



**SIMULATION AS A TEACHING METHOD FOR NURSING EDUCATION IN  
HEALTHCARE-ASSOCIATED INFECTION PREVENTION AND CONTROL IN ASIAN  
COUNTRIES: A QUALITATIVE STUDY**

***SIMULAÇÃO COMO MÉTODO DE ENSINO NA FORMAÇÃO EM ENFERMAGEM NA  
PREVENÇÃO E CONTROLO DE INFEÇÕES ASSOCIADAS AOS CUIDADOS DE SAÚDE  
EM PAÍSES ASIÁTICOS: UM ESTUDO QUALITATIVO***

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## ABSTRACT

**BACKGROUND:** Applying simulation for nursing education, especially in healthcare-associated infection prevention and control (HAI-PC) in developing countries has limited evidence. The study was conducted to explore educators' perceptions of simulation as a teaching method for nursing education in HAI-PC in two Vietnamese and two Cambodian universities.

**METHODS:** An exploratory qualitative design was applied. A focus group of 37 educators from four universities was conducted for data collection. Inductive and deductive qualitative content analysis was applied in analysing the data.

**RESULTS:** The core category was constructed to reflect educators' perception of scenario-based simulation (SBS) as a teaching method for nursing education in HAI prevention and control. This main category included three subcategories: (i) enhancing nursing competence; (ii) preparing students for simulation; and [1] promoting simulation pedagogy competence.



**CONCLUSIONS:** The findings identified the importance and benefits of applying simulation as a teaching method in nursing education. Additionally, it emphasized the necessity of enhancing knowledge associated with HAIs and providing additional training on simulation for educators to improve the quality of conducting simulations.

**KEYWORDS:** Asian Countries; Healthcare-Associated Infection Prevention and Control; Scenario-Based Simulation; Simulation; Teaching Strategy.

## RESUMO

**ENQUADRAMENTO:** A aplicação da simulação no ensino de enfermagem, especialmente na prevenção e controlo de infeções associadas aos cuidados de saúde (IACS), em países em desenvolvimento, tem evidências limitadas. O estudo foi conduzido para explorar as perceções dos educadores sobre a simulação como método de ensino para a formação em enfermagem na prevenção e controlo de IACS em duas universidades vietnamitas e duas universidades cambojanas.

**MÉTODOS:** Foi aplicado um desenho qualitativo exploratório. Um grupo de discussão com 37 educadores de quatro universidades foi conduzido para a recolha de dados. A análise qualitativa de conteúdo indutiva e dedutiva foi aplicada na análise dos dados.

**RESULTADOS:** A categoria central foi construída para refletir a perceção dos educadores sobre a simulação baseada em cenários (SBC) como método de ensino para a formação em enfermagem na prevenção e controlo de IACS. Esta categoria principal incluiu três subcategorias: (i) aprimoramento da competência em enfermagem; (ii) preparação dos estudantes para a simulação; e [1] promoção da competência em pedagogia de simulação.

**CONCLUSÕES:** Os resultados identificaram a importância e benefícios da aplicação da simulação como método de ensino na formação em enfermagem. Além disso, enfatizou a necessidade de aprimorar o conhecimento associado às ICACS e fornecer treinamento adicional sobre simulação para educadores, visando melhorar a qualidade da condução das simulações.

**PALAVRAS-CHAVE:** Estratégia de Ensino; Países Asiáticos; Prevenção e Controlo de Infeções Associadas aos Cuidados de Saúde; Simulação Baseada em Cenários; Simulação.

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## 1. INTRODUCTION

Healthcare-associated infection progress report in 2021, each day, approximately 1 in 31 patients and 1 in 43 nursing home residents developed at least one infection with their healthcare. Most types of HAIs are associated with catheter-associated urinary tract infection, central-line-associated bloodstream infection, surgical site infection, and ventilator-associated pneumonia (VAP) [2]. Evidence-based prevention strategies can reduce HAIs but are insufficiently implemented. Therefore, education is an essential component of infection prevention and control efforts and traditional methods of teaching including lectures, videos, and fact sheets provide some opportunities for hands-on practice. However, with the growing recognition of simulation-based learning in healthcare education, the use of simulation-based learning in HAI prevention adjunct to traditional teaching has highlighted the importance of simulation-based learning as an educational tool in infection prevention and control [3].

Scenario-based simulation (SBS) is an experiential learning method, that comprehensively describes a clinical situation, where students assess the patient, respond to the situation, and evaluate the outcomes. Students can put everything they have been taught into practice, cope with any difficulties and problems and even make mistakes without causing damage all in a safe environment, without any risk to patients [4]. SBS has been used in HAI prevention and control education in areas such as hand hygiene, standard precaution, central line-associated bloodstream infection prevention, catheter-associated urinary tract infection prevention, surgical site infection



prevention and ventilatory-associated pneumonia prevention. According to the results from a review of 27 publication utilized SBS, the results indicated that SBS not only improved learners' sense of competence and confidence but also increased knowledge and compliance in infection prevention leading to decreased HAI rates and reduced healthcare expenditure [5].

Besides that, there is a lot of evidence to indicate the effectiveness of simulation pedagogy in teaching and representing an effective solution for transitioning students from the learning environment to clinical practice. Simulations have strong educational effects on nursing education and assist nursing students in increasing knowledge acquisition and enhancing professional skills, critical thinking, and clinical judgment ability [6]. Simulations also showed the effective method to prepare students' emotions and strong mental by reducing anxiety and increasing self-confidence when compared to traditional teaching methods [7]. Moreover, simulations gave students the possibility to reflect on their learning and competence with their student colleagues [8]. Besides that, a review indicated that scenario-based simulation is a good way to prevent iatrogenic risk related to medical errors [9]. However, the drawback of SBS includes time constraints, lack of technological competency, and workload issue, which can be challenging for nursing faculty [10, 11]. Additionally, it demands an understanding of the process and application of SBSs in practice, and a more standardized approach to the development of simulation scenarios [10].

Some Asian countries are facing challenges in providing high-quality teaching for nursing students including a lack of resources available for students, a lack of computers and internet access, and a scarcity of teachers [12]. Similarly, in Vietnam, there were identified restrictions in clinical practice facilities, where the equipment for nursing practice classes is not adequate for educational needs, lack of teachers, and need to renovate and enhance their teaching competencies, as well as modernize teaching approaches and resources, adapted to training needs [12]. Hereupon, in those countries, there is evident underdevelopment of equipment and pedagogical models that allow the differentiated training of health professionals in the scope of HAI prevention and control. Moreover, its educational approach does not reflect the potential of nursing students to act as future nurses with competencies to deal with and resolve scenarios where unsuitable professional nursing practices may represent a focus of infection with an impact on patient safety and well-being. Therefore, the PrevInf project funded by Erasmus+ was implemented in Asian countries to assist universities in Asian countries in improving nursing students' competencies in HAI-PC by the development of the nursing curriculum, regarding the prevention and control of HAIs, through the provision of pedagogical materials and teaching strategies, such as practice-based Simulation Scenarios, to teachers and nursing students. This paper reports on the implemented piloting PrevInf Simulation scenarios in four universities in Asia to explore educators' perception of the role of simulation scenarios as a new teaching method as well as their suggestions to improve simulation education.

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## **2. MATERIALS AND METHODS**

### **2.1. STUDY DESIGN**

An exploratory qualitative study was conducted and used focus group interviews to explore educators' perceptions of simulation as a teaching method to enhance nursing students' capacity regarding HAI-PC. The study was reported against the 'Consolidated criteria for reporting qualitative research checklist' (COREQ) used to guarantee uniformity in qualitative research.

### **2.2. SETTING**

Two universities in Vietnam and two universities in Cambodia including Haiduong Medical Technical University (HMTU), Namdinh University of Nursing (NDUN), International University [13], and Bolyo Institute (BNI) were chosen for this study following reasons: (1) all four universities participated the "capacitating Asia's Nursing students on innovative and sustainable prevention and control of healthcare-associated infections" project, (2) provided a nursing program for a bachelor's degree, and both countries are in Asia with similar cultures and politics.



### **2.3. PARTICIPANTS**

A purposive sample of at least 10 educators from each university was invited to participate in a focus group following the inclusion criteria: (1) currently working in the university, (2) having at least one year of experience in teaching practice, and (3) having at least a bachelor's degree. Exclusion criteria included educators who were not present at the time of the data collection.

### **2.4. INSTRUMENT**

The eight-question semi-structured interview was used for focus group discussions in a comfortable setting. The interview guide was developed based on a previous literature review from the European PrevInf research partners which focuses on areas including (1) the role of simulation, (2) the process of conducting simulation such as preparing reading materials, orientation, briefing and debriefing, and (3) suggestions to improve simulation. The interview guide was checked and translated by groups of the research team at each university before the actual data collection.

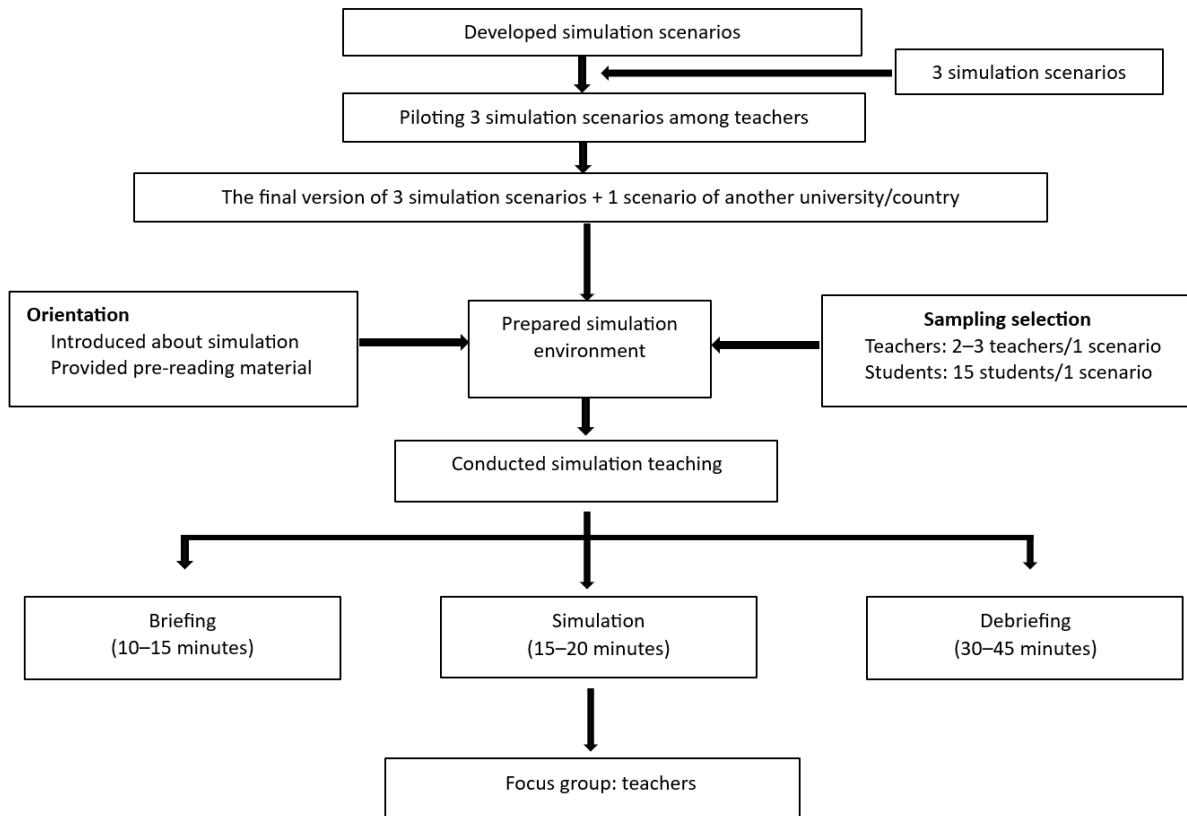
Before starting the data collection, pilot testing of the interview questions was carried out in HMTU. Two nurses who were employed part-time lecturers in the hospital were invited for the pilot interview to detect problems with the wording of instructions, and questions and determine the time involved. Only minor revisions were made to the questions by adding additional explanations before asking educators' perceptions of simulation as a teaching method for nursing education.

### **2.5. DATA COLLECTION**

The process of data collection is described (Figure 1) in the following. Firstly, each university developed three simulation scenarios associated with HAI prevention and control with experts' consultation from European project partners. Secondly, each scenario was piloted among teachers in a research team to test and validate the simulation scenario and minor changes were made. Thirdly, each university used three scenarios from its own developed, supported by teachers at the European PrevInf partners, and picked one more scenario from other partner universities to pilot among nursing students. Fourthly, to prepare for the simulation and select participants, the research teams of each Asian university prepared a simulation and invited target participants to attend the simulations. Each simulation was run for around 2 hours with three sections including briefing, simulation action and debriefing. Teachers were invited to participate in the discussion group at the end of each piloted simulation.



**FIGURE 1:** Process of data collection.



The focus groups were conducted at locations that were regularly used for meetings. At the beginning of the focus group, a brief orientation was provided about the purpose of the study, the topic of the discussion, asking permission for the recording of the discussion, and the right to decline to answer questions at any time during the study. Participants were invited to sign a consent form after an opportunity to ask further questions. Each focus group included one moderator and one facilitator from the research team to lead the discussion. The focus groups lasted 60–90 minutes.

Participants discussed their perceptions of how simulation improves HAI teaching and what kind of challenges it may arise. Moreover, they suggested implementing SBS as a teaching method to enhance nursing students’ capacity regarding HAI-PC.

**2.6. DATA ANALYSIS**

Data from the focus groups were transcribed verbatim by the Asian research teams. Transcriptions were carried out progressively as each focus group was completed. The transcripts were compared with audio recordings to ensure accuracy. Both inductive and deductive qualitative content analysis were used to analyse the qualitative data from the focus groups. The inductive qualitative content analysis developed by Elo and Kyngäs [14] was used to analyse the focus group data from HMTU University first. This process of data analysis includes three phases: preparation, organizing and reporting. Regarding the preparation phase, data from the first focus group was read and reread several times to understand the meaning and then the participants’ statements were divided into meaning units. This included all words, nouns, phrases, sentences, or even the portion of pages related to simulation. Each of the responses was read to highlight exact words, phrases, or ideas that captured units of information. The process of the organizing phase included open coding, creating categories, and abstraction. For the open coding, notes and headings were written in the text while reading it. Each data segment was reread through, and coded, and the code

entered on the left-hand margin opposite the transcribed interview to describe all aspects of the content. The headings were collected from the margins and put into coding sheets and sub-categories were freely generated at this stage. After open coding, the lists of sub-categories were grouped under higher-order headings. Sub-categories with similar events and incidents were then grouped into categories to provide a means of describing the phenomenon. Each category was named using content-characteristic words. An example of coding is provided in Table 1 below.

**TABLE 1:** Coding example.

TRANSCRIPTION	OPEN CODING	SUB-CATEGORIES	MAIN CATEGORY
<i>'Simulation creates a safe environment for the student to practice and let students make mistakes without harm to real patients.'</i>	Safe environment Let students make mistakes, without harm to patients	Empowering confidence in nursing care	Enhancing nursing competence
<i>'Simulation assists students in reinforcing comprehensive knowledge and practice of infection and prevention control as well as other nursing skills such as communication and critical thinking skills.'</i>	Reinforcing comprehensive knowledge and practice	Integrating theory and practice	

Regarding applying the deductive content analysis method, once the structure of categories and subcategories emerged from the HMTU team. Then it was sent to the rest of the HMTU research team to double-check with the transcript. After the structure of categories and subcategories were approved by HMTU team, then it was sent to the Asian partner universities to use the structure of categories and subcategories to analyse the data they had collected.

### 2.7. VALIDITY, RELIABILITY, AND RIGOUR

To increase the rigor of the qualitative data analysis, the identified categories, and sub-categories in the two transcripts were discussed with the other researchers in the HMTU research team and were further refined. These were rechecked categories. Once the researchers had agreed on the categories and subcategories, the first author sent the structure of analysis to another university to analyse the remaining transcripts from three other universities. Any inconsistencies were discussed between authors until a consensus was reached. In addition, to overcome challenges to rigour in reporting qualitative studies, the use of COREQ composed of a 32-item checklist (Supporting information Appendix 1) provided a framework for explicit and comprehensive reporting.

### 2.8. ETHICAL APPROVAL

Ethical approval for the study was obtained from the Institutional Review Board of Asian partner universities. The research proposal was also approved by the Ethics Committee of the Health Sciences Research Unit: Nursing of the Nursing School of Coimbra with number P761-3/2021. Informed consent was obtained to ensure that the subjects voluntarily participated in this study. The participants in the study were provided with full information about the study including the purpose, research methods, and their right to withdraw from the study at any time without consequences.

## 3. RESULTS

### Participants' demographic

Forty educators from four universities in Asian countries (Vietnam and Cambodia) were invited to participate in the study, and 37 of them were recruited. The mean age of the participants was 39.5, and around 70.3% of them were nursing teachers. Most participants had master's degrees 62.2%. The mean experience in teaching was 11 years, and the mean professional experience was 13 years (Table 2).



**TABLE 2:** Participant demographic characteristics (n = 37).

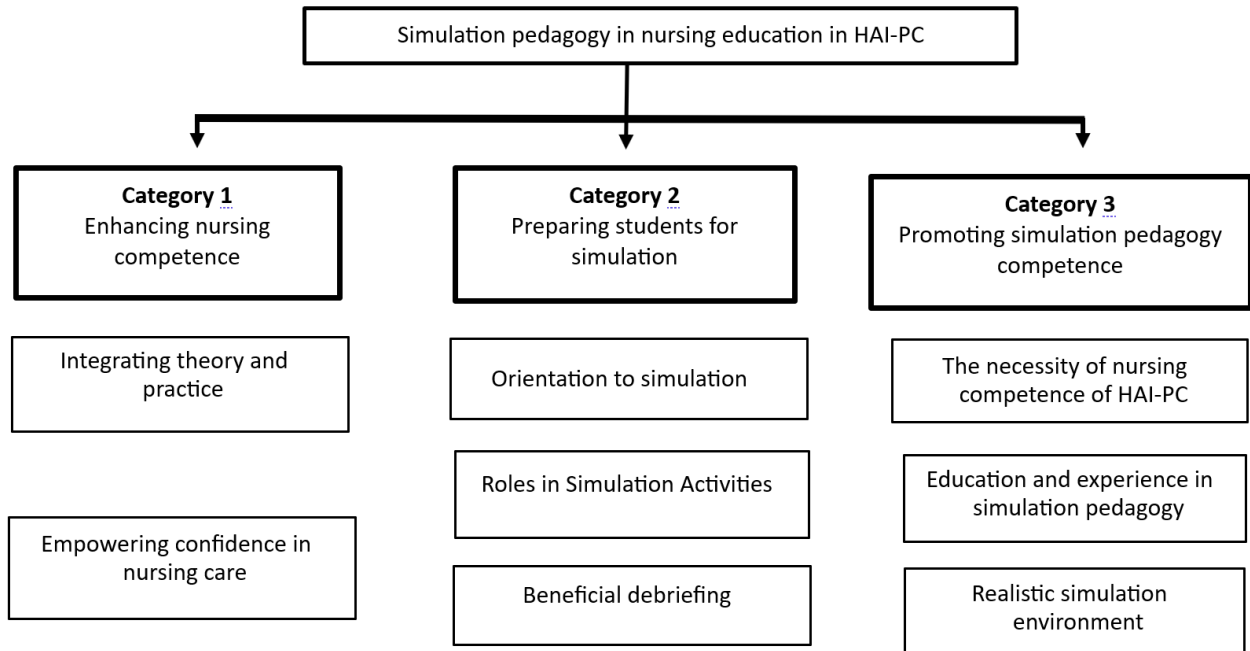
EDUCATORS' CHARACTERISTICS	VALUE	NUMBER (N)	PERCENTAGE (%)
Gender	Male	16	43.2
	Female	21	66.8
Professional background	Nursing teacher	26	70.3
	Physician	10	27.0
	Physiotherapist	1	2.7
Highest qualification	Professor	1	2.7
	Assist. Professor	1	2.7
	PhD degree	1	2.7
	Master's degree	23	62.2
	Medical doctor degree	5	13.5
	Bachelor's degree	7	18.2
Universities	HMTU	11	29.7
	NDUN	10	27.1
	BNI	8	21.6
	IU	8	21.6
Teaching courses	Fundamental of Nursing, Adult Nursing, Community Health, Fundamental Nursing, Nursing Research, Statistics, Nursing Theory, Nursing Ethics, Nursing Process, Medical Terminology, Anatomy and Physiology.		
		Mean (SD)	
Age (years)		39.5 (11.8)	
Professional experience (years)		13 (8.7)	
Experience in teaching (years)		11 (8.5)	

Three major categories emerged from the data: (1) Enhancing nursing competence; (2) Preparing students for simulation; and (3) Promoting simulation pedagogy competency (Figure 2).





FIGURE 2: The major categories and sub-categories.



### 3.1. ENHANCING NURSING COMPETENCE

The category enhancing nursing competence was associated with the role of simulation as a teaching method to support nursing students to foster their knowledge and skills associated with HAI-PC. The main category was made based on the subcategories: integrating theory and practice and empowering confidence in nursing care.

**Integrating theory and practice** was an important result of simulation pedagogy. Simulation assisted students in learning theory based before simulation and thereafter to apply the knowledge in practice caring for patients in the scenarios. Simulation made theory and practice integration possible not only in general knowledge but also assisted students in improving knowledge associated with HAI prevention and control. The teacher was needed to point out the connections between previously learned knowledge, maybe to repeat them for this scenario and to take it into the current caring situation. That is how integrating theory and practice in simulations also fostered the redevelopment of competence and assisted students reflectively in progress in their studies.

*‘Lecturer competency plays an important role in integrating the strategy from theory into practice during the HAIs simulation’. (BNI)*

*‘Simulation assists students in reinforcing comprehensive knowledge and practice of infection and prevention control as well as other nursing skills such as communication and critical thinking skills’. (HMTU)*

*‘Applying simulation will help the student to improve their clinical intervention in a real practice including communication, observation, and technical skills’. (BNI)*

**Empowering confidence in nursing care** was described, as in one simulation the students were able to practice a variety of nursing skills leading to better care in a clinical setting. The association between learning in simulation and future patient safety was pointed out to emphasize the importance of scenario-based simulation. Providing a safe environment for learning in simulation created a possibility for students to gain confidence. Such a safe learning environment, where students could practice with sufficient orientation and not have to hurry at all times was pleasant. Moreover, it is comprised of a comfortable and acceptive atmosphere for having even possibility to make unintentional mistakes without harming the real patients.



*'Applying simulation scenarios will help students learn how to handle a specific situation by combining different skills to solve problems. This will be beneficial for students when taking care of real patients in clinical practice by reducing errors.'* (HMTU)

*'Teachers create a comfortable atmosphere so that students can freely express all their difficulties and questions as well as reduce mistakes by learning from their peers.'* (IU)

### 3.2. PREPARING STUDENTS FOR SIMULATION

This category focused on nursing teachers' points of view of preparing students for simulation. This category is discussed under the following sub-categories: orientation to simulation, roles in simulation activities and beneficial debriefing.

**Orientation to simulation**, which started in the theory classes by providing supportive pre-reading materials to students to read at home before attending the simulation. Pre-reading materials were necessary for students because those provided the most important content of the simulation and assisted students in understanding how they needed to be prepared for attending the simulation. However, lecturers shared challenges associated with taking time and effort to prepare pre-reading materials.

*'Pre-reading materials are necessary for guiding the students before conducting the simulation scenario.'* (IU)

*'Pre-reading material helps students consolidate their knowledge and prepare well before performing the simulation.'* (NDUN)

At the beginning of the simulation, the pre-simulation orientation assisted students in understanding the specific objective of the scenario and guided them through the process of applying previous knowledge and skills in the decision-making process. Lecturers expressed their perceptions on the role of orientation as an important step in conducting effective simulation.

*'The clear and specific orientation of lecturers helps students understand the purpose and objectives of the simulation session.'* (NDUN)

*'Orientations are also necessary for students to better understand the task when performing simulation activities (actors, observers, etc.)' and must be provided as essential and compulsorily for starting the simulation.'* (IU)

To give an effective orientation, teachers suggested using a video to help students understand the simulation more easily as a new teaching method.

*'Teachers can show samples of applying simulation as new teaching by providing a video for students so that they can easier imagine the role of each member in the simulation.'* (HMTU)

**Roles in Simulation Activities.** Students acting as actors or observers assisted them in gaining knowledge and skills associated with HAIs, like hand hygiene and waste disposal. Teachers also noted that students are not only learning when acting as actors, simulation assists students' learning when acting as observers too. Simulation also allowed students to adapt individual learning processes.

*'With a role as actors, students can better understand infection control such as when to wash hands, how to separate waste, how requirements are disposed of...'*(HMTU)



'Students acting as observe, gain experience, and knowledge from observing actors, and discussing deeper at the end of the simulation to get better understand'. (HMTU)

**Beneficial debriefing.** The educator expressed the importance of conducting a debriefing after the simulation. They also expressed their concern regarding the challenges to leading debriefing effectively and not failing the debriefing by focusing on criticizing students' errors or mistakes.

*'Debriefing section provides opportunities for students to reflect on what has been done and learning with each other'. (NDUN)*

*'Debriefing helps students consolidate their knowledge and correct their mistakes'. (HMTU)*

On the other hand, debriefing was the challenging part when conducting SBS because it not only required-lecturers with knowledge and skills related to the topic but also a variety of management skills to conduct an effective SBS.

*'It is hard to provide a successful debriefing ... and manage time and discussion. Otherwise, they may focus on criticizing the mistakes that students have made rather than focusing on helping students' learning to achieve the objective'. (BNI)*

Therefore, a participant from HMTU gave suggestions for lecturers to conduct a debriefing by preparing skills to summarise and lead effective debriefing.

*'Lectures need to have skills such as time management, ability to observe students progression and to make a summary of the key knowledge. They also need to be able to assist students to form a unified comprehension of the scenario to do better the next time'. (HMTU)*

### 3.3. PROMOTING SIMULATION PEDAGOGY COMPETENCE

This category relates to educators' suggestions for the improvement of simulation. It indicated that strengthening knowledge associated with HAI-PC and receiving more simulation training, especially on writing scenarios and debriefing, is essential for educators to be confident and provide effective simulations. Also, the improvement of the environmental setting needs to be paid attention to create a realistic environment for students to practice. Three subcategories were presented including the necessity of nursing competence of HAI-PC, education and experience in simulation pedagogy and realistic simulation environment.

**The necessity nursing competence of HAI-PC.** Many participants expressed the essence of having knowledge and skills related to HAI-PC to be able to write clinical situations close to real. Besides that, participants also considered updating knowledge associated with HAI-PC between international and national guidelines should be integrated. For example, an educator pointed out,

*'Strengthening capacity regarding the core competency of HAI-PC is essential to receive more up-to-date knowledge'. (BNI)*

*'Information provided for students should consider the local context which means the combination between international standard clinical practice (CPG) and national guideline'. (IU)*

**Education and experience in simulation pedagogy:** This subcategory referred to educators' views on their competence in conducting simulation and their need to improve their teaching methods. Many participants expressed their worries about conducting the simulation those concerns included writing scenarios, setting up the simulation environment, using models, and managing and guiding the debriefing discussion.



*'I am not confident when implementing the simulation steps, especially the stage of the ongoing situation and the debriefing after the situation'. (NDUN)*

Educators also expressed their concern about writing simulation scenarios.

*'Writing real clinical scenarios, from basic to advanced, suitable to the level of students and modules are necessary'. (IU)*

*'Person acting as the patient in the simulation needs to be trained to act similar to clinical reality so that students can develop critical thinking and other skills such as communication skills'. (HMTU)*

Therefore, suggestions to improve the simulation also were provided among participants.

*'Need to be trained in developing simulation scenarios for infection prevention and control so that lecturers can master the scenario'. (NDUN)*

**Realistic simulation environment.** Making a realistic simulation environment refers to preparing the simulation environment as authentic as in the healthcare units to assist students in getting used to clinical practice. Educators expressed their concerns about the need to develop a more realistic environment for the simulation because the current settings did not meet the requirements yet:

*'Simulation room is still not suitable yet. It needs to be fully equipped like hospital environment to help students feel like the real hospital'. (HMTU)*

*'Effective environment learning including convenience simulation room will provide the more competency among the mentor and lecturer'. (BNI)*

#### 4. DISCUSSION

This study aimed to explore educators' perceptions of simulation as a teaching method for nursing education in HAI prevention and control in four Asian universities. The findings indicate that educators perceived simulation as a relevant pedagogic method to be valuable for supporting the nursing students' learning and building their HAI-PC competencies. This is in accordance with previous studies from both high-income [15] and low-income countries [16]. The WHO has also indicated that health education institutions should utilize simulation in the education of health professionals because it is a highly valuable pedagogical tool for training nurses and midwives [3].

The benefits of the SBS were acknowledged by educators in this study and were viewed as a great learning method for students to integrate theory into practice and empower students' confidence in providing patient care. These findings correlate with several studies that demonstrated the benefits of using simulation to improve study learning [17] [5]. Previous studies have shown the effectiveness of simulations in teaching and solution for transitioning students from the university learning environment to clinical practice. A study indicated that simulations brought strong effects in nursing education and assisted students in increasing knowledge acquisition and enhancing professional skills, critical thinking, and clinical judgement ability [6]. Other studies indicated that simulation-based training not only improved learners' sense of competence and confidence but also increased knowledge and compliance in infection prevention and control leading to decreased HAI rates and reduced healthcare expenditure [5]. Moreover, simulation give students the possibility to reflect on their learning and competence with their student colleagues [8]. However, the drawback of SBS included time constraints, lack of technological competency, and workload issue, which can be challenging for nursing faculty [10, 11]. Further, it demands an understanding of the process and application of SBLs in practice, and a more standardized approach to the development of simulation scenarios [10].

The educators highlighted one of the essential steps for an effective simulation the pre-simulation orientation to guide students through the process of applying previous knowledge and skills to simulation, which is in line with other study [18]. An orientation session should be held before the simulation to familiarize students with learning objectives, ground rules, role assignments, equipment and simulation modality to be used [19, 20], because orientation also assist students to promote self-confidence and provide a calm environment to practice [18]. Therefore, the INACSL Standards Committee recommended a checklist for educators to use as a guideline for preparing students for orientation to the simulation. Videos provide consistency in the orientation process and an opportunity for students and teachers review as necessary [21]. Further findings suggest that providing material and resources before the simulation promotes students' ability to be successful in addressing the simulation objectives. Educators should need to insist students to complete preparation activities in advance of the simulation [21]. These recommendations corresponded with the suggestions from educators in the current study.

In the present study, educators involved in simulations were seen as equally influential in the learning process, regardless of whether they took on observational roles or actively participated hands on. These findings correspond with a systematic review of learners who valued observer roles because they had an over overarching view, examination of details from a distance, and meaningful feedback during debriefing [22]. This can be explained by Bandura's social learning theory, which proposes that virtually all learning acquired experientially can also be acquired as vicarious learner[23]. Through observation, learners can build behaviours without trial and error, but experience emotions by watching and resolve fears through other's experiences. Bethards [2014] similarly reports that this provides all learners, regardless of their roles, the same opportunities to achieve the learning objectives [24]. However, the learners who did not value observer roles as highly as a hands-on role described observer roles as passive, or boring because they were not fully engaged in the learning process [25]. Emotional engagement in simulation is connected to the feeling of relevance of the scenario to the goals of the simulation. Lack of guidance for the observer role tasks may have prevented observer engagement [22, 26]. Learners who valued observer roles described it as being less stressful and providing them the opportunity to see the big picture, examine details from a distance, and provide meaningful feedback to the team [22].

Debriefing is the "heart and soul" of the simulation experience [27]. For this study, debriefing was experienced by educators just an important section when conducting simulation because after the simulation it helped students to understand the key competence applied in the simulation, to improve for the next simulation. However, educators in this current study also expressed their concern regarding the challenges of how to guide an effective debriefing. In line with Secheresse, Lima [28], the debriefing technique should be adapted to the objectives of the training and learners previous competence [28]. In line with a previous study, World Health Organization [3] stated that debriefing needs to be conducted in a non-judgmental manner, the facilitator must discuss positive aspects observed during simulation and areas that need improvement.

In agreement with prior studies, the findings of the current study also highlighted the need for improvement in conducting SBS in Asian countries including having knowledge and skills related to HAI-PC, feeling less confident in simulation, and needing more education and experience in simulation pedagogy. Additionally, there is a need for realistic simulation environment. Similar to these results, a prior study suggested that educators using SBS lacked confidence in their proficiency with simulation pedagogy. By comparison, educators who used SBS more frequently in the past 12 months showed stronger self-confidence. Educators would gain confidence with the increased use of simulation [30]. The literature proposes that persistent deliberate practice is an efficient way to develop necessary simulation teaching skills [31]. Some researchers suggested that preferred strategies to develop simulation guidance competencies are observing skilled instructors' simulation teaching and understanding simulation through trial and error [32] and practicing simulation teaching in a safe and simulated educational environment with feedback from



experienced simulation facilitators [13]. Some emphasize that an overall training program of SBS may promote the competencies of nursing educators [31].

This current study also highlights the importance of setting up a realistic simulation environment, which is in line with a study indicating that SBL needs to use real medical equipment and supplies. This implies that institutions need to procure medical equipment and supplies to ensure realism during simulation. Equipment requires regular maintenance and servicing, faculty members need ongoing training in simulation techniques, and there is a continuous need for administrative and technical support for simulation facilitators. All these actions require financial resources [33]. Additionally, if the simulation lacks realism and is very different from what students see in real clinical practice. Earlier studies have already shown, that students had negative feelings for simulation because lack of realism [34, 35]. Although it is not always possible to create scenarios that are totally equal to the reality, the educators should focus on creating simulation scenarios that represent an approximation to reality. SBS, without any doubt, has proven to be highly favourable, optimizing the teaching, learning and assessment processes in higher education.

## 5. CONCLUSION

This study provides knowledge and insight into educators' perception of scenario-based simulation as a new pedagogy method in Asian countries. Overall, the educators expressed the importance and benefits of using simulations for students as it improved students' competence and prepared them for professional practice. However, the educators emphasized the need to improve nursing knowledge of HAI-PC and training in simulation pedagogy to ensure high-quality education in low-resource settings. Further research is necessary to explore whether educators can apply effective simulation in teaching.

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