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Using Simulation-based Experiential Learning to Improve Nurse Practitioner Education Regarding Opioid Prescribing and Medical Assistance in Dying

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Abstract

Aim: A Quality Improvement Project, guided by the Service-Learning framework, was undertaken to determine if introducing simulation into graduate nurse practitioner (NP) education would improve students' knowledge, self-reported competency, and confidence regarding opioid prescribing and participation in Medical Assistance in Dying (MAiD).
Background: Canadian government regulations authorize NPs to prescribe opioids and participate in MAiD. Simulation-based learning provides an opportunity for NP students to improve knowledge and critical-thinking skills regarding MAiD protocols and opioid prescribing in a safe, non-judgmental environment.
Methods: A four-hour simulation-based workshop on opioid prescribing and MAiD was provided to NP students in their final course before graduation. NP students rotated through three 60-minute simulation-based scenario stations; two opioid scenarios using standardized patients and a MAiD scenario with a high-fidelity manikin. Students were expected to apply knowledge obtained during their NP program to conduct a thorough assessment, determine diagnostic tests/tools, formulate diagnoses, and develop a collaborative treatment plan. Outcomes measures included completing a pre/post-simulation knowledge-based quiz, self-assessment on each scenario, and debriefing.
Findings: Scores on the pre-simulation quiz score ranged from 3–9 ($M = 6.19$); post-simulation quiz scores ranged from 6-12 ($M = 9.88$). Paired-Samples T-Test indicated a statistically significant increase between pre and post-mean scores. In all scenarios, there was an increase in the percentage of NP students who self-reported themselves as "competent" between their pre/post-simulation assessments.
Conclusions: This educational innovation created an engaging environment that facilitated learning. Given that opioid prescribing and MAiD are authorized acts for NPs, it is essential that graduates feel supported and prepared for these situations.

Key Words: nurse practitioner, simulation, QIP, MAiD, opioids, education

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Introduction

Nurse practitioner (NP) students encounter many complex situations requiring evidence-based knowledge, problem-solving, and critical decision-making skills. In Canada, as is the case globally, opioid prescribing and participation in Medical Assistance in Dying (MAiD) are complex situations relevant to NP practice. Additionally, prescribing opioids and participating in MAiD are newer additions to the NP scope of practice (College of Nurses of Ontario [CNO], 2020; CNO, 2021). Although there is limited literature regarding MAiD and NP practice, students report a lack of confidence and experience in opioid management (Pittman et al., 2020). Furthermore, practicing NPs indicate less confidence and increased anxiety when prescribing opioids for patients with a history of addiction, patients with unclear diagnoses, and those on high doses of opioids (Pittman et al., 2021). Consequently, NP graduates may not feel competent or confident prescribing opioids or participating in MAiD.

To prepare NP students for their future roles, learning opportunities must be made available that enable them to prescribe opioids and participate in MAiD scenarios in a safe learning environment. Graduating NP students were provided with three structured, simulation-based experiential learning opportunities to evaluate learning related to opioid prescribing and MAiD. The aim was to evaluate NP students' knowledge, self-reported competency, and confidence regarding opioid prescribing and participation in MAiD, before and after simulation-based experiential learning was provided. Simulation-based experiential learning may ultimately improve outcomes regarding opioid prescribing and participation in MAiD.

The three simulations were run as separate topics (Opioids and MAiD). However, because prescribing controlled substances, including opioids, is often a component of MAiD, and because some students travel significant distances to school, we decided to provide simulation-based education for both topics on the same day.

Background

Experiential learning Framework

The Novice to Expert Model, introduced by Dr. Patricia Benner in 1982, discusses how an individual gains knowledge, skills, and abilities through five stages, from novice to expert stage (Benner et al., 2009, as cited in Thomas & Kellgren, 2017). Novices have limited experience in practice. They use their theoretical knowledge to understand clinical protocols and guidelines. At the same time, the advanced beginner stage is achieved after considerable clinical experience. Advanced beginners can look at the bigger picture as they have been involved in real-world practice. In the competent stage, the nurse has worked for 1 to 2 years focusing on managing patient care. As the nurse gains knowledge and years of experience, the nurse moves on to the proficient and, finally, the expert stage in Benner's Model.

Benner's Model provides the conceptual structure to guide NP education and their learning trajectory in prescribing opioids or participating in MAiD. The NP students may be at the proficient or competent stage as a registered nurse. However, they are at the novice level with the NP role in opioid prescribing and MAiD. They may have received theory instruction on these topics, but only observational experiences within the clinical setting. According to Benner's Model, at the novice level the learners apply theory, guidelines, and protocols to aid with their actions. Simulation scenarios can be developed to facilitate the use of guidelines and algorithms

to guide not only their actions but also the outcomes of their actions. Benner's Model can provide scaffolds for building the progression of the simulation experience as the NP student moves through the levels of skill acquisition (Kerr & Macaskill, 2020).

Simulation in NP Education

The simulation was selected as our pedagogical approach as it has been successfully used in NP education. Prior use of simulation in NP education has improved students' patient safety confidence levels (Brown et al., 2020), enhanced student competence, increased knowledge, and increased expertise in diagnostic reasoning (Mason Barber & Schuessler, 2018). In addition, higher self-confidence, heightened critical thinking, enhanced clinical decision-making, and communication techniques have been noted (Nye et al., 2019). Likewise, NP students have reported an interest in using simulation-based learning in their coursework (Alhaj Ali, 2018).

There is literature regarding the use of simulation in NP programs; however, there is minimal research related to NP simulation-based training regarding opioid prescribing or participation in MAiD. Two studies were somewhat related to the topic. Padgett et al. (2020) developed an unfolding case study on opioid addiction to integrate opioid education into their undergraduate and graduate nursing programs. Jenkinson and Hartman (2021) used simulation to examine the effectiveness of Interprofessional Education in end-of-life teaching for prelicensure and graduate family NP students.

NP Prescribing of Controlled Substances

Changes in 2012 and 2018 to regulations under the *Controlled Drugs and Substances Act* (1996) enabled NPs in Canada to prescribe controlled drugs and substances. Subsequent regulatory changes by the CNO authorized NPs to prescribe controlled substances (CNO, 2017; CNO, 2020). As a result, as of 2017, all Canadian university NP programs had controlled substances embedded into their curriculum (NP-education, 2019). After completing the program and passing a provincial exam, entry-level NPs are authorized to prescribe controlled substances (CNO, 2017; CNO, 2020). Government regulations, regulatory, and curricular restrictions prevent NP students from prescribing controlled substances; students gain experience by practicing writing prescriptions in a classroom setting.

NP Participation in MAiD

The Parliament of Canada (2016) amended the Criminal Code to change the law regarding MAiD to allow medical assistance for dying Canadians under specific conditions. Subsequently, the federal government passed Bill C-7 to amend the Criminal Code (Parliament of Canada, 2021); this bill expanded the eligibility and requirements for MAiD. To reflect regulatory and legislative requirements, information regarding NP participation in MAiD was added to the Primary Health Care NP (PHCNP) curriculum (CNO, 2016; NP-education 2019; CNO, 2021). Unfortunately, NP students can only participate in MAiD in a registered nurse (RN) capacity and, as such, cannot perform eligibility assessments (CNO, 2021). Given that opioid prescribing and MAiD are newly authorized acts for NPs, it is essential that graduates are competent and confident to practice.

Methods

The experiential learning incorporated a four-hour simulation-based workshop on opioid prescribing and MAiD, conducted in July 2021 at a midsized university in Southwestern Ontario. The workshop was provided to NP students in their final course, Integrative Practicum (IP), before graduating from the PHCNP program. Clearance for the research was provided by the University Research Ethics Board (REB) #20-184.

All students in the graduating class were offered simulation (*N*=18); a Consent and Information letter was emailed to all students enrolled in the IP course. Consent outlined the intended outcome, procedures, potential risks and discomforts, benefits, compensation, voluntary participation and withdrawal, confidentiality, data storage and destruction, contacts for further information, and the potential for publication of the findings. To avoid any undue influence on the students to participate, the email was sent from the students' instructor, who was not a participant in the simulation scenarios. Students who consented to participate attended the workshop at the local university (following COVID-19 guidelines in force at the time).

Structured Experiential Learning

Students in IP were selected because knowledge regarding opioid prescribing and MAiD is embedded throughout the entire program, and the final course represents a culmination of knowledge. Experiential learning was conducted before students graduated and began their practice to ensure that knowledge attained after graduation would not influence results. Accordingly, they were not expected to complete additional preparation before the simulations. PHCNP instructors and experts in simulation developed and facilitated the workshop.

Simulation Scenarios

The university has simulation suites with low and high-fidelity simulation manikins and rooms that replicate an acute care facility and a patient's home. Due to the complexity of opioid prescribing and MAiD we did not combine the information; rather, we kept the scenarios limited to only one topic. Nevertheless, prescribing various controlled substances is a component of MAiD, and we felt it was important to have the topics taught sequentially. Having the topics taught on one day encouraged participation as students did not have to travel on multiple days.

On arrival, a structured pre-briefing was conducted, including an orientation to the learning environment and the provision of required patient and scenario information. NP students worked in groups and rotated through three 60-minute simulation-based scenario stations followed by a 30-minute debrief at each scenario and were given 15 minutes to complete the evaluations. Students were expected to apply knowledge obtained during their NP program to conduct a thorough assessment, determine diagnostic tests/tools, formulate diagnoses, and develop a collaborative treatment plan.

The simulation-based education included three scenarios; two opioid scenarios utilized standardized patients, and a MAiD scenario used a high-fidelity manikin. All the scenarios were developed as part of a collaborative effort between the simulation experts and the NP instructors teaching in the PHCNP program at the university. Scenarios were reflective of the content in the PHCNP program (2019), the CNO Standards of Practice (2020, 2021). They followed the International Nursing Association for Clinical Simulation and Learning (INACSL) Standards of Best Practice (INACSL, 2021) and the Canadian Association Schools of Nursing (2015)

Guidelines for Clinical Placements and Simulation. Each scenario was designed to provide a safe, non-consequential environment for the NP students to gain knowledge, comfort, and confidence in prescribing opioids and participating in MAiD.

The first scenario was centred around a patient who was opioid-seeking with a concern for misuse or diversion. The patient visited the emergency department seeking pain control for chronic low back pain, explicitly requesting opioids, stating their family physician was away on vacation. The second scenario involved a patient initially seen in the emergency department with knee pain after a fall. The patient followed up with their NP provider two months after a confirmed tibial plateau fracture. In the first two scenarios, the NP students were expected to complete risk assessments on each patient, including possible urine drug screening, use of a risk assessment tool, and treatment agreements if required. At the end of each scenario, where appropriate, the participant was required to write a complete prescription and incorporate non-pharmacological management. These activities were designed to assist students in determining the appropriateness of an opioid prescription and gain comfort and confidence with the dialogue necessary in these encounters.

In the third scenario, the participant was required to assess a patient with an irremediable condition, and their family member requested information about MAiD eligibility, safeguards, process, and consent. The standard application, available from the CNO as a practice standard, was available for consultation. This scenario required the participants to utilize knowledge attained from the NP curriculum to complete a thorough assessment of the patient and determine if they meet all the legal requirements for MAiD.

Reflection and Reciprocity

Participants in the simulation were encouraged to collaborate and work as a team. Additionally, debriefing post-simulation provided NP students with the opportunity to reflect on their feelings during the simulation scenarios to determine information learned about themselves, their feelings towards opioid prescribing and participation in MAiD, and incorporating the new knowledge into practice as entry-level NPs.

Outcome Measures

Simulation effectively assesses a participant's ability to transfer knowledge gained during the simulation sessions to real-world practice; this transfer may be related to the participant's self-assessment of their learning and self-confidence (Bergamasco et al., 2021). Simulation outcomes should measure participant experiences that increase their learning and enhance personal and professional growth (Cowperthwait, 2020). Experiential learning outcomes included measuring students' knowledge acquisition, self-reported competency assessment, and confidence regarding prescribing opioids and participation in MAiD.

Knowledge Acquisition

To assess knowledge acquisition, NP students completed a pre/post-simulation Knowledge Quiz that contained the same questions. The quiz had 10 questions, including multiple-choice, select all that apply, and short answer questions; there was a maximum score of 17. Knowledge acquisition was measured by examining the differences between the pre/post-scores (See Appendix A for questions on the Knowledge Quiz).

Self-Reported Competency

To promote personal and professional growth, the NP students completed a pre/post-simulation self-reported competency assessment on each simulation scenario. The self-reported competency assessment tools were based on a CAN-Sim Self-assessment Rubric template (Tyerman et al., 2021). Using the learning outcomes and competency indicators for each scenario, NP students rated themselves as competent, intermediate, or novice regarding opioid prescribing and participation in MAiD (See Table 1 under results for the percentage of respondents that self-reported as competent by Scenario).

Confidence

The Simulation Effectiveness Tool-Modified (SET-M) (Leighton et al., 2015) was adapted to reflect the graduate level of the NP students with a few items removed that did not apply (e.g., "I developed a better understanding of the pathophysiology"). It was sent as an online survey via the university Qualtrics to all student participants after completion of the simulation-based education. The SET-M is a valid and reliable method ($\alpha = 0.93$) for evaluating students' perceptions of the effectiveness of the simulation in meeting their learning needs (Leighton et al., 2015). The confidence subscale within the SET-M was used to evaluate the students' self-confidence regarding opioid prescribing and participation in MAiD (See Appendix B for questions on Post-simulation SET-M).

Data Collection

Due to the uniqueness of the topics in experiential learning, there were no valid and reliable measurement tools other than the SET-M, specific to our curriculum and regulatory practice standards. To mitigate this, content experts created the measurement tools. The knowledge quiz and the self-reported assessment tools were developed as a collaborative effort between the simulation experts and the NP instructors in the PHCNP program. Content validity of the instruments was confirmed by having other NP instructors in the program review and provide input on the quiz and the self-reported assessment tools.

On arrival at the workshop, NP students completed a paper version of the Knowledge Quiz-Opioid Prescribing and MAiD to evaluate their knowledge base on these topics. After completing the simulation scenarios, participants completed another paper version post-simulation knowledge quiz at their last scenario station, with the same questions to evaluate post-simulation knowledge. NP students also completed the Pre/Post-simulation Self-reported Competency Level before and after each scenario. Finally, all participants were sent a link via email to complete our adapted Post-simulation SET-M via Qualtrics. They were given three options for 11 questions (somewhat agree, strongly agree, or disagree); a final open-ended question required a written response.

Experiential learning developers and facilitators were faculty in the NP program at the university. Therefore, to reduce potential bias and maintain data anonymity, demographics were not collected. Data collection and entry were performed by two assistants not affiliated with the NP program or its students. Additionally, the quiz and self-reported assessment tools were handed out and collected by the assistants.

Findings

There were 18 students in the graduating NP class, and 16 participated in the simulation-based scenarios. The scores on the pre-simulation quiz score ranged from 3–9 (M = 6.19); post-simulation quiz scores ranged from 6-12 (M = 9.88). Paired-Samples T-Test indicated a statistically significant increase between pre and post-mean scores M = 3.69, 95% CI [4.77, 2.61], t (15) = 7.29, p < .005, d =1.82

Pre/Post-simulation students rated themselves as competent, intermediate, or novice learners for each scenario (Opioid [back, knee], and MAiD). In all scenarios, there was an increase in the percentage of NP students who self-reported themselves as "competent" between their pre/post-simulation assessments (See Table 1).

Table 1 ***Pre/Post Simulation: Percentage of NP Students that Self-Reported as "Competent" by Scenario*** *(n= 16)*

Scenario	Pre-Simulation	Post-Simulation
Opioid Scenario-Chronic Back Pain	12.50% - 43.75%	81.25% - 93.75%
Opioid Scenario-Acute Knee Pain	12.50% - 31.25%	68.75% - 75.00%
MAiD Scenario	0 – 33.33%	50.00 – 81.25%

During debriefing, NP students reported an overall benefit from the scenarios and having simulation in their program. Students felt that the scenarios increased their knowledge and self-reported competency; they felt more confident regarding opioid prescribing and participation in MAiD. Unfortunately, only one student completed the post-simulation SET-M via Qualtrics. The respondent "strongly agreed" to all questions except one; they "somewhat agreed" that pre-briefing on the topics would have increased their confidence. Their comments included, "*I found the experience to be incredibly beneficial. I am a better clinician as a result. I would have liked to participate in more of these scenarios throughout the year*."

Discussion

Opioid prescribing and MAiD are recent additions to the NP scope of practice. As such, it is crucial to ensure graduates feel supported and are prepared for practice as it is critical to establish and maintain patient safety. During the experiential learning, NP students reported an overall benefit from the scenarios and an improved self-reported competency level between the pre and post-simulation assessments. Students also reported that the scenarios increased their knowledge and confidence regarding opioid prescribing and participation in MAiD. In addition, analysis using a Paired-Samples T-Test indicated a statistically significant increase in the Knowledge Quiz pre/post-simulation mean scores.

There were intriguing findings from the experiential learning which can aid us in planning educational changes to meet gaps in the educational programs. First, pre-simulation, none of the NP students identified themselves as "competent" regarding identifying the legal requirements for the provision of MAiD (eligibility, consent, independent witness, safeguards,

and reporting). Reassuringly, the percentage of NP students who reported themselves as "competent" increased to 50% post-simulation. Second, statistical analysis of the pre/post-simulation quiz revealed two questions where the overall students' marks decreased on the post quiz and another question was not answered correctly by any student pre or post-simulation. These areas could be a focus in the NP curriculum.

One of the questions with a decreased overall score on the post-simulation quiz was related to the medications given during MAiD. It is not surprising that students scored poorly on this question as students are restricted from participating in the assessment and administration of MAiD and can only support the process in their role as RNs (CNO, 2021). This lack of active participation as NP students means they are not fully prepared for the reality of practice. Embedding simulation into the NP curriculum enables NP students to practice real-life scenarios regarding MAiD.

The other two questions were both regarding opioid prescribing. In one question, there was a decreased score on the post-simulation quiz. The students were required to select the appropriate first-line medication for a patient with back pain. The second question was answered incorrectly by all on the pre and post-simulation quizzes. In this question, students were expected to select medications from the given options that were equivalent to 90mg of morphine. Based on responses to both questions, students appeared to struggle. Similarly, opioid prescribing is an area that practicing physicians and NPs report as challenging. Pittman et al. (2020) found that physicians report that they do not graduate with education about the safe tapering of opioids; this leads to inadequate knowledge or skill related to opioid tapering. Likewise, practicing NPs reported their confidence as 67.2% when managing patients with chronic pain (Pittman et al., 2021). Fortunately, based on the findings, simulation can narrow or eliminate gaps in education by providing students with the opportunity to link theory to practice in a safe and controlled environment. Additionally, simulation scenarios can be adapted to reinforce or teach critical concepts and meet ongoing students' learning needs.

Implications for Practice/Research

Nurse educators in NP programs are challenged to offer curricular and clinical programs that ensure graduates provide safe, competent care to patients and their families (Jeffries et al., 2019). The use of simulation in graduate education promotes a collaborative atmosphere where students learn from practice and each other which improves students' competency and confidence (Brown, 2019). This experiential learning fostered NP student engagement in the final course of their program and encouraged collaboration, teamwork, and idea generation.

Future simulation scenarios can be adapted to reflect academic areas that require reinforcement or additional learning reflective of curricular or practice changes. Additionally, post-graduate, simulation-based training can introduce and implement regulatory changes in a safe, non-judgmental environment. Information gathered from this simulation-based experiential learning can inform educational practices and public health policies to ensure NP preparedness for opioid prescribing and MAiD in practice. Furthermore, to promote interdisciplinary education, simulation exercises for opioid prescribing and MAiD that include interdisciplinary roles need to be developed and utilized in academic settings.

Limitations

The number of students that participated in the simulation-based education was small. However, the number reflects the usual graduating class, and the small group size allows us to incorporate simulation into our program easily. The simulation facilitators were faculty in the NP program, and as such, no demographics or identifying data was collected. Unfortunately, this did not allow us to explore individual students' scores. In the future, data collection requires a coding system that retains anonymity. Finally, only one student responded to the post-simulation SET-M online via Qualtrics, generalizing findings for this impossible. Future studies should include completing the tool in-person immediately after the simulation to improve feedback.

Conclusions

The ability to analyze patient situations critically and respond to those situations is essential to the everyday practice of NPs, as is the case when caring for patients requiring treatment with opioids or MAiD. Given the collaborative and cross-disciplinary nature of opioid prescribing and MAiD procedures involving NPs, physicians, and pharmacists, it is foreseeable that simulation scenarios would benefit from inter-professional education.

The findings of this simulation-based experiential learning support the effectiveness of this teaching strategy and provide support for using simulation for further educational opportunities with NP students as they transition from novice to expert. Simulation enabled NP students to review their performance with an educator and discuss potential areas for improvement. Additionally, students developed the ability to analyze and evaluate patient situations involving MAiD and safe opioid prescribing.

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NP Pre and Post-Simulation Knowledge Quiz Questions-Opioid Prescribing and MAiD

1. A patient has requested Medical Assistance in Dying (MAiD) due to their irremediable pancreatic cancer diagnosis. The patient asks if they will be able to die at home surrounded by their loved ones. How should the NP respond?
a) Unfortunately at this time you are required to be in an accredited facility to receive MAID.
b) Yes, a provider will schedule a time with you and your family to perform MAID at home.
c) Yes, you will be provided with a prescription for medications that you can take at home.
d) It will depend on the comfort of your family members to administer the medication if you are unable.
2. Please list the 5 (five) safeguards that must be in place for MAiD.
3. A patient who has consented to MAiD asks the NP about the medications that are given for the procedure. How should the NP respond?
a) The medications for MAiD are predetermined by the pharmacist
b) I will work with you and your family to determine which medications are best
c) I will have to consult with my physician partner to decide the medications to be given
d) The medications to be prescribed are outlined by the College of Nurses of Ontario
4. How long is the standard waiting period between the client's signed request and the delivery of MaiD?
5. The standard waiting period may be waived if what two patient factors are imminent?
6. You are caring for a palliative care patient who is currently taking 90mg of Morphine by mouth daily. Which of the following are equivalents to this dosage? SELECT ALL THAT APPLY
a) Hydromorphone (Dilaudid) 18mg oral
b) Oxycodone 60mg oral
c) Hydromorphone (Dilaudid) 15mg oral
d) Oxycodone 30mg oral
e) Codeine 600mg oral

7. A patient comes to the clinic reporting back pain from a back injury while lifting heavy boxes 6 weeks ago. After assessing the patient and ruling out red flags, which of the following would be appropriate prescriptions by the NP (given no contraindications)? SELECT ALL THAT APPLY
a) Ibuprofen 600mg po QID prn x 1 week then reassess
b) Naproxen 500mg po BID prn x 1 week then reassess
c) Oxycocet 5/325mg 1-2 tabs po QID (56 tablets) x 1 week then reassess
d) Morphine 5mg po BID prn x 14 tablets then reassess
e) Cymbalta 30mg po daily x 1 week then reassess
8. List 3 (three) factors that would place a patient at high risk for opioid misuse
9. The 2017 Canadian Guidelines for prescribing opioids for Chronic Non-Cancer Pain recommends which of the following morphine milligram equivalent (MME) dosage restrictions for prescribing?
a) Prescribe doses less than 200 MME per day
b) Prescribe doses less than 100 MME per day
c) Prescribe doses less than 90 MME per day
d) The recommendation varies based on patient presenting complaint
10. Patients who are taking long-term opioids for chronic non-cancer pain require tapering prior to discontinuation as their bodies become dependent on them, and patients will experience withdrawal symptoms
a) True
b) False

Post-simulation SET-M Questions

1. Would prebriefing on the topics prior to the scenarios increased your confidence
2. I am better prepared to respond to changes in my patient's condition regarding opioid management
3. I am better prepared to respond to patient/family questions regarding MAiD
4. I am empowered to make clinical decisions
5. I developed a better understanding of prescribing opioid medications
6. I am more confident in providing interventions that foster patient safety
7. Debriefing contributed to my learning
8. Debriefing allowed me to verbalize my feelings
9. Debriefing was valuable in helping me improve my clinical judgment
10. Debriefing provided opportunities to self---reflect on my performance during simulation
11. Debriefing was a constructive evaluation of the simulation
12. What else would you like to say about today's simulated experience

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