

REVIEWS

Simulation in preparation or substitution for clinical placement: A systematic review of the literature

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ABSTRACT

Background: In recent years, nursing education has undergone changes and restructuring due to changes that have occurred in clinical and academic settings. Currently, academic leaders are facing the challenges of an increasing number of students, the difficulty of recruiting teachers and preceptors to accompany students, and fewer clinical settings that can accommodate many interns at once. To come to terms with these changes, the idea of replacing clinical hours with simulation has emerged. On this issue, little conclusive data is available. The objective of this article is to clarify the contribution of simulation in clinical nursing education in preparation or substitution for clinical placement.

Methods: The CIHNL, MedLine, and PubMed databases, and Google and Google Scholar search engines were consulted between to conduct a systematic review of the literature between 2008 and 2014. Thirty-three articles were selected.

Results: Students and teachers perceive the benefits of simulation as an adjunct to clinical placement in terms of effectiveness, self-confidence, and preparation for clinical practice. Substituting clinical placement with simulation does not seem to have a significant impact on clinical competency, critical thinking, knowledge acquisition, and self-confidence.

Conclusions: The findings question the very concept of substitution and suggest that the strengths of clinical exposure through both simulation and clinical placement should be highlighted.

Key Words: Nursing education, Simulation, Clinical placement, Effectiveness, Self-confidence

1. BACKGROUND

In recent years, nursing education has undergone changes and restructuring due to the reforms that have occurred in clinical and academic settings. In clinical settings, in-patient profiles have become more complex because of an aging population and the multiple pathologies it has caused. In addition, more services are offered in the community, while the shortage of health professionals persists. Consequently, the nursing role has expanded, requiring new nursing skills and greater professional autonomy. In academic settings, instruction has been redesigned to reflect a competency-based approach precisely to meet the new challenges facing nurses.^[1] In nursing

education, this major change has resulted in a revision of nursing programs. Currently, academic leaders are facing the challenges of an increasing number of students, the difficulty of recruiting teachers and preceptors to accompany nursing students, and fewer clinical settings that can accommodate many interns at once.^[2,3] To come to terms with these changes, which include fewer resources, the idea of replacing clinical hours with simulation has emerged. On this issue, no conclusive results are available. Indeed, three meta-analyses conducted between 2009 and 2010^[4-6] showed that studies were inconclusive as to the effectiveness of simulation as an adjunct or substitution for clinical placement,

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due to a lack of longitudinal group follow-up, randomized control groups, and standardization of simulation scenarios. Nevertheless, the authors of these studies, and the clinical settings, tend to judge this innovation positively. It is therefore important to examine the literature further to clarify the contribution of simulation and its various contexts of use in nursing practice training.

Objective

Therefore, the objective of this article is to clarify, from a systematic review of the literature, the contribution of simulation in the preparation or substitution of clinical placement and discuss its relevance in improving the preparation of future nurses.

2. METHODOLOGY

The CIHNAL, MedLine, and PubMed databases, and Google and Google Scholar search engines were consulted to identify clinical studies, systematic reviews, and guidelines since 2008, using the following keywords: “demonstration room”, “learning”, “nurse”, “simulation”, “clinical learning”, and “clinical placement”. In addition, several Web sites, including the International Nursing Association for Clinical Simulation and Learning have provided access to experiences on the use of simulation. Following the database search, the most relevant and recent articles were analyzed independently by two researchers; the search for articles then continued based on the references of these articles. Thirty-three articles were selected in all. Several articles were rejected because they addressed simulation as an alternative to laboratory or theory courses. For example, the systematic reviews of Yuan *et al.* (2011),^[7] Cook (2013),^[8] Foronda, Liu & Bauman (2013),^[9] and HETI (2014)^[10] examined the effects of simulation while comparing it to other types of learning activities, such as classroom activities. Researchers focused on simulation as support to overall learning, as facilitator to the transition from academic to clinical work or as an evaluation mode. Each article was classified according to its proximity to the objectives of the study. Subsequently, each article associated with an objective was summarized using an analysis grid. Emerging themes were then recorded and submitted to the researchers. The themes were refined until consensus was reached.

3. RESULTS

The results are presented from the perspective of two major themes identified: 1) definition of simulation, its approach, and its advantages and disadvantages, 2) effects of simulation on learning when used in preparation or substitution for clinical practice hours.

3.1 Definition of simulation, its approach, and its advantages and disadvantages

Simulation is defined as the most accurate possible representation of a care situation. It is categorized according to its degree of clinical realism (fidelity): high, intermediate, or low. The high-fidelity simulation is defined as “Experiences using full scale computerized patient simulators, virtual reality or standardized patients that are extremely realistic and provide a high level of interactivity and realism for the learner”(p.S6). The Intermediate-fidelity simulation is defined as “Experiences that are more technologically sophisticated such as computer-based self-directed learning systems simulations in which the participant relies on a two-dimensional focused experience to problem solve, perform a skill and make decisions or the use of mannequins more realistic than static low fidelity ones having breath sounds, heart sounds and/or pulses”(p.S7) and the low fidelity simulation is defined as “Experiences such as case studies, role-playing, using partial task trainers or static mannequins to immerse students or professionals in a clinical situation or practice of a specific skill”(p. S7).^[11]

The studies presented in this article are those that evaluate high- and intermediate-fidelity simulation since these types of simulation are most often used to substitute for clinical hours. These types of simulation favour behavioural or constructivist approaches.^[12] Parker and Myrick (2009)^[12] proposed that “In behaviorist pedagogy the human mind is perceived as a memory bank for accumulated knowledge [while. . .] constructivist pedagogy argues that knowledge transmission is not inertly passed from teacher to learner but, rather, is created by individual learners, or in some cases groups of learners (*e.g.*, HPS-based clinical scenarios), by processing experiences and interactions with their environment.” (p.325-326) Hence, in the behavioural approach, understanding an action is given second place, and the behaviour itself is prioritized. In the constructivist approach, understanding the action is prioritized and requires the mobilization of multiple resources (knowledge, skills, and attitudes) to integrate, within a network of concepts, the ability to act in context. The literature reviewed is mostly situated within a constructivist approach by proposing complex, holistic scenarios that are close to clinical reality and integrating, for the most part, a dimension of group learning, either as group work within the simulation or during post-simulation feedback. Learning is thus reinforced and stimulated by the presence of other students. However, the articles reviewed do not always specify whether the simulations evaluated were followed by debriefings or other forms of group learning, or whether the clinical situations used were standardized. Finally, the attitudes of the instructors

themselves influence the quality of simulated situations and their pedagogical potential for students.^[13]

In all the literature reviewed, the benefits of simulation are highlighted because it is conducted in a safe environment for patients and students.^[14-17] For students, since it is a safe practice, simulation offers the opportunity to experience rare or difficult situations in clinical practice, such as cardio-pulmonary resuscitation or end-of-life situations.^[18] Furthermore, simulation ensures uniformity of learning experiences, since all students of a same cohort can experience similar situations.^[19] Pedagogically, simulation puts students in situations in which they need to be active and in control of their learning.^[17] As a result, students develop their knowledge and skills according to their own needs. This stimulating environment and freedom of learning increases student motivation and interest in learning and developing confidence in their abilities.^[14, 16, 18, 20] For clinical settings, simulation carried out in academic settings frees up internship spaces and lightens the workload of nursing supervisors. However, it is plausible that a decrease in internship hours has the effect of reducing the nurses' professional development generated by the presence of student nurses. With their questions, the latter contribute to updating and enhancing practices in health care settings.

In addition, despite a lack of consensus in the literature to

confirm this assumption, studies suggest that learning acquired in simulation scenarios prior to clinical placement facilitates clinical learning.^[20-22]

The disadvantages of simulation training are rarely discussed in the literature reviewed. For students, simulations may be synonymous with stress. Indeed, for some students, simulated scenarios, often performed before others, are a source of anxiety and can even interfere with learning.^[17, 20] Other authors^[14, 20] indicate that simulation learning has its limitations since resources related to professional socialization and communication are acquired mainly during clinical experiences. Professional socialization and comprehension of the nursing role and nursing skills are fostered through association with other nurses and professionals in an immersive clinical setting. For their part, Berragan (2011)^[14] and Valler-Jones, Meechan, & Jones (2011)^[17] indicate that students exposed to simulation may blur the lines between reality and simulation, *i.e.*, they fail to distinguish between simulation and being face-to-face with real patients. For academic settings, simulation may be a financial burden in terms of resources to be deployed, both material (rooms, number of mannequins, maintenance, creation and management of scenarios) and human (teachers preparation, creation and updating of scenarios, reorganization of teaching into small groups, room preparation).^[16] Table 1 summarizes the advantages and disadvantages of simulation.

Table 1. Advantages and disadvantages of simulation^[9, 11, 12, 15]

	Advantages	Disadvantages
For students	<ul style="list-style-type: none"> • Safe environment for patients and students • Opportunity to practice situations that are rare or difficult to experience in clinical placement • Standardization of learning experiences for an entire cohort of students • Students active and in control of their learning • Stimulating environment that motivates student learning and development of self-confidence • Reflective feedback that promotes learning 	<ul style="list-style-type: none"> • Possible stressful situation for students • Exigencies of preparation and active listening and involvement can lead to cognitive burnout in students • Risk of interfering with the development of professional socialization and communication resources • Risk of "simulated" learning • Risk of blurring reality with simulation
For clinical settings	<ul style="list-style-type: none"> • Frees up clinical placement spaces • Eases workload of nurse supervisors • Pre-internship simulation facilitates clinical learning 	<ul style="list-style-type: none"> • Risk of reducing professional development and standards of practice
For academic settings	<ul style="list-style-type: none"> • Eases financial burden of human resources required to manage clinical placements 	<ul style="list-style-type: none"> • Heavy financial burden of material and human resources invested in simulation

3.2 Studies on the effects of simulation

The literature reviewed is grouped according to whether simulation is used to prepare for or supplement clinical placement.

3.2.1 Substitution for clinical placement

In the studies reviewed, no more than 25% of clinical hours were replaced with simulation, with the exception of a large

U.S study on the effects of 10%, 25% and 50% of total hours replaced.^[23] To our knowledge, only the United Kingdom has introduced regulation regarding the use of simulation in nursing education, in lieu of placement hours. Indeed, in 2007, after careful consideration, the Nursing and Midwifery Council (NMC) allowed nursing schools to replace 13% of clinical practice with simulation practice, or 300

out of 2,300 hours.^[17,24] The reasons for this development were the increase in complex health situations, difficulties in finding suitable placement venues for all health professionals, time restrictions imposed by clinical settings on the duration of placements, the quantity and quality of preceptorship, discrepancies in the essential skills of graduating students, informal practices regarding placement substitution, and the demands of faculties.^[18] All these reasons led the U. K. NMC to review clinical education standards to ensure that students could practice safely after graduating. A pilot study was commissioned by the NMC to assess the effect of standard utilization of simulation to around 10% of clinical hours in nursing programs. Thirteen sites in the U.K. participated in the pilot study. The results of this large study suggested that simulation helps students achieve learning objectives, gives students opportunities for learning experiences impossible to identify in clinical settings, and helps improve self-confidence.^[18] In response to these findings, the NMC modified standard nursing education programs. As a result, of the 4,600 learning hours, which included 2,000 theoretical hours, 300 laboratory hours (low to high simulation), and 2,300 clinical hours, it was possible to convert 300 clinical hours into simulation activities, corresponding to 13% of total internship hours.^[25] Note that clinical education hours for nurses in the U.K. are among the highest in the world.

Asia, Eastern Europe, North and South America are also currently implementing simulation initiatives.^[24] In the United States, the National Council of State Board Nursing (NCSBN) conducted three national studies between 2010 and 2013.^[26] Two of these studies involved the use and impact of simulation on the preparation of future nurses. The first study, using questionnaires, examined the use of simulation by faculties and schools across the country ($n = 1060$).^[27] The results showed that simulation was already widely used (87%), and nearly 81% of the participating schools wished to make further use of simulation in their programs.^[27,28] Already, 77% of respondents from faculties admitted replacing or wishing to replace clinical practice with simulation if legislation permitted. Respondents felt comfortable with replacing about 25% of clinical practice time with simulation.^[27] From a list of items that could be acquired only in clinical settings, the 546 respondents mainly cited communication (31%) and organization of health care delivery (21%).^[28]

The second study developed an experimental randomized design with three groups: a control group receiving up to 10% of clinical preparation time in simulation and two experimental groups receiving 25% and 50% of clinical preparation time in simulation, respectively. The objective was to assess the impact of simulation learning in lieu of 25% to 50% of

placement hours on clinical competency and nursing knowledge, from students and teachers perceptions.^[28] The 847 students from ten nursing schools were randomly assigned to one of the three groups in the two-year study (2011-2013). The nurse educators who participated in the study received three preparation sessions on the Jeffries Simulation Framework^[29] and instruction on the Debriefing for Meaningful Learning method.^[30] The simulation situations were validated by experts (Delphi method) and the developed scenarios were reviewed by experts in nursing simulation to ensure consistency with the Jeffries framework.^[29] The simulation scenarios, lasting 15 to 20 minutes, were standardized and were accompanied by debriefing sessions of 20 minutes. The simulated settings were hospitals and outpatient and community clinics. During the simulations, students were assigned roles (nurse, family member, or observer). Clinical instructors remained with the students to observe their work and then to evaluate them using the Creighton Competency Evaluation Instrument (CCEI) for each session. Finally, students from all groups were evaluated weekly with the CCEI.^[23] To our knowledge, this is the only study that explains each step of its longitudinal, experimental, randomized study replacing clinical hours with Simulation in pre-licensure nursing education, and use validated questionnaires.

Overall, the quantitative and experimental studies selected measured the effects of simulation in lieu of placement hours on clinical competency, critical thinking, acquisition of knowledge and expertise, and self-confidence.

1) Effects on the development of clinical competency and critical thinking Watson *et al.*^[31] conducted an experimental study with first year physiotherapy students from six Australian universities to assess the development of clinical competency among students trained partially with simulation, in comparison with students trained exclusively in traditional internships. Two models of simulation were created to replace one out of four clinical practice weeks with laboratory simulation. The first model (Model 1) used simulation intensively for one week, and then the students transferred to a clinical practice environment for three weeks. The second model (Model 2) alternated simulation with clinical practice days for two weeks, then the students did two weeks of clinical practice exclusively. Nine scenarios frequently encountered in practice were developed through simulation, and these scenarios were played by actors. Three hundred and seventy students participated in the study and were randomized into the control group ($n = 185$) or the experimental groups, *i.e.*, the group using Model 1 ($n = 96$) or the group using Model 2 ($n = 89$). After Week 4, all students were judged on their ability to assess and treat patients. The tool used by the preceptors was the Assessment of Physiother-

apy Practice (APP), which measures communication, patient assessment, and management skills. The students then evaluated their learning using a self-administered questionnaire. The results of the study showed that there was no significant difference between the two experimental groups and between the experimental and control groups in terms of clinical competency as assessed by the preceptors and the students. The study was conducted on a short-term clinical placement, and the concept of competency was not explicitly defined. Watson (2012)'s^[31] study in physiotherapy arrived at similar results when they replace one out of four weeks of clinical experience by simulation.

The prospective study by Meyer, Connors, Hou, & Gajewski (2011)^[32] was conducted among nursing students ($n = 116$) in a pediatrics course of twelve hours/week over eight weeks in a U.S. university. Twenty-five percent of clinical placements (two/eight weeks) were replaced by simulation scenarios. In each group of eight students, two students participated in two weeks of simulation activities instead of regular clinical placement. The simulation activities were accompanied by follow-up sessions of 30 minutes. Every two weeks, the students were evaluated in the clinical setting by placement supervisor nurses using a clinical performance assessment tool developed by Massey & Warblow (1999).^[33] The results showed that simulation improved the performance of the student nurses, especially when simulation took place in the first two weeks in lieu of clinical placement. On the other hand, simulation had no significant effect on patient communication ($p = .06$) or clinical judgment ($p = .360$). The study was conducted in a single internship, and the concepts of performance and clinical judgment were not explicitly defined.

Finally, the study by Hayden, Smiley, Alexander, Kardong-Egren, & Jeffries (2014),^[23] presented at the beginning of this section, assessed clinical competency using two validated instruments: the Creighton Competency Assessment Instrument (CCEI) and the New Graduate Nurse Performance Survey (NGNPS). Another instrument, the Global Assessment of Clinical Competency and Readiness for Practice, which has good internal consistency and is currently being validated, was also used. The results showed that there was no statistically significant difference between the three groups (10%, 25%, or 50% simulation) for all tests and practice settings. For specific practice content areas, results for medical-surgical nursing showed that the students in the 25% or 50% simulation groups had slightly higher scores in the clinical judgment category. For the perinatal, pediatric, and mental health areas, it was rather the control group, with up to 10% simulation, which stood out positively for two or three categories (assessment, judgment, and/or communication),

while the group with 25% simulation stood out positively for all categories (assessment, judgment, communication, and safety). The study by Hayden *et al.* (2014)^[23] also used the Critical Thinking Diagnostic to assess critical thinking. This tool includes five questions in each of the following dimensions: problem recognition, clinical decision making, prioritization, clinical implementation, and reflection. Here also, the results showed that there was no statistically significant difference between the three groups (10%, 25%, or 50% simulation) for all tests and practice settings. However, the average score for students in the 50% simulation group was higher for the problem recognition dimension. Overall, these studies showed that clinical competency and critical thinking appeared to remain stable whether students received up to 10%, 25%, or 50% simulation in lieu of clinical placement hours.

2) Effects on acquisition of knowledge and expertise For their part, Schlairet & Pollock (2010)^[34] conducted a survey of nursing students ($n = 74$) in two groups, one alternating periods of simulation and clinical placement over two weeks and the other participating only in clinical placement for the same period. The knowledge assessment tool was a multiple-choice test. The results of the study showed that simulation is a method equivalent to clinical placement in terms of knowledge acquisition in this short period of time. Moreover, in a review of the literature, Ross (2012)^[35] showed that simulation is an effective teaching method in medicine for developing knowledge and physician competency in nursing. Karadag *et al.* (2012)^[36] conducted an experimental study to determine the impact of simulation on the development of expertise, including taking vital signs and performing physical assessments. The sample of first-year nursing students ($n = 82$) was randomly divided into an experimental group exposed to simulation with a mannequin (intermediate fidelity) and a control group exposed to regular clinical hours. The results showed that the students in the experimental group were better able to demonstrate the techniques compared to the students in the control group. Finally, the longitudinal, controlled, and randomized study by Hayden *et al.* (2014)^[23] measured general knowledge using the ATI RN Comprehensive Predictor (2010). This is an objective test measuring eight dimensions of nursing out of 150 items: 1) clinical judgment, 2) foundational thinking in nursing, 3) analysis, 4) assessment, 5) evaluation, 6) implementation, 7) planning, and 8) priority setting. Specialized knowledge was evaluated using the ATI Content Mastery Series (CMS), which uses objective tests to measure basic nursing knowledge in the medical-surgical, perinatal, pediatric, mental health, and community health areas. The results showed that there was no statistically significant difference between the three

groups in the study (10%, 25%, or 50% simulation) for general or specific knowledge. Thus, according to these studies, simulation makes a difference in expertise but does not affect knowledge acquisition one way or another.

3) Effect on self-confidence The study by Lambton (2008)^[15] reports on the perception of students exposed to 25% replacement of their clinical time in pediatrics with simulation. The students were exposed to four simulations. Their perceptions were described using open-question questionnaires and focus groups. Most of the students' comments were positive. The students wished to have more simulation experiences to maximize their development. The study showed that students were generally satisfied with replacing a moderate percentage of their clinical hours with simulation. As Beyer (2012)^[37] points out, it seems that clinical placement, particularly the environment and limitations of clinical placement, does not always provide the learning opportunities necessary for student professional development. Some, more negative, comments blamed scenario construction, lengthy preparation, and a feeling of vulnerability of students when performing scenarios before their peers.

A majority of articles reviewed^[5,21,38-43] are unanimous about the significant impact of simulation in increasing student self-confidence. Student self-confidence has an impact on their clinical skills and competency in responding to the needs of patients. Harder (2010)^[40] also postulates a two-way link between student clinical performance and self-confidence. Indeed, when students have self-confidence they are more inclined to be assertive and to demonstrate knowledge and skills, thereby improving performance. This performance reassures the students and gives them even more self-confidence. However, the notion of performance is not explicitly defined by the author.

In summary, the replacement of clinical hours with simulation does not seem to affect clinical competency of students. Looking at specific content areas, the study by Hayden *et al.* (2014)^[23] shows a possible advantage of simulation on the development of clinical competency in the medical-surgical and community health areas and a potential disadvantage in the perinatal, pediatric, and mental health areas. Students, however, perceive the advantages of simulation on their self-confidence.

3.2.2 Preparation for clinical practice

The studies reviewed in this section explain the contribution of high-fidelity or intermediate-fidelity simulation in preparation for clinical placement.

1) Effects on self-confidence and critical thinking In a U.S. experimental study, Bambini, Washburn & Perkins

(2009)^[44] using pre- and post-simulation questionnaires, assessed whether simulation influenced student preparation (n = 112) for their first clinical practice (obstetrics) in a nursing program. The results of the study showed that simulation increased student confidence in their ability to pass the clinical examination, judge situations, and solve problems. According to the students, the impact of simulation on self-confidence was explained by the fact that they knew what to expect and how to react in similar situations presented to them in a clinical setting.

Finally, Szpak & Kameg (2013)^[22] reported that students perceived an improvement in critical thinking when they were prepared with pre-clinical simulation. However, the study did not specify whether it was the simulation experience per se, the post-simulation debriefing, or both, that promoted the perception of improved critical thinking.

2) Effects on integrating expertise A U.S. study, this time qualitative,^[42] conducted among students (n = 38) in a mental health course on withdrawal syndrome, showed that students felt simulation was beneficial for integrating knowledge and using it in a clinical setting, citing the importance of the simulation-internship sequence. Indeed, the students had received a theoretical course on addiction and withdrawal symptoms before completing simulation training, which allowed them to reinforce the theory they had learned and then apply it to clinical situations. Still in the perspective of student preparation for clinical work, in a joint study conducted in the U.K. with graduating students (n = 135), McCaughey & Traynor (2010)^[21] evaluated the impact of simulation on preparation for clinical practice and transition to the nursing role. The completed questionnaires (n = 93) indicated that simulation helped students become aware of their ability to assess patient health status (96.8%) and organize care (82.8%), and to become confident in exercising clinical judgment (92.5%). Furthermore, the students felt more confident in their ability to act appropriately (92.5%) if similar situations arose in clinical practice. Finally, the students found that simulation was a helpful learning experience both for preparing for end-of-program placement (92.5%) and for transitioning as health professionals (72%). In the same vein, studies by Buckley & Gordon (2011),^[45] Harder (2010),^[40] Lapkin, Levett-Jones, Bellchambers & Fernandez (2010),^[5] and McCaughey & Traynor (2010)^[21] all show that simulation improves students' ability to assess patients, respond to medical emergencies, make appropriate referrals, and plan care more effectively. In turn, Ackermann (2009)^[46] conducted a quasi-experimental study with nursing students (n = 65) to assess differences in their ability to mobilize knowledge depending on whether simulation or traditional teaching methods, in this case regarding cardiopulmonary resuscita-

tion, were used during their internship. The results showed that students who participated in simulation acquired more knowledge ($p = .000$) and were able to demonstrate greater mastery of CPR skills ($p = .000$) compared to students who participated in traditional methods. Three months later, the students in the simulation group appeared to have retained slightly more knowledge ($p = .002$) compared to the other students.

In summary, simulation as an adjunct to clinical placement seems to have many advantages for preparing students for clinical reality. Simulation reinforces self-confidence and facilitates learning and the capacity of students to mobilize their resources in clinical settings.

4. DISCUSSION AND CONCLUSION

This systematic review of the literature examined the state of knowledge about the contribution of high- and intermediate-fidelity simulation on practical (or clinical) nursing education. Quasi-experimental studies of simulation in preparation for clinical placement are fewer compared to those in which simulation substitutes for clinical hours. Nevertheless, all the studies are clearly in favour of using high- or intermediate-fidelity simulation as a clinical training approach, especially in preparation for clinical placement. Contributions identified to date pertain to learner self-confidence, mobilization of resources in real-life clinical situations, and critical thinking, particularly in recognizing problems. Post-simulation group feedback seems to be one of the greatest sources of learning and knowledge consolidation. However, the methodological limitations identified argue for more studies that use validated assessment tools to measure the dimensions of clinical judgment or critical thinking, rather than questionnaires on the perception of improvement or satisfaction; they also argue for instruments that make a clear and explicit distinction between knowledge, competency, and performance assessment.

As for the advantages of replacing clinical hours with simulation training, studies especially highlight the lack of significant difference between clinical experience and simulation, even when the latter replaces 50% of clinical hours. This finding deserves further consideration, while simulation centres are being developed in response to limited internship spaces, and nursing educators are taking stronger positions in favour or against simulation.^[13]

Our attention turns towards the very concept of substitution. The study by Hayden *et al.* (2014)^[23] emphasizes different results regarding competency depending on the area of clinical exposure. The postulate that competency, knowledge, and capacity for critical thinking developed in clinical placement are specific and complementary to those developed in simulation-based context is plausible. Thus, rather than having a comparative perspective of these learning modes, it would be preferable to take advantage of the strengths of each mode according to area of exposure and the desired effects. It would therefore be useful to examine various simulation-clinical combinations more closely depending on the area of exposure, and conduct realistic evaluative studies^[47] within these contexts. Specific and detailed studies should also be conducted, for example, regarding minimum number of simulations in lieu of clinical hours, operationalization of simulation activities, and simulation settings. Furthermore, studies such as that of Hayden^[23] are to be replicated.

Our attention also turns towards learning opportunities in clinical settings. If clinical competency develops as much through simulation as through clinical practice, it is plausible to ask whether host settings have the resources and skills to support and stimulate students in their competency development. Would post-clinical group debriefing be as essential a learning factor as post-simulation debriefing is? Furthermore, economic studies that compare the cost of organizing clinical placements with that of organizing simulation-based learning would identify whether nursing competency could be developed at a lower cost.

Finally, clinical exposure through internship and simulation will continue to cohabit. On the one hand, clinical experience is indispensable for accessing adaptive strategies to deal with unexpected situations, create therapeutic relationships, and socialize professionally. On the other hand, simulation is indispensable for facilitating the shared learning of all students and responding to real-life emergencies. It remains to be explored how this cohabitation can be maximized to promote learning that will support increasingly high quality care.

CONFLICTS OF INTEREST DISCLOSURE

The authors declare that there is no conflict of interest statement.

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