Exploring the Role of Virtual Simulation Gaming in Reducing Physical Examination Anxiety for Undergraduate Nurses

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Research Report

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ABSTRACT

Simulated objective structured clinical examination (OSCE) assessments have traditionally evoked high levels of anxiety for students, both when learning the scenarios in face-to-face simulations and when undertaking the actual OSCE assessment. Virtual simulation gaming (VSG) is an identified method of preparation for simulation that may reduce performance anxiety for students undertaking OSCE assessment. This quantitative exploratory research utilised established satisfaction and anxiety/confidence scales to explore the impact of VSG on student perceptions of simulation experiences, anxiety and self-confidence in clinical decision-making. Summative OSCE assessments were conducted in two cohorts before an inpatient and ambulatory care clinical practicum. Cohort one undertook their summative OSCE assessment immediately following the initial teaching, with the second cohort completing a mental health and addictions clinical practicum before their summative OSCE. Descriptive and inferential statistics were used to examine the relationships between simulation satisfaction, students' perceived anxiety, and confidence with clinical decision-making. Self-reported satisfaction with simulation levels were high and improved over subsequent simulations. Results showed that although the second cohort demonstrated higher levels of confidence in clinical decision-making, there was no significant difference in anxiety levels between the two cohorts. This suggests that OSCE-related anxiety is situational rather than directly related to self-confidence. Anxiety was reported by most students following summative OSCEs despite the introduction of VSGs in pre-OSCE clinical simulation preparation. Even though they had high satisfaction with the simulation experience and reported feeling confident, this did not allay student anxiety. Overall, the study did not identify any measurable factors that would indicate which students would score high in self-confidence and/or anxiety. While it was not possible to directly attribute high levels of self-confidence to the introduction of VSGs, student satisfaction with simulation and clinical learning that included VSGs was high, indicating the positive effect on learning.

KEYWORDS

Simulation-based learning, nursing education, virtual simulation gaming, clinical decision-making, clinical practicum

INTRODUCTION

Simulation-based learning (SBL) is a teaching and learning strategy used in nursing education to provide students with the opportunity to practice clinical skills and develop clinical decision-making in a controlled setting (Gaba, 2004; Lioce et al., 2020). Simulated objective structured clinical examination (OSCE) is one way of assessing students' competence and safety to practice prior to clinical practicums. For nursing students, the stakes are high, as outcomes of their OSCE assessment may affect their progression through the Bachelor of Nursing degree. Recognising the effect OSCEs have on students, we introduced virtual simulation games (VSG) as preparation for formative face-to-face simulation sessions run in the weeks leading up to the OSCE assessment. The aim of the VSG was twofold – firstly to develop clinical decision-making in a safe way, secondly, through this process, to assist students to develop self-confidence to help reduce examination anxiety.

This paper presents research data collected as a formal evaluation of the efficacy of the VSG initiative. The research aims are provided below, followed by a description of the context – Year Two Bachelor of Nursing students preparing for their OSCE assessments – and a rationale for the introduction of VSGs as a preparation strategy. The methodology, data collection and analysis tools are described, followed by the results and implications for nursing education teachers. Limitations are noted, as is the opportunity for further research, with a final conclusion that asserts the value of VSGs, while underscoring the complex range of factors which affect anxiety, and confidence.

RESEARCH AIMS

The purpose of this study was to explore student perceptions of satisfaction with simulation, self-confidence in clinical decision-making (CDM), and anxiety about simulated OSCE assessments following the introduction of VSGs to better prepare students psychologically for simulation and reduce simulation/exam anxiety associated with Year Two summative OSCE assessments.

The aim of this research was to analyse:

- Nursing student satisfaction with simulation following VSG pre-simulation preparation
- Nursing student perception of VSG and clinical simulation labs on CDM during OSCE assessment
- The impact of simulation preparation on student anxiety relating to OSCE assessment

BACKGROUND

Simulation-based learning (SBL) prepares nursing students for workplace learning in the clinical setting (Kardong-Edgren et al., 2020; Miller & Guest, 2021). Studies have shown that students completing SBL prior to clinical practicums demonstrate decreased anxiety and increased self-confidence, leading to improved clinical performance (Neilson & Harder, 2013; Woda et al., 2019). Virtual simulation gaming (VSG) is one identified method of SBL that aids in the development of clinical decision-making (CDM) in nursing (Luctkar-Flude et al., 2021; Verkuyl & Hughes, 2019). In Year Two of a Bachelor of Nursing course, students complete an initial course that includes hybrid medium-fidelity clinical laboratories where clinical skills and clinical decision-making are applied to a simulated patient scenario. After this preparatory learning, students complete a summative OSCE assessment where 'safety to practice' elements are assessed against the Nursing Council of New Zealand competencies for registered nurses at a Year Two level (Te Kaunihera Tapuhi o Aotearoa Nursing Council of New Zealand, 2022).

OSCE assessments within the Year Two course have traditionally evoked high levels of anxiety for students, both when learning the scenarios in clinical labs and when undertaking the actual OSCE assessment. Anxiety can impair students' ability to learn and perform, especially in a simulation (Shearer, 2016; Zhang & Walton, 2018). This is reflected in findings by Cobbett and Snelgrove-Clarke (2016), Nielson and Harder (2013) and Gore et al. (2011) relating the simulation anxiety experienced by students as comparable to examination anxiety, regardless of the formative or summative aspect of the simulation. The use of web-based teaching such as VSGs has been shown to improve student self-confidence and reduce anxiety associated with CDM (Bektaş & Yardimci, 2018). Studies have shown that virtual simulation can be just as effective as face-to-face simulation in building student confidence, with the added benefit of allowing students to repeat the experience multiple times (Luctkar-Flude et al., 2021).

It is clear that pre-simulation preparation is a crucial aspect of nursing simulation, highlighting its importance in improving student outcomes and satisfaction (Dileone et al., 2020; Leigh & Steuben, 2018; Shearer, 2016). However, it appears that learners may not always complete pre-simulation activities, indicating a need for strategies to encourage engagement with these tasks (Tyerman et al., 2019; Verkuyl & Hughes., 2019). Virtual simulation games have been identified as a potentially valuable tool for preparing students for clinical lab-based simulation, as gaming is perceived by students as more engaging compared to static case studies (Cobbett & Snelgrove-Clarke, 2016; Luctkar-Flude et al., 2021). The accessibility and flexibility of web-based education make it an effective method

for making simulation learning accessible on and off campus and at a time and place that suits the student (Bektaş & Yardimci, 2018; Verkuyl et al., 2017).

VSGs are serious games designed for educational purposes, depicting real-world events and designed for specific learning outcomes (Lioce et al., 2020). To address the students' lack of preparation for simulation within the Year Two course, three pre-simulation VSGs were developed to provide students with an opportunity to familiarise themselves with simulation scenarios and practice clinical decision-making (Sadd & Hills, 2021). The three VSGs used in this research form part of the pre-simulation online preparation prior to clinical laboratory-based hybrid medium-fidelity simulation and simulation OSCEs. Each VSG directly reflects one of three simulation scenarios developed, refined and used in clinical simulations and OSCEs over the previous three years of the Year Two course.

Each VSG replicates the OSCE simulation scenarios encountered during clinical lab simulation, challenging students with five key decision-making points in each scenario. Scenario-based role modelling is a successful strategy in nursing education and SBL (Coram, 2016), and VSGs offer a way to role-play the correct decisions once the student has made their choice within the game. By replicating face-to-face simulation scenarios in a different format, VSGs provide students with an opportunity to consider their decisions and reinforce their CDM in preparation for OSCE assessment. Students have the opportunity to return to the VSG after clinical simulation to further practice their CDM in preparation for their summative OSCE assessment. Each virtual pre-simulation game is made available in preparation for face-to-face simulation, remaining available until the summative OSCE. This provides students the opportunity to prepare and cognitively practice their decision-making within each scenario, enabling students to determine when, and how, they do their learning.

METHODS

The research uses a quantitative cross-sectional exploratory design with two survey instruments collected from two sites, using purposive sampling. All students were provided with access to the three VSGs, but only those who consented and completed the surveys were included in the research.

Two survey instruments were used to collect data:

- The Satisfaction with Simulation Experience Scale (SSES, adapted with permission; Levett-Jones et al., 2011) was used to evaluate student perceptions of clinical simulation labs and OSCE assessments. The adapted questionnaire was used to collect data on student experiences using VSG as pre-simulation preparation following each of the three clinical simulation labs.
- The Nursing Anxiety and Self-Confidence with Decision Making Scale (NASC-CDM) (White, 2011) was completed post-OSCE assessment in two cohorts. The NASC-CDM has been widely used in nursing education research to assess student-nurse anxiety relating to simulation and clinical practice settings.

Ethical approval was gained from the institute's Research and Human Ethics Committee, approval number TRC 2020.094. A participant information sheet was provided before the commencement of the research and informed consent was gained before completing surveys.

Data collection

Clinical labs, which include hybrid medium-fidelity simulations, take place during the first seven weeks of the year. These simulations focus on respiratory, cardiac and neurological scenarios, and are conducted in weeks three, five and six, respectively. Each related pre-simulation virtual simulation game (VSG) is available to students from the week prior to the face-to-face simulations. Following each simulation, SSES data was collected.

Table 1. Delivery format.

Week	1	2 Resp VSG available	3	4 Cardiac VSG available	5 Neuro VSG available	6	7	8	9-17	18
All students	Skills Labs	Skills Labs	Hybrid sim – resp scenario	Skills Labs	Hybrid sim – cardiac scenario	Hybrid sim – neuro scenario	Skills Labs			
			SSES survey – resp scenario		SSES survey – cardiac scenario	SSES survey – neuro scenario				
Cohort 1 only								OSCE exam Cohort 1	Acute Inpatient placement	
								Cohort 1 NASC-CDM		
Cohort 2 only								Mental Health placement / Study block		OSCE exam Cohort 2
										Cohort 2 NASC-CDM

After the initial preparation in weeks one to seven, students are divided into two clinical (practicum) cohorts. The first cohort (n = 43, Cohort 1) was assessed by an Objective Structured Clinical Examination (OSCE) in week eight. NASC-CDM data was collected for this group at this point. The second cohort (n = 38, Cohort 2) underwent a combination of study leave and a Mental Health practicum placement lasting ten weeks, during which the simulation labs and VSGs were available for practice. Following the completion of the Mental Health practicum, Cohort 2 was assessed by an OSCE exam prior to commencing their Inpatient and Ambulatory Care practicum. NASC-CDM data was collected for the second cohort at this point.

Data analysis

Descriptive and inferential statistics were used for data analyses of SSES and NASC-CDM data using the IBM statistical program Statistical Package for Social Sciences (SPSS), Version 28.0 (IBM Corp, NY). Demographic data was collected from the NASC-CDM (Figure 1).

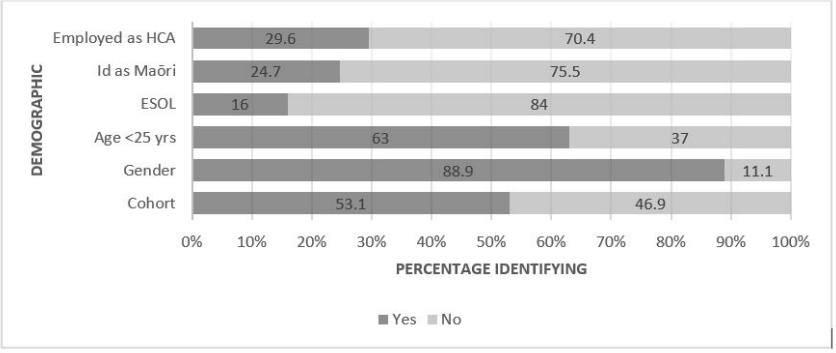

Figure 1. Demographic data (NASC-CDM).

Note: For analysis purposes, demographic data has been presented here as Yes/No, other than gender (Female:Male) and Cohort (1:2).

RESULTS

Descriptive statistics, including frequencies, median and distributions, were analysed separately. Non-parametric tests such as Spearman rho, Kruskal-Wallis and Mann-Whitney U were used to examine relationships and differences in groups.

Satisfaction with Simulation Experience Scale (SSES)

The SSES scale, developed by Levett-Jones et al. (2011), evaluates student satisfaction with simulation. The questions were adapted (with permission) to include VSG. Eighteen questions are presented using a Likert scale ranging from 1 (Strongly disagree) to 5 (Strongly agree), using three subscales: debrief and reflection, clinical reasoning and clinical learning. The subscales of clinical reasoning and clinical learning were combined for analysis and labelled 'clinical reasoning and learning'.

The SSES debrief and reflection subscale includes questions 1–9, with a possible score range of 9–45. For example, "Reflecting on the virtual pre-simulation game enhanced my learning" and "I received feedback during the virtual pre-simulation game that helped me to learn." The clinical reasoning and clinical learning subscales include questions 10–18, with a possible score range of 9–45. For example, "The virtual simulation game enabled me to demonstrate my clinical reasoning skills during the simulation" and "The virtual simulation game and simulation helped me to recognise my clinical strengths and weaknesses."

Internal consistency of variables was checked against Levett-Jones's (2011) reported Cronbach alpha of .776 for debrief and reflection, .988 for clinical reasoning, and .850 for clinical learning. The Cronbach alpha on this study was .889 for debrief and reflection. The subscales of clinical reasoning and clinical learning were combined and had a Cronbach alpha of .917, indicating very good internal consistency of both subscales (Cohen, 1998).

The median debrief and reflection scores (Md = 36, IQR = 32, 39) indicate students were generally "Unsure" or "Agreed" with statements about their debrief and reflection experiences following virtual pre-simulation games and simulation. Students generally "Agreed" that virtual simulation games supported their clinical reasoning and learning (Md = 41, IQR = 36, 45). Median scores for each scenario indicate students' levels of satisfaction with debrief and reflection and clinical reasoning/clinical learning were consistent for each (Table 2).

Table 2. Satisfaction with Simulation Experience Scale (SSES) median values.

N		Total DBL	Total CRL	Total respiratory DBL	Total respiratory CRL	Total cardiac DBL	Total cardiac CRL	Total neurological DBL	Total neurological CRL
	Valid	218	218	66	66	82	82	70	70
	Missing[a]	28	28	16	16	0	0	12	12
Median		36.0	41.0	41.0	40.5	40.5	40.5	40.5	41.0
Inter-quartile range[b]		32.0–39.0	36.0–45.0	36.0–43.25	37.0–44.0	36.0–44.0	36.0–44.0	36.0–45.0	36.5–45.0

Note: DBL refers to debrief and reflection questions 1–9; CRL refers to combined clinical reasoning and clinical learning questions 10–18.

[a] Missing scores account for varying numbers of students attending and completing surveys each time.

[b] Possible score range 9–45.

Nursing Anxiety and Self-Confidence with Clinical Decision Making (NASC-CDM) Scale

The NASC-CDM (White, 2011, with permission) has been widely used in nursing education research to evaluate student-nurse anxiety related to simulation and clinical practice settings. The questionnaire was completed post-OSCE assessment by 81 out of 102 participants.

The NASC-CDM used a Likert scale of 1 = Not at all; 2 = Just a little; 3 = Somewhat; 4 = Mostly; 5 = Almost totally; 6 = Totally. Questions include statements such as "I am _____ self-confident and _____ anxious in my ability to ask the client additional questions to get more specific information about the current problem" and "I am _____ self-confident and _____ anxious in my ability to correlate physical assessment findings with the client's nonverbal cues to see if they match or don't match."

White's (2011) NASC-CDM scale has a Cronbach's alpha coefficient reported as .97 for self-confidence and .96 for anxiety subscales, indicating very good internal consistency (Cohen, 1998). The SC-CDM in this study has a Cronbach's alpha of .96 for self-confidence and .96 for anxiety.

After the OSCE assessment, the NASC-CDM scale was used for participants to self-assess their self-confidence and anxiety with CDM. Demographic data was analysed using frequency counts for categorical variables. The Likert items on the survey were grouped into two composite score scale variables: 'total self-confidence' (SC) (possible range 27–162) and 'total anxiety' (possible range 27–162). This allowed the data to be analysed as interval data using the means as a measure of central tendency. The median self-confidence score (Md = 112, IQR = 100, 129.5) indicated students were "mostly" self-confident, while the median anxiety score (Md = 62, IQR = 56, 80) indicates students were "just a little" to "somewhat" anxious in their ability (Table 2).

Table 3. NASC-CDM median values.

N		Total SC	Total anxiety
	Valid	81	81
	Missing[a]	0	0
Median		112.0	62.0
Inter-quartile range[b]		100.0–129.5	56.0–80.0

Note: SC refers to self-confidence with decision-making.

[a] Missing scores account for varying numbers of students attending and completing surveys each time.

[b] Possible score range 27–162.

Relationships

Spearman Rank Order Correlation (Spearman rho) was used to examine relationships between the level of satisfaction between debrief and reflection (DBR) and clinical reasoning and learning (CRL) (SSES); and to explore relationships between self-confidence with clinical decision-making (SC) and anxiety (White, 2011, NASC-CDM).

A strong, positive correlation (rho = .739, n = 218, $p < .001$) was found between levels of satisfaction with DBR and CRL. The relationship between SC and anxiety was examined separately for each cohort. A medium, negative correlation was found between self-confidence with clinical decision-making and reported anxiety (rho = -.384, n = 43, $p < .005$) for the first cohort. However, there was only a small non-significant negative correlation for the second cohort (rho= -.38, n= 43, p= .05).

Exploring groups

There were no statistically significant differences in self-confidence levels between Cohort 1 and Cohort 2, as indicated by the non-significant Mann-Whitney U test result ($U = 768.5$, $z = -.459$, $p = .646$, $r = .05$). However, there was a small difference in anxiety levels between the two cohorts, with the second cohort reporting slightly lower anxiety levels than the first cohort, although this difference was also not statistically significant ($U = 721.5$, $z = -.904$, $p = .366$, $r = -.10$).

Additionally, the demographic variables of age, English for speakers of other language (ESOL) status, identification as Māori, or previous experience as a healthcare assistant (HCA) did not show any significant differences in the study's variables.

DISCUSSION

The purpose of this study was to explore student perceptions of satisfaction with simulation, self-confidence in clinical decision-making (CDM) and anxiety about simulated OSCE assessments, following the introduction of VSGs as a preparation tool for Year Two summative OSCE assessments.

Students in this study had high levels of satisfaction with simulation following VSG pre-simulation preparation, accompanied by high levels of self-confidence for clinical decision-making on the summative OSCE assessment. The results of this study show a strong positive correlation between student perception of VSG and clinical simulation on clinical decision-making during OSCE assessment. High levels of satisfaction with debrief and reflection related to high levels of satisfaction with clinical learning and reasoning. Research has shown that preparation for simulation does increase confidence and decrease anxiety (Luctkar-Flude et al., 2021). Similarly, when comparing in-person clinical simulation and VSG, Verkuyl et al. (2017) also report high levels of satisfaction for both formats.

In the first cohort of this study to complete their summative OSCE, results show a strong correlation between high levels of self-confidence and lower levels of anxiety for students, indicating performance anxiety was balanced by students' confidence and familiarity with the simulation scenarios. These findings reflect those of White et al. (2019), who found that students completing the NASC-CDM reported higher levels of self-confidence and lower levels of anxiety with CDM related to the use of innovative teaching pedagogy, such as simulation and interactive classrooms. In a systematic review, Tyerman et al. (2019) conclude that pre-simulation supports the development of confidence and competence while reducing performance anxiety associated with simulation.

The second cohort completed the pre-simulation VSGs and in-class formative simulations at the same time as the first cohort. Their summative OSCE assessment was not held until they had completed a Mental Health clinical practicum and study block. The clinical experience likely helped develop their communication skills and related self-confidence. However, for the second cohort, high levels of self-confidence did not correlate to lower levels of anxiety, indicating these students experienced anxiety related to the situational performance anxiety of the OSCE assessment. While the students in the second cohort did have time and opportunity to practice their OSCE scenarios and VSGs were available during this time, the higher levels of anxiety in the second cohort may also be related to the time elapsed since being face to face and participating in the simulations.

Literature has long identified a relationship between anxiety, memory and performance (Shearer, 2016; Ansari & Derakshan, 2010). This relationship is known as Yerkes and Dodson's Law, commonly referred to as the inverted-U curve (Yerkes & Dodson, 1908), which represents the point where performance peaks before declining as anxiety increases (Faller et al., 2019). Al-Ghareeba et al. (2019) found that anxiety could have both positive and negative effects on learners' performance during simulation activities, with Nielson and Harder (2013) suggesting that it could enhance motivation and performance up to a certain point, beyond which it could lead to a decrease in performance. Performance anxiety can lead to a negative feedback loop, where poor performance can increase anxiety, leading to further poor performance, and so on (Yerkes & Dodson, 1908). This can be particularly detrimental in high-stakes situations, such as simulation and OSCE assessments.

While simulation is meant to be a formative experience, nursing students still experience anxiety similar to physical examination anxiety (Al-Gareeba et al., 2019). This is exacerbated when the simulations then form the summative OSCE assessments (Zhang & Walton, 2018). A systematic review by Oliveira et al. (2013) found that preparation and pre-briefing play an important role in students' anxiety and confidence in their decisions and actions, findings that are reflected in this study when OSCEs follow a simulation format. Virtual pre-simulation games provide students the opportunity to prepare for simulation, increasing familiarity with simulation scenarios, and potentially increasing their confidence with clinical learning and reasoning, and decision making. The median ranges of self-confidence and anxiety scores in this study indicate most students were in the performance-anxiety range of the U-curve. In the first cohort of this study to complete their summative OSCE, NASC-CDM results showed a strong correlation between high levels of self-confidence and lower levels of anxiety for students, indicating performance anxiety was balanced by the student's confidence and familiarity with the simulation scenarios. These findings reflect those of White et al. (2019), who found that students completing the NASC-CDM reported higher levels of self-confidence and lower levels of anxiety with CDM related to the use of innovative teaching pedagogy, such as simulation and interactive classrooms. However, for the second cohort, high levels of self-confidence did not correlate to lower levels of anxiety, indicating these students experienced anxiety related to the situational performance anxiety of OSCE assessment (Zhang & Walton, 2018). The higher levels of anxiety in the second cohort may also be related to the time elapsed since being in class, contrasting with Woda et al. (2019), who reported that students completing simulation-based learning prior to clinical practicums demonstrate decreased anxiety and increased self-confidence, leading to improved clinical performance.

Overall, the study did not identify any measurable factors that would indicate which students would score high in self-confidence and/or anxiety. In terms of differences between groups, no significant findings were identified within or between groups for satisfaction with debriefing and reflection, satisfaction with clinical reasoning and clinical learning, self-confidence, and anxiety. This indicates that the factors of cohort, age, identification as Māori, English as a second language, and HCA experience did not have a significant impact on these variables.

Limitations

This study used validated survey tools (White et al., 2011; Levett-Jones et al., 2011). Both instruments collected self-assessed data from nursing students, providing insight into their experiences and perceptions. One tutorial group was not given an SSES survey to complete after their first formative simulation, as data collection was reliant on teachers distributing the surveys. However, sufficient data was still available for analysis. Potentially, collecting SSES data following the summative OSCE may have provided an opportunity to directly compare SSES and NASC-CDM data. Findings may have been enhanced through the evaluation of learning such as through pre- and post-tests. This would provide a clearer measurement of the effects of VSG on learning and allow for a closer examination of the differences between the first and second cohorts. Therefore, this study was unable to measure the impact of VSG on performance. Further study into how students experience anxiety during simulation and OSCE would be useful in managing performance anxiety for OSCE assessments.

Implications for practice

Many forms of simulation may induce anxiety, which has been implicated in both positive and negative effects on performance. This can be exacerbated when simulation becomes a summative assessment such as an OSCE. Some studies suggest that increased stress and anxiety levels can enhance retention and learning pathways (Nielsen & Harder, 2013). However, anxiety may also lead to decreased performance and learning. Educators should be aware of the causes of student anxiety during simulation to moderate anxiety levels and enhance learning (Nielsen & Harder, 2013). Preparation for simulation is an essential component, yet there is limited research into effective pre-simulation preparation (Tyerman et al., 2019). Pre-simulation VSGs provide a way for students to familiarise themselves with the simulation and to practice their clinical decision-making skills prior to and following the simulation. Educators need to recognise the anxiety that students may encounter during simulation activities and OSCE assessments, and consider any contributing factors that could potentially result in inadequate performance.

There may be an optimal level of anxiety (arousal) that can enhance performance, and this may vary depending on the individual and the task at hand (Al-Ghareeba et al., 2019; Shearer, 2016). It is important for educators to be aware of the potential effects of anxiety on learning and performance, and to strive to create a safe and supportive learning environment that minimises anxiety while still challenging students to learn and grow. While a decrease in students' reported anxiety can be an indication of the effectiveness of simulation, it should be noted that other factors can also impact anxiety levels, such as individual differences, external stressors and environmental factors (Gore et al., 2011). Therefore, it is important to use multiple measures to assess the effectiveness of simulation, such as objective performance measures, qualitative feedback and clinical outcomes.

CONCLUSION

Overall, this study highlights the importance of exploring the relationship between various factors that may impact nursing students' learning and performance. While some relationships were identified, further research is needed to identify measurable factors that can predict self-confidence and anxiety in nursing students. It is important to identify triggers of anxiety during simulation activities and OSCE assessments to help reduce and manage student anxiety. Even with the introduction of virtual pre-simulation games for preparation as a cognitive learning method, student anxiety with summative OSCE assessments remains high, despite reporting high self-confidence. Exposure to the clinical workplace environment did not reduce the anxiety with a simulated practical OSCE exam.

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ABBREVIATIONS / ACRONYMS

OSCE – objective structured clinical examination
SBL – simulation-based learning
SC – self-confidence
VSG – virtual simulation game
DBR – debrief and reflection
CRL – clinical reasoning (and clinical) learning
NASC-CDM – nursing anxiety and self-confidence with clinical decision-making
SSES – satisfaction with simulation experience scale

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