



Development, implementation, and evaluation of a mental rehearsal strategy to improve clinical performance and reduce stress: A mixed methods study



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SUMMARY

Background: Mental rehearsal is a form of mental training that has been used by physicians and nurses to improve performance of clinical skills, and as a vital component of stress management training. To help novice nurses deal with often stressful clinical events that require the processing of information essential to patient management, a mental rehearsal strategy was developed and implemented in a Year 3 nursing simulation program. Inherent to mental rehearsal is imagery, which facilitates cognitive and affective modification, and reduction of extraneous cognitive load. As such, it was expected that the mental rehearsal strategy would improve students' performance and reduce stress in managing deteriorating patients.

Methods: The study used a mixed methods design. Eighteen Year 3 nursing students participated in the pre- and post-design study, which consisted of the development and implementation of a mental rehearsal strategy. The Rescuing A Patient In Deteriorating Situations (RAPIDS) tool was used to assess performance. Heart rates and systolic blood pressures were used to measure stress. The State-Trait Anxiety Inventory (STAI) was used as a psychological measure of stress/anxiety. Five participants were involved in a focus group discussion that evaluated the usefulness of the mental rehearsal strategy.

Results: There was a significant improvement in performance ($P < 0.05$). However, post-test heart rate and systolic blood pressure were not significantly different from pre-test measures. A comparison of STAI results did not show significant differences between pre- and post-test state anxiety and pre- and post-test trait anxiety. Three themes emerged from the focus group interview: managing stress, using a mental framework, and integrating realistic simulations with the mental rehearsal strategy.

Conclusion: The mental rehearsal strategy for deteriorating patient management can be valuable based on the findings on performance and based on the participants' feedback. Its role in reducing stress, however, needs further evaluation.

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Introduction

Patient deterioration is a clinical event that can elicit stress in the health-care professionals. The influence of stress on performance during such high-acuity events could affect patient management and care; hence, addressing this issue is of vital importance (Harvey et al., 2010; LeBlanc, 2009). Because of this, strategies that enable nurses to better

manage their emotions and reduce excessive stress that may impair clinical performance are needed (Harvey et al., 2010; Liaw et al., 2012).

Mental rehearsal (MR) or mental practice is one strategy that holds much promise. It “refers to the cognitive rehearsal of a task in the absence of overt physical movement” (Driskell et al., 1994, p. 481). Unlike physical practice, MR is a cognitive strategy that facilitates the improvement of performance (Jones and Stuth, 1997) and involves mental training, which requires the rigorous practice of a task or a skill in the mind (Eldred-Evans et al., 2013).

Health-care research on MR showing positive results has affirmed the effectiveness of the strategy in enhancing performance (Arora et al., 2010; Doheny, 1993; Eldred-Evans et al., 2013) and reducing stress (Arora et al., 2011; Wetzal et al., 2011). The use of mental imagery in MR can be used for affective and cognitive modification to gradually eliminate negative thoughts and images that are associated with stressful

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events (Jones and Stuth, 1997). From the perspective of cognitive load theory, imagery—which is part and parcel of MR—results in an “imagination effect” that facilitates acquisition of schemas in long-term memory (Leahy and Sweller, 2008). According to this theory, the use of imagery may be more vital when one is learning material that has a higher interactivity effect—that is, material with various information that must be absorbed simultaneously (Leahy and Sweller, 2008).

The use of MR in health-care education has previously been limited to highly physical skills such as basic surgical skills, laparoscopy, venipuncture, and intramuscular injection (Arora et al., 2011; Doheny, 1993; Sanders et al., 2004, 2007). The effect of MR, however, in performance of a task that is more complex and involves a high interactivity element remains to be further explored. Mental rehearsal uses an integrated format—one that reduces extraneous cognitive load, and benefits learners more (Leahy and Sweller, 2004)—and thus may positively affect performance. Because the management of patient deterioration requires assimilation of multiple information presented simultaneously (e.g., interpreting vital signs, assessing signs and symptoms, etc.) and then managing the patient, an intervention that results in an “imagination effect,” such as MR, may be of value. As a stress management intervention, there is a need to explore how MR can affect stress in complex task performance. Thus, this paper aimed to determine if the developed MR strategy was effective in enhancing clinical performance and in managing stress in clinical deterioration. Given the dearth of research in the use of MR in nursing practice, this study demonstrated an innovative approach of integrating MR in nursing education and training. It showed the potential of using MR in a complex nursing task—assessing and managing patient deterioration.

Methods

Development and Implementation of the MR Strategy

An initial literature review conducted to determine the important steps vital to initially managing deteriorating patients showed that airway, breathing, and circulation were the primary foci of management. The assessment and management of patient deterioration in other institutions worldwide were also explored. Existing checklists related to patient deterioration were appraised and various visual cues needed to adequately evaluate and manage patient deterioration were examined. From this first step, an MR script specific to patient deterioration was developed, guided by the Airway, Breathing, Circulation, Disability and Examine/Expose (ABCDE) mnemonic (Liaw et al., 2011). The MR script was then sent for evaluation to local experts on patient deterioration and to the Clinical Decision-Making Teaching Team, who made suggestions on how the script could be further enhanced. After revisions were made based on elicited feedback, another round of discussions was conducted to finalize the script. The final version was then prepared and integrated into the MR strategy. The concept of mental imagery or the visualization of a skill played repeatedly in the mind without actual action (Driskell et al., 1994) is the underlying concept behind the MR strategy. The complete strategy consisted of a didactic component introducing the concepts of MR, stress, and performance to participants. A video of a nurse managing a deteriorating patient was then shown to participants to help them visualize the steps involved. This was followed by a breathing exercise, a technique that promotes relaxation (Paul et al., 2007), which has been shown to lead to a substantial increase in working memory needed for cognitive tasks such as learning and reasoning (Flor et al., 2013). Finally, the MR script was recited by a facilitator to the participants after they were instructed to close their eyes and visualize script. The details of the MR strategy for patient deterioration are shown in Fig. 1. The facilitation of MR lasted 30 minutes; however, the participants were encouraged to practice the MR script on their own as many times as they could prior to the post-test later that day.

Facilitated Mental Rehearsal

- Didactic component: Introduction to MR, stress and performance
- Video presentation of managing patient deterioration
- Relaxation techniques

Individual Mental Rehearsal

- Practicing MR alone

Fig. 1. Mental rehearsal strategy.

Evaluation of the MR Strategy

The study is a mixed methods design that comprised a single-group pre- and post-test evaluation of the effectiveness of the developed MR strategy and a follow-up study using a focus group interview. The mixed methods design was considered appropriate as the generated information from both methods could complement one another thus mitigating the limitations of using just one approach (Polit and Beck, 2006). The combination of quantitative findings from the simulation setting and qualitative findings from the focus group after clinical exposure provided strength to the design. Ethical approval was given by the university's Institutional Review Board prior to the commencement of the study.

Study Design and Participants

One hundred five Year 3 nursing students who had completed the Clinical Decision-Making module were invited to participate in the study. These students were in their last year of a 3-year Bachelor of Science in Nursing program. Of the total invitees, 18 students participated in the pre- and post-tests in the simulation setting. Consent was taken before the pre-test and after they were briefed on the purpose of the study, their study involvement, and the confidentiality of all information that will be taken from them during the study. A qualitative component using a 45-minute focus group discussion was later conducted for those who participated in pre- and post-tests. Of the 18 students, five participated in the focus group during which their feedback on how the MR strategy had benefited them during their clinical posting was elicited. Guide questions (Table 1) enabled the facilitator to explore the participants' experiences during their clinical attachment and how the MR strategy had benefited them. As the focus group was done after the students' 9-week clinical placement and prior to graduation, scheduling issues resulted in the low turn-out.

Data Collection and Outcome Measures

The participants were exposed to deteriorating patient simulations at pre- and post-tests which were conducted in the simulation center. Patient deterioration simulations involved a standardized patient (SP) manifesting the signs and symptoms of a patient in clinical deterioration. In managing deteriorating patients, the participants were required to perform tasks such as pulse rate count, blood pressure taking, and chest

Table 1

Guide questions for focus group interview.

Focus group discussions guide questions
1. How was your transition-to-practice clinical placement?
2. Did you encounter any patient deterioration during your clinical placement?
3. How did you feel during the experience and what were your thoughts then?
4. Do you think mental rehearsal is beneficial? Do you think it benefits simulation training?
5. What can be further improved such that the mental rehearsal could benefit students more? Any feedback?

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