simulations are classified into three categories based on their fidelity, that is, high, mid-range, and low, and each serves particular educational purposes and contributes differently to the learning spectrum (CASN, 2015). High-fidelity simulations generally integrate computerized mannequins, that is, high-fidelity human patient simulators, and technologies to enable students to practise clinical and decision-making skills in a psychologically safe environment that reduces patient safety concerns (CASN, 2015; Koukourikos et al., 2021; Seropian et al., 2004). Moreover,

high-fidelity simulations are considered a comprehensive solution to the challenge of securing quality clinical placement opportunities, thereby enhancing student confidence and fostering learning in a controlled environment (Koukourikos et al., 2021; Lemermeyer, 2020; Yuan et al., 2012). Mid-range fidelity simulations include interactive computer programs, virtual reality setups, and standardized patients to offer dynamic, realistic circumstances for applying and assessing student clinical reasoning and procedural skills (CASN, 2015). Standardized patients are people who are trained to act as patients, thereby providing real-world human-to-human interactions primarily for teaching communication skills and assessing student performance (Koukourikos et al., 2021). Low-fidelity simulations, often involving task trainers or role-play between students, concentrate on developing specific psychomotor skills and basic patient interaction competencies that are essential for foundational nursing practice (CASN, 2015).

Debriefing is believed to play an integral role in assessing and enhancing learning outcomes across all simulation modalities in undergraduate nursing education (CASN, 2015; Dreifuerst, 2012). It consists of a structured reflection to help students integrate theoretical knowledge with practical experience, facilitating deep learning and the development of critical thinking skills (CASN, 2015; Dreifuerst, 2012).

Historical Perspectives on Empathy

In the nursing discipline, empathy is a core element in nurse–patient relationships, facilitating the delivery of quality nursing care (Alligood, 2005; Ward, 2016). Despite such an emphasis, there is no consensus on its definition despite multiple attempts to define empathy (Chua et al., 2021; Tan et al., 2021; Terry & Cain, 2016; Yu & Kirk, 2009). A psychotherapist who integrated empathy into the sphere of therapeutic care claimed that empathy involves health care professionals (HCPs) perceiving clients' individual experiences vicariously while maintaining a clear distinction that this perception is only a simulation (Rogers, 1957). Rogers's (1957) definition falls predominantly into the cognitive domain. Peplau (1991) consolidated empathy into nursing care in the 1950s, defining empathy as the capability to intuitively perceive the dynamics of a scenario while not necessarily possessing the capacity to articulate or consciously recognize its components. Peplau's definition is largely in the intuitive domain, which can be translated into affective or emotional understanding.

In medicine, Hojat et al. (2001), the founders of an empathy measure, the Jefferson Scale of Physician Empathy, defined empathy as a capacity for an uncritical comprehension of patients' experiences, emotions, and feelings. Their definition fits into the cognitive domain because of its emphasis on understanding over emotional sharing. Chua et al.'s (2021) systematic review of empathy tools revealed that the most commonly used instruments, the Jefferson Scale of Empathy and the Interpersonal Reactivity Index, were invalid because they lacked comprehensiveness and robustness.

Over time, the concept of empathy expanded to include affective, imaginative, and behavioural dimensions (Tan et al., 2021). Morse et al. (1992) classified empathy into four categories: moral, emotive, cognitive, and behavioural. The moral aspect of empathy relates to the internal altruistic motivation that drives the empathic process and reflects an ethical predisposition towards understanding and assisting others (Morse et al., 1992). The emotive aspect pertains to the capacity to vicariously feel others' emotions and falls into the affective dimension (Morse et al., 1992). The cognitive aspect involves the intellectual capacity to comprehend and recognize others' feelings and perspectives from an objective standpoint; namely, this aspect requires

perspective taking and the analytical processing of another's emotions and experiences (Morse et al., 1992). The behavioural aspect encompasses the communicative actions used to relay understanding of others' viewpoints through verbal and nonverbal expressions, thus demonstrating empathic engagement (Morse et al., 1992).

The term *clinical empathy* was first coined by Berger (1987), who construed empathy as harmony between sympathy and insight, which aligns with Rogers's (1957) cognitive empathy. Further, Terry and Cain (2016) proposed *digital empathy*, insisting on a nuanced understanding of clinical empathy since both HCPs and patients perceive empathy differently, not merely as a cognitive function. Therefore, digital empathy encompasses imaginative, affective, and cognitive aspects, resulting in rapport and expanding clinical empathy in a more holistic and interdependent manner (Terry & Cain, 2016).

Care ethicists augmented previous authors' definitions of empathy by introducing *political empathy*, which acknowledges the societal and political perspectives of care, to encompass the importance of power dynamics and societal context (van Dijke et al., 2019). The concept of *relational empathy* further broadened the understanding of empathy in health care by underlining the inherent vulnerability and mutual dependence of individuals, thereby underscoring the relational nature (van Dijke et al., 2019). This construct highlighted the interconnectedness in human relationships and the significant role of empathy in nurturing that interconnectedness, which, in turn, promotes altruism and responsiveness to others' needs and well-being (van Dijke et al., 2019). This perspective not only accentuates the complexity and depth of empathic engagement in clinical settings (van Dijke et al., 2019) but also resonates with the idea of human connectedness in nursing (Peplau, 1991). In sum, despite the definitional discrepancies of empathy, scholars have unanimously asserted that empathy is a relational construct that exclusively emerges through interpersonal interactions.

The elusive nature of empathy impacts the accuracy and validity of empathy measures in nursing education and clinical settings. Yu and Kirk (2009) conducted a systematic review evaluating 12 empathy assessment tools used in nursing, spanning 1987 to 2007. The authors found that pre-existing instruments neither demonstrate comprehensive psychometric robustness nor sufficiently encompass all four domains of empathy. In another systematic review, de Lima and Osório (2021) appraised 23 empathy assessment tools and agreed that the ill-defined concept of empathy significantly affects the development and validity of existing instruments. Although some researchers insist that empathy is a trainable skill (Alligood & May, 2000; Halpern, 2003), such an assertion seems hasty since empathy cannot be measured accurately (de Lima & Osório, 2021; Yu & Kirk, 2009).

Empathy and High-Fidelity Human Patient Simulators: Philosophical Perspectives

Lemermeyer (2020) identified the lack of empirical evidence supporting the efficacy of high-fidelity human patient simulators in enhancing nursing undergraduates' skills and knowledge, particularly as it related to the intricacies of incorporating empathy development into nursing education via high-fidelity simulation. The author questioned the effectiveness of high-fidelity human patient simulators in capturing the nuanced aspects of empathic care that can be found only in human-to-human interactions. The effectiveness of such simulations can be further influenced by social determinants of health (Raphael et al., 2020). For example, socio-economic disparities may affect access to high-fidelity simulations and other educational resources, potentially widening the empathy gap among students from different backgrounds (Raphael et al.,

2020). Social exclusion and early childhood development also play significant roles in shaping students' empathetic abilities and overall well-being (Raphael et al., 2020). Addressing these social determinants in the design and implementation of simulation-based pedagogy can enhance the development of empathy and improve overall patient care outcomes.

Although the use of high-fidelity human patient simulators mitigates safety risks to patients through repetitive practice of psychomotor skills, it inadvertently deprives nursing undergraduates of opportunities for learning from patient interactions (Lemermeyer, 2020). For example, while a nursing student is removing staples from a postoperative patient, they are also learning relational practice and lessons in vulnerability, empathy, and reciprocal human connection (Lemermeyer, 2020). Lemermeyer (2020) stressed that real patients impart knowledge beyond mere verbal or physiological indicators by communicating complex emotions and conditions subtly and nonverbally, which high-fidelity human patient simulators can never replicate. Hence, shifting clinical learning to simulation can hamper the development of vital relational nursing skills, including empathy, in nursing undergraduates and foster a biomedical notion that does not recognize the nuanced, empathic aspects of patient care (Lemermeyer, 2020).

Dean et al. (2015) examined the use of high-fidelity human patient simulators in undergraduate nursing education and its impact on the development of empathy and interpersonal skills. Nursing undergraduates described empathy as ongoing processes of interpreting and responding to patients' verbal and nonverbal cues, indicating that authentic empathic responses require human-to-human interactions, and they found it challenging to apply these skills when interacting with high-fidelity human patient simulators (Dean et al., 2015). Nursing undergraduates often prioritized their clinical skills over communication when working with high-fidelity human patient simulators because of the simulators' lack of human emotional responses. Based on their findings, Dean et al. suggested that the simulated environment could lead to a form of detachment or reduced sensitivity in nursing undergraduates towards real patient experiences and emotions.

Similarly, Haque and Waytz (2012) discovered that when faced with increased clinical responsibilities and stress, health care students and HCPs experienced reduced brain activation in areas associated with empathy and increased activation in areas related to cognitive control. Empathy reduction can also result in the adoption of dehumanization as a coping mechanism to handle challenges (Haque & Waytz, 2012). Thus, a lack of empathy in patient care can create a vicious cycle that affects not only patients' health outcomes but also job satisfaction, burnout rates, and overall well-being in HCPs (Chua et al., 2021; Trzeciak et al., 2017).

Nursing Undergraduates' Lived Experiences and Perceptions During the Pandemic

Numerous international studies have explored nursing undergraduates' lived experiences and perceptions regarding the COVID-19-pandemic-initiated transitions in clinical education, which often required a greater reliance on simulation (Lobão et al., 2023). Although students understood the need for simulation, they still preferred in-person clinical placements over simulation (Bryan et al., 2022). The absence of authenticity and human-to-human interactions in almost all types of simulation modules were challenging for nursing undergraduates (Bryan et al., 2022; Joung & Kang, 2022; Kim et al., 2021; Lobão et al., 2023; Thirsk et al., 2023; Younis et al., 2021). Some nursing undergraduates reported that they learned to prioritize identifying correct procedures over establishing rapport with patients or demonstrating empathy and meaningful interpersonal connections in their simulation activities (Joung & Kang, 2022). Taken together,

these simulations led to nursing undergraduates' emphasis on mastering techniques over relational dimensions of nursing (Dean et al., 2015; Joung & Kang, 2022; Lemermeyer, 2020). Moreover, nursing undergraduates unanimously agreed that simulation learning cannot and should not be a complete replacement for in-person clinical practicum (Dean et al., 2015; Joung & Kang, 2022; Lemermeyer, 2020; Lobão et al., 2023; Thirsk et al., 2023; Younis et al., 2021). Furthermore, a systematic review of the effectiveness of different education interventions, such as in-person clinical placements, workshops, lectures, and art-based learning, for empathy development in nursing undergraduates determined that immersive, experiential simulation modalities (such as role-playing) were the most effective (Levett-Jones et al., 2019).

Debriefing is integral to learning clinical reasoning and empathy following high-fidelity simulations. However, according to Dean et al. (2015), student participants asserted that the simulation environment did not effectively support the development of dialogic and empathic interactions. After conducting a comprehensive systematic literature review and meta-analysis, Cho and Kim (2024) reported that neither pre-simulation briefing nor debriefing sessions significantly impact empathy development. Moreover, Cho and Kim (2024) also noted that "empathy cannot be improved through a short period of experience or training" (p. 11). These findings challenge the predominant belief that debriefing is universally important for evaluating and enhancing learning outcomes in all simulation methods (CASN, 2015; Dreifuerst, 2012).

Neo-liberal Ideology and Health Care Systems

Empathy, central to nursing practice and health care, plays a critical role in fostering positive outcomes for both patients (Dean et al., 2015) and HCPs (Chua et al., 2021; Trzeciak et al., 2017). Therefore, the idea of *compassionomics* is introduced to underscore the benefits of empathic care in health care environments (Trzeciak et al., 2017). Such accentuation of empathy is particularly relevant in the context of the capitalist and neo-liberal health care system, which values productivity and cost-effectiveness (Bruce et al., 2014). Despite the predominant perception that the emphasis on empathy in care delivery collides with the efficiency-driven characteristics of the neo-liberal health care system, the integration of empathic care coincides with and promotes productivity and cost-effectiveness. Increasing attention to empathy development in undergraduate nursing curricula is inevitable, even in the context of the capitalist, neo-liberal health care system, a phenomenon coined "McDonaldization" (Ritzer, 2021).

The lack of consensus in defining empathy and the absence of accurate measurement tools together hinder meticulous assessment and identification of effective means to integrate empathy development into nursing education. Nevertheless, simulation learning will continue to be used in nursing education because of pre-existing factors, such as limited quality clinical placement opportunities, global nursing educator shortages, and international nursing shortages leading to deteriorating staff–student ratios in clinical settings (Dean et al., 2015; Dewart et al., 2020; Mansfield et al., 2021; Spence et al., 2019; Thirsk et al., 2023). As evidence, use of simulation modules as pedagogical tools in nursing education had been consistently growing before the global COVID-19 pandemic and serve to instruct nursing undergraduates on diverse elements of patient care (Ward, 2016; Yuan et al., 2012).

Remarkably, the dependence on high-fidelity human patient simulators for clinical education might not be as cost-effective as has been assumed (Dean et al., 2015). Rather, the use of high-fidelity human patient simulators provokes significant financial outlay for the acquisition, upkeep, and functioning of high-fidelity human patient simulators, and requires considerable time

for creating scenarios, on top of the aforementioned impacts on empathy development in nursing undergraduates (Nehring & Lashley, 2009). Moreover, an increased reliance on high-fidelity human patient simulators tends to limit the time available for other pedagogical approaches, consequently exerting pressure on the overall curricula (McGarry et al., 2014). Even from the neo-liberal and capitalist standpoints regarding cost-efficiency, overreliance on high-fidelity human patient simulators in nursing clinical education for empathy development can be undesirable (Dean et al., 2015) since burnout and nursing retention rates can be inversely impacted (Chua et al., 2021; Trzeciak et al., 2017).

Scholarly sources consequently outline challenges associated with implementing high-fidelity human patient simulators in nursing education, particularly in the context of cultivating empathic communication abilities essential for proficient practice (Dean et al., 2015). These challenges encompass an absence of a coherent strategy for high-fidelity human patient simulators use, obstacles in defining and evaluating empathy accurately, and a shortage of cost–benefit analysis data (Dean et al., 2015).

Implications for Nursing Education

In the realm of nursing education, the use of high-fidelity human patient simulators for empathy development elicits significant concerns (Dean et al., 2015; Lemermeyer, 2020). A prominent disconnect between practising via high-fidelity human patient simulators and developing genuine empathic skills towards real patients is apparent. Dean et al. (2015) suggested that technical skill development provided by high-fidelity human patient simulators might not adequately support the emotional and relational aspects of nursing care. We believe that high-fidelity human patient simulators could be used to practise psychomotor skills, but the development of clinical and interpersonal skills with real clinical experience or other human-centred activities is essential. Simulation cannot substitute for in-person clinical placements as the former lacks human interactions (Bryan et al., 2022; Joung & Kang, 2022; Kim et al., 2021; Lobão et al., 2023; Thirsk et al., 2023; Younis et al., 2021). Thus, a balanced approach, incorporating both technical education and the development of empathic understanding, is required in nursing education (Dean et al., 2015). Simulation pedagogy's lack of realism and direct patient contact were perceived as shortfalls for clinical education, which calls for blended learning approaches that combine simulated and real-world experiences (Bryan et al., 2022; Joung & Kang, 2022; Kim et al., 2021; Lobão et al., 2023; Thirsk et al., 2023; Younis et al., 2021). We agree with Dean et al. (2015) that the use of role-play, involving standardized patients or peer students, can facilitate empathy development by allowing nursing undergraduates to step into patients' shoes and acquire a deeper understanding of what it is like to engage in human-to-human interactions.

After conducting a systematic review, Levett-Jones et al. (2019) suggested that, while many studies assessed empathy immediately following interventions, only a few extended their measurements across the full span of undergraduate enrolment. Studies that measured empathy over time revealed that empathy levels among nursing students fluctuated, indicating that the developmental trajectory of empathy might be more complex and variable than previously understood. Future educational interventions might need to consider sustained and repeated measures to accurately appraise the impact of empathy development over the entire course of nursing undergraduates' educational journeys.

Finally, the absence of literature discussing specific tools that demonstrate the relationship between simulated learning and the development of empathy illuminates a significant

gap in current research. This gap is particularly significant given the increasing reliance on simulated learning methods in undergraduate nursing education. The deficiency of validated tools that effectively link these two critical aspects of undergraduate nursing education suggests an urgent need for targeted research. Developing and validating such tools could significantly enhance our understanding of how simulated experiences contribute to empathy development, ultimately leading to more effective educational practices.

Conclusion

This paper has included a critical analysis of the integration and implications of high-fidelity human patient simulators in undergraduate nursing education, with a special focus on empathy development. We have explored how the increasing reliance on various simulation modalities, particularly high-fidelity simulations, aims to bridge the gap between theoretical knowledge and practical application while also addressing the challenges associated with securing quality clinical placements. Despite the technological advantages high-fidelity simulations offer, that is, safety and controlled learning environments, concerns remain regarding their effectiveness in genuinely fostering essential empathic skills among nursing undergraduates.

We have also highlighted gaps in the existing literature, notably the dearth of tools that effectively assess and measure the impact of simulation-based learning on the development of empathy. Such gaps emphasize the need for continued research in this area, particularly studies that can provide longitudinal insights into how empathy evolves throughout the tenure of undergraduate nursing education. Additionally, future educational strategies should incorporate sustained and periodic evaluations to better understand and promote the development of empathy over time, rather than relying solely on immediate post-intervention assessments.

Given the complexities of teaching and measuring empathy, it is imperative that nursing education not only encompasses simulation technologies but also includes an integration of these tools with real-world patient interactions in order to cultivate a holistic and empathetic clinical skill set. Emphasizing a balanced educational approach that includes both simulated and actual patient care experiences will likely yield more proficient and empathetic practitioners. Ultimately, while simulations are invaluable in providing a safe learning environment, they must be part of a broader, more integrated pedagogy that reflects the nuances of human interactions and the inherent empathy required in nursing practice.

References

Alligood, M. R. (2005). Rethinking empathy in nursing education: Shifting to a developmental view. *Annual Review of Nursing Education*, *3*, 299–309. https://www.proquest.com/docview/216907419

Alligood, M. R., & May, B. A. (2000). A nursing theory of personal system empathy: Interpreting a conceptualization of empathy in King's interacting systems. *Nursing Science Quarterly*, *13*(3), 243–247. https://doi.org/10.1177/08943180022107645

Aslan, H., & Pekince, H. (2020). Nursing students' views on the COVID-19 pandemic and their perceived stress levels. *Perspectives in Psychiatric Care*, *57*(2), 695–701. https://doi.org/10.1111/ppc.12597

Berger, D. M. (1987). *Clinical empathy*. Jason Aronson.

Bruce, A., Rietze, L., & Lim, A. (2014). Understanding philosophy in a nurse's world: What, where and why? *Nursing and Health*, *2*(3), 65–71. https://doi.org/10.13189/nh.2014.020302

Bryan, V., Corcoran, L., Dewart, G., Thirsk, L. M., & Bowers, E. (2022). Clinical learning during the pandemic: Experiences of LPN-BN undergraduate nursing students. *Journal of Professional Nursing*, *42*, 301–307. https://doi.org/10.1016/j.profnurs.2022.07.020

Canadian Association of Schools of Nursing. (2015). *Practice domain for baccalaureate nursing education: Guidelines for clinical placements and simulation*. https://www.casn.ca/wp-content/uploads/2018/07/FINAL-clinical-sim-2015-revised-nov-2016.pdf

Cho, M.-K., & Kim, M. Y. (2024). Effectiveness of simulation-based interventions on empathy enhancement among nursing students: A systematic literature review and meta-analysis. *BMC Nursing*, *23*(1), 319. https://doi.org/10.1186/s12912-024-01944-7

Chua, J. Y. X., Ang, E., Lau, S. T. L., & Shorey, S. (2021). Effectiveness of simulation-based interventions at improving empathy among healthcare students: A systematic review and meta-analysis. *Nurse Education Today*, *104*, 105000. https://doi.org/10.1016/j.nedt.2021.105000

Dean, S., Williams, C., & Balnaves, M. (2015). Practising on plastic people: Can I really care? *Contemporary Nurse*, *51*(2–3), 257–271. https://doi.org/10.1080/10376178.2016.1163231

de Lima, F. F., & Osório, F. de L. (2021). Empathy: Assessment instruments and psychometric quality—A systematic literature review with a meta-analysis of the past ten years. *Frontiers in Psychology*, *12*, 781346. https://doi.org/10.3389/fpsyg.2021.781346

Dewart, G., Corcoran, L., Thirsk, L., & Petrovic, K. (2020). Nursing education in a pandemic: Academic challenges in response to COVID-19. *Nurse Education Today*, *92*, 104471. https://doi.org/10.1016/j.nedt.2020.104471

Dreifuerst, K. T. (2012). Using debriefing for meaningful learning to foster development of clinical reasoning in simulation. *The Journal of Nursing Education*, *51*(6), 326–333. https://doi.org/10.3928/01484834-20120409-02

Halpern, J. (2003). What is clinical empathy? *Journal of General Internal Medicine*, *18*(8), 670–674. https://doi.org/10.1046/j.1525-1497.2003.21017.x

Haque, O. S., & Waytz, A. (2012). Dehumanization in medicine: Causes, solutions, and functions. *Perspectives on Psychological Science*, *7*(2), 176–186. https://doi.org/10.1177/1745691611429706

Hojat, M., Mangione, S., Nasca, T. J., Cohen, M. J. M., Gonnella, J. S., Erdmann, J. B., Veloski, J., & Magee, M. (2001). The Jefferson scale of physician empathy: Development and preliminary psychometric data. *Educational and Psychological Measurement*, *61*(2), 349–365. https://doi.org/10.1177/00131640121971158

Joung, J., & Kang, K. I. (2022). Can virtual simulation replace clinical practical training for psychiatric nursing? *Issues in Mental Health Nursing*, *43*(8), 706–711. https://doi.org/10.1080/01612840.2022.2055684

Kim, M. J., Kang, H. S., & De Gagne, J. C. (2021). Nursing students' perceptions and experiences of using virtual simulation during the COVID-19 pandemic. *Clinical Simulation in Nursing*, *60*, 11–17. https://doi.org/10.1016/j.ecns.2021.06.010

Koukourikos, K., Tsaloglidou, A., Kourkouta, L., Papathanasiou, I. V., Iliadis, C., Fratzana, A., & Panagiotou, A. (2021). Simulation in clinical nursing education. *Acta Informatica Medica*, *29*(1), 15–20. https://doi.org/10.5455/aim.2021.29.15-20

Lemermeyer, G. (2020). Seeking reality through the unreal: Interviewing high-fidelity human patient simulation in undergraduate nursing education. *Explorations in Media Ecology*, *19*(3), 319–335. https://doi.org/10.1386/eme_00049_1

Levett-Jones, T., Cant, R., & Lapkin, S. (2019). A systematic review of the effectiveness of empathy education for undergraduate nursing students. *Nurse Education Today*, *75*, 80–94. https://doi.org/10.1016/j.nedt.2019.01.006

Lobão, C., Coelho, A., Parola, V., Neves, H., Sousa, J. P., & Gonçalves, R. (2023). Changes in clinical training for nursing students during the COVID-19 pandemic: A scoping review. *Nursing Reports*, *13*(1), 378–388. https://doi.org/10.3390/nursrep13010035

Mansfield, J., Williamson, K., & Goodwin Veenema, T. (2021). *COVID-19 and academic practice partnerships: During pandemic and beyond* [Webinar]. American Association of Colleges of Nurses. https://www.aacnnursing.org/conferences-webinars/info/sessionaltcd/wfr21_02_11

McGarry, D., Cashin, A., & Fowler, C. (2014). Is high fidelity human patient (mannequin) simulation, simulation of learning? *Nurse Education Today*, *34*(8), 1138–1142. https://doi.org/10.1016/j.nedt.2014.04.014

Michel, A., Ryan, N., Mattheus, D., Knopf, A., Abuelezam, N. N., Stamp, K., Branson, S., Hekel, B., & Fontenot, H. B. (2021). Undergraduate nursing students' perceptions on nursing education during the 2020 COVID-19 pandemic: A national sample. *Nursing Outlook*, *69*(5), 903–912. https://doi.org/10.1016/j.outlook.2021.05.004

Morse, J. M., Anderson, G., Bottorff, J. L., Yonge, O., O'Brien, B., Solberg, S. M., & McIlveen, K. H. (1992). Exploring empathy: A conceptual fit for nursing practice? *Image: The*

Journal of Nursing Scholarship, *24*(4), 273–280. https://doi.org/10.1111/j.1547-5069.1992.tb00733.x

Nehring, W. M., & Lashley, F. R. (2009). Nursing simulation: A review of the past 40 years. *Simulation & Gaming*, *40*(4), 528–552. https://doi.org/10.1177/1046878109332282

Peplau, H. E. (1991). *Interpersonal relations in nursing: A conceptual frame of reference for psychodynamic nursing*. Springer. https://doi.org/10.1007/978-1-349-10109-2

Raphael, D., Bryant, T., Mikkonen, J., & Raphael, A. (2020). *Social determinants of health: The Canadian facts* (2nd ed.). Ontario Tech University Faculty of Health Sciences & York University School of Health Policy and Management. https://thecanadianfacts.org/The_Canadian_Facts-2nd_ed.pdf

Ritzer, G. (2021). *The McDonaldization of society: Into the digital age* (10th ed.). Sage Publications Inc.

Rogers, C. R. (1957). The necessary and sufficient conditions of therapeutic personality change. *Journal of Consulting Psychology*, *21*(2), 95–103. https://doi.org/10.1037/h0045357

Seropian, M. A., Brown, K., Gavilanes, J. S., & Driggers, B. (2004). Simulation: Not just a manikin. *Journal of Nursing Education*, *43*(4), 164–169. https://doi.org/10.3928/01484834-20040401-04

Spence, D., Zambas, S., Mannix, J., Jackson, D., & Neville, S. (2019). Challenges to the provision of clinical education in nursing. *Contemporary Nurse*, *55*(4–5), 458–467. https://doi.org/10.1080/10376178.2019.1606722

Tan, L., Le, M. K., Yu, C. C., Liaw, S. Y., Tierney, T., Ho, Y. Y., Lim, E., Lim, D., Ng, R., Ngeow, C., & Low, J. (2021). Defining clinical empathy: A grounded theory approach from the perspective of healthcare workers and patients in a multicultural setting. *BMJ Open*, *11*(9), e045224. https://doi.org/10.1136/bmjopen-2020-045224

Terry, C., & Cain, J. (2016). The emerging issue of digital empathy. *American Journal of Pharmaceutical Education*, *80*(4). https://doi.org/10.5688/ajpe80458

Thirsk, L. M., Stahlke, S., Bryan, V., Dewart, G., & Corcoran, L. (2023). Lessons learned from clinical course design in the pandemic: Pedagogical implications from a qualitative analysis. *Journal of Advanced Nursing*, *79*(1), 309–319. https://doi.org/10.1111/jan.15409

Trzeciak, S., Roberts, B. W., & Mazzarelli, A. J. (2017). Compassionomics: Hypothesis and experimental approach. *Medical Hypotheses*, *107*, 92–97. https://doi.org/10.1016/j.mehy.2017.08.015

van Dijke, J., van Nistelrooij, I., Bos, P., & Duyndam, J. (2019). Care ethics: An ethics of empathy? *Nursing Ethics*, *26*(5), 1282–1291. https://doi.org/10.1177/0969733018761172

Ward, J. (2016). The empathy enigma: Does it still exist? Comparison of empathy using students and standardized actors. *Nurse Educator*, *41*(3), 134. https://doi.org/10.1097/NNE.0000000000000236

Younis, W., Abdalrahim, M. S., Darawad, M. W., Shawashi, T., Maharmeh, M., Alosaimi, D., & Hamdan-Mansour, A. M. (2021). Students' perspective of clinical online training during COVID-19 pandemic: A descriptive phenomenological study. *Educational Sciences: Theory & Practice*, *21*(3), 69–80. https://doi.org/10.12738/jestp.2021.3.006

Yu, J., & Kirk, M. (2009). Evaluation of empathy measurement tools in nursing: Systematic review. *Journal of Advanced Nursing*, *65*(9), 1790–1806. https://doi.org/10.1111/j.1365-2648.2009.05071.x

Yuan, H. B., Williams, B. A., Fang, J. B., & Ye, Q. H. (2012). A systematic review of selected evidence on improving knowledge and skills through high-fidelity simulation. *Nurse Education Today*, *32*(3), 294–298. https://doi.org/10.1016/j.nedt.2011.07.010