Original Article

Positive Impact on Critical Care Knowledge Acquisition and Skills of Vietnamese Nurses through an Online Standardized Training Program

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Abstract

Background: Improved access to healthcare, increasing elderly population, growing incidence of chronic diseases, combined with the high prevalence of accidents and infectious diseases are driving the demand for critical care services in acute hospitals. However, low and middle-income countries not only have a shortage of critical care nurses, but there are also gaps in their graduate, post-graduate, and specialized training as well as in their continuing education to support them in their role.

Methods: This quality improvement project aimed to assess the effect of a web-based group study program on knowledge acquisition and skills and competency development of critical care nurses at seven private,not-for-profit hospital sites within a hospital system in Vietnam. The Essentials of Critical Care Orientation 4.0 course from the American Association of Critical Care Nurses was delivered to two cohorts of ICU nurses who worked in critical care. Course content was translated in Vietnamese. The program leveraged a preceptor-facilitator-learner model that depended on group discussions and self-learning. Program effectiveness was evaluated using quantitative pre- and post-test design, combined with a post-program survey.

Results: Average post-test scores of the first cohort increased by 34.0% over pre-test while those of the second cohort increased by an average 41.0%. Post-program survey revealed that all learners were satisfied with the quality of content, the web-based delivery system, content translation and the overall teaching methodology. Learners also demonstrated greater confidence in delivering safe, proactive patient care.

Conclusion: The utilization of an online, standardized western education program, translated to Vietnamese, delivered through a facilitator-group learning model is successful in increasing the knowledge level of Vietnamize critical care nurses.

Keywords: Critical care, nursing, Vietnam, Continuing Professional Development

Introduction

Demand for healthcare services is rapidly increasing across low-to-middle income countries due to the burden of chronic and infectious diseases, better access to and spending on healthcare, and a growing elderly population. As a result, demand

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for critical care services is also expected to increase in these countries; however, dearth of trained and specialized critical care teams is a key reason for poor patient outcomes. The global burden of critical care is estimated based on morbidity and mortality in the Intensive Care Unit (ICU)[1]. Sepsis is a common complication in the ICU and southeast Asian countries have a relatively higher burden of it. Also, patients from low and lower-middle income countries have a higher risk of in-hospital death compared to high-income countries[1,2]. Nurses are a crucial component of the critical care team. Research covering various hospital departments across 9 European countries indicates a strong inverse correlation between patient mortality and optimum nurse staffing and education, with the outcome for a hospital significantly improving with a greater number of nurses with a bachelor's degree[3].In comparison, a scoping review by Macey et. al. suggested that middle-income countries had limited critical care nurses (CCNs) with post-basic training, while low-income countries had none[4]. The study observed that nurses from various other specialties including pre-registration student nurses supported critical care in low- and middle-income countries. Shortage of trained nurses creates the need forcontinuing professional education (CPD) to develop knowledge and skills to support critical care.

In Vietnam nursing was established as a professional practice as recently as 1990[5]. Literature describing organized training for CCNs in Vietnam is sparse. To the best of the author's knowledge, bulk of the training comprises on-the-job learning, shadowing, experiential learning, and yearly reviews of a few CCN competencies created by individuals or specific groups within hospitals. Consequently, CPD is vital for CCNs to provide safe, standardized, and effective patient care[6]. Traditional CPD methods, such as, attending conferences and workshops, are expensive, time consuming and logistically complex[7]. Vietnam has the added language barrier whereof very few nurses speak and understand English. CPD courses need to be developed and delivered in Vietnamese to cater to the local nurses. As with any health system, Vietnamese nurses are overworked and have little time to invest in their learning and development during work hours.

Online CPD programs address these challenges by allowing nurses the flexibility to learn in their own time and pace while relieving cost and resource pressures associated with delivering these programs in person[7]. Online programs are also easier to scale up and can support access outside the work environment and on multiple devices, including personal computers and smartphones. Language, however, persists as an unaddressed challenge as the courses are usually offered in English.

Research shows that educational programs focused on the adult learners that are engaging, relatable, active, shared and learner-owned result in better learning outcomes[8]. We hypothesized that using online, self-paced programs and their application in daily practice, delivered through a group-learning model in local language will help improve knowledge retention for the nurses. Group learning and concomitant on-the-job application could help develop critical thinking, articulation, self-management, and leadership skills as well.

The AACN Essentials of Critical Care Orientation 4.0 (ECCO 4.0) from the American Association of Critical-Care Nurses (AACN)[9]is an internationally certified program that offers a comprehensive curriculum to equip nurses with the essential skills and knowledge needed to provide optimal care in critical care settings. It contains 18 modules covering 72 lessons. Course content is delivered over the Elsevier Performance Management (EPM) software platform.

In this quality improvement program, a private Vietnamese hospital group with 7 sites invited a US-based CCN consultant to address nurse knowledge and skills development by implementing sustainable strategies to improve overall critical care knowledge. The purpose of the quality improvement project was to determine the feasibility and effectiveness of a western-oriented, online critical care learning course with primarily non-English speaking CCNs at the hospital system; and establish the effectiveness of this learning methodology on the nurses' learning outcomes.

Methodology

Pilot: To evaluate the feasibility of the program, we selected 5 lessons from Cardiovascular Part 1 of AACN ECCO 4.0 for 5 nurses to review. The nurse with the highest score in the International English Language Testing System (IELTS) exam was designated as the facilitator while the remaining 4 nurses were designated as learners. Th facilitator was coached by the consultant. Facilitator coaching focused on ensuring complete engagement between the nurses and the content. By the fourth lesson, coaching was not required.

AACN ECCO 4.0 content was translated by the facilitator with support from a learner with strong English skills. The translated lesson was sent to the remaining learners to review on their own for 1 week via the EPM and then test their knowledge through the platform itself. After approximately 1 week, a group lesson was conducted by the facilitator and coached by the consultant.

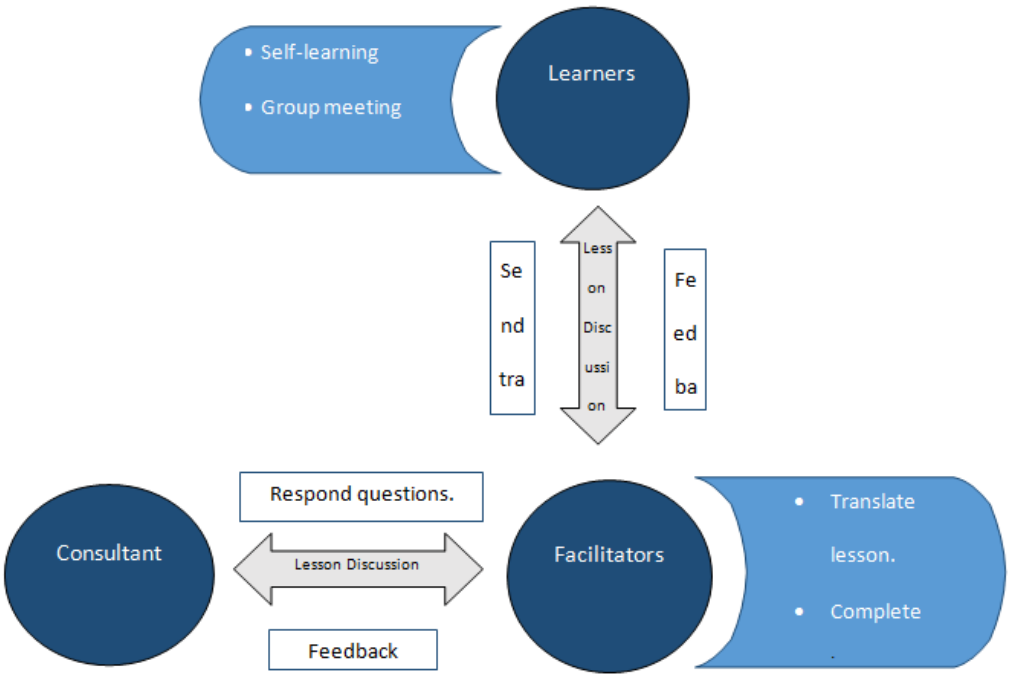
Pilot nurses' post test scores averaged 85%, which was above the target score of 80%, along with favorable feedback on the system. The successful pilot led to organizational commitment to launch the program with 50 nurses.

Cohort 1: Executed from January 2022 to January 2023, the program started with a pre-test of a hundred multiple-choice questions on basic knowledge in critical careby50 critical care nurses from across the hospital system. A test blueprint was created to ensure questions covered all areas of critical care nursing. A selection of 17 modules covering70 lessons from AACN ECCO 4.0 was chosen to match the learning needs and practice requirements for critical care in the health system based on the pre-test results. Because the largest hospital in the system performed cardiac surgery, nurses at that facility were assigned an additional module containing three lessons to coverc are of the cardiac surgery patient. The cohort of 50 nurses was divided into 10 groups, each with 4 learners and 1 facilitator. Facilitator nurses were selected based on their pre-test scores, willingness to participate and English skills. All the nurses were given a virtual tour of EPM so that they could easily access and complete the lessons assigned to them in their personal accounts.

A full-year calendar outlined the schedule for lesson translation, facilitators-consultant group meetings, facilitator-learner group discussions for each group, and lesson completion (See figure 1). The facilitators received a 2-hour education session on adult learning and group learning strategies by the consultant. Facilitators with good English skills were paired with facilitators with lessor English skills to translate the lessons. The consultant met with the facilitators weekly to review the upcoming lesson, and to address any concerns, ensure clarity, share cases, and impart any additional knowledge to improve understanding of the lesson and unit practice. The facilitators' role, in turn, was to support learners with lesson completion, answer their questions and conduct virtual group discussions to further reinforce and/or enhance the learnings. The process occurred as follow:

- Key learnings from the lessons and some of the lesson content were translated by the facilitators.
- The translated lessons were sent to the learners one week at a time to review on their own and test their knowledge within EPM.
- The consultant met with the facilitators virtually to discuss and debate the content before the latters' group meetings.
- The facilitators then conducted group discussions via Microsoft TEAMS with learners in their groups approximately1 week after the learners had received their lesson.

At the end of 16 modules 37 learners and 10 facilitators took the post-test. They were also sent a program feedback survey and 47 nurses responded to it. 3 learners did not complete the program as they left the health system.



Cohort 2 –Executed in the same format as Cohort 1 from May 2023 to April 2024, cohort 2 included 42 learners and 8 facilitators returning from cohort 1, divided into 8 groups. The overall teaching methodology was the same as cohort 1. However, cohort 2 was assigned 16 modules containing 64 lessons to better match the precise knowledge needs of the health system. Nurses involved in the care of cardiac surgery patients had the additional module as before. Pre- and post-test were conducted as before. A program feedback survey was also rolled out, but the questions and the platform used were different from cohort 1.

Results

Cohort 1 –37 nurse learners, guided by 10 facilitators, completed the program covering 17 modules, which included 70 lessons, over 13 months. A summary of pre- and post-test scores was tabulated as per Table 1 and indicateda 34%increase in average group score after completing the course. Also, the range of scores consolidated and the median score improved from 55.5% in pre-test to 85.50% in post-test. Cohort 1 was also prescribed a repeat test in the same format 1 year after program completion. Group average test score in the repeat test was 86.6%.

Table 1: Summary of pre-, post- and repeat test scores of cohort 1

	Pre-Test n=50	**Post-Test n=47**	**Repeat Test n=44**
Range of Scores	20% - 91%	75% - 96%	76% - 100%
Group Average	63.1%	85.0%	86.6%

All respondents of the program feedback survey were satisfied with the quality, depth and range of content provided under the AACN ECCO 4.0 course. They were also satisfied with the tests included within the lesson content. Respondents rated the ability to access content and the ability to review it in their own time favorably.

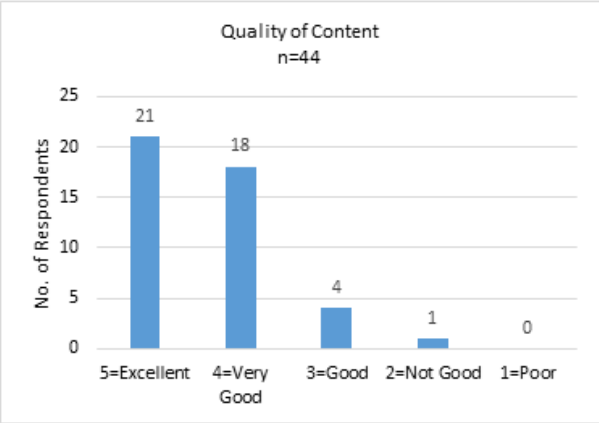


Figure 2: Cohort 1 feedback on quality of content

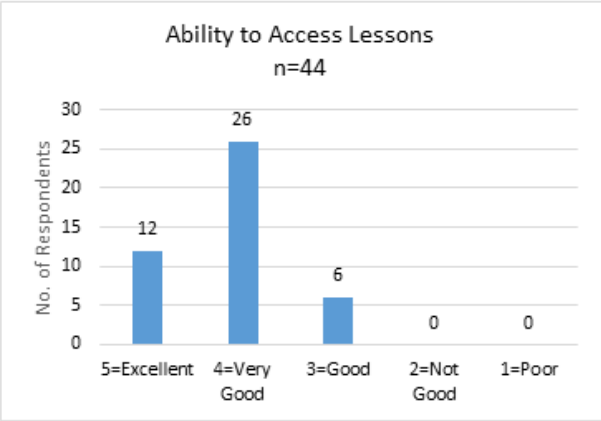


Figure 3: Cohort 1 feedback on the ability to access the lessons

Majority of the respondents found the English-to-Vietnamese lesson translation helpful in understanding and learning the concepts better. All respondents stated that the group discussions and their participation in the discussions positively impacted their understanding and learning.

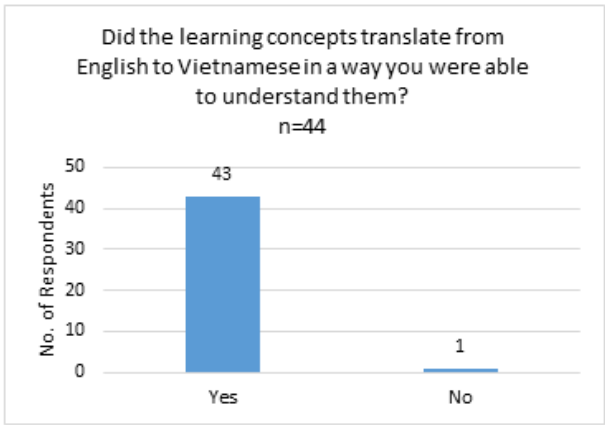


Figure 4: Cohort 1 feedback on language translation

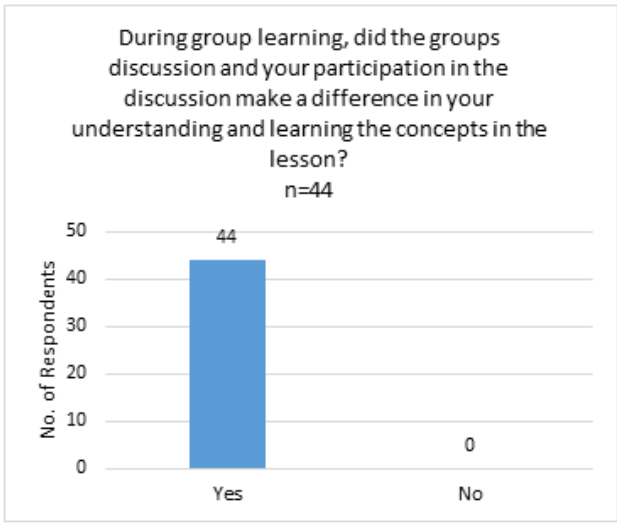


Figure 5: Cohort 1 feedback on group discussions

The feedback survey included questions on the respondent's perceptions of the impact on their day-to-day practice. On a 5-point scale, 33 respondents rated the probability of them recognizing a change in their patient's condition as "Very High" or "High" while 31 rated the probability of intervening appropriately in response to a change in the patient's condition as "Very High" or "High". 31 respondents rated the probability of advocating on the patient's behalf to the care team as "Very High" or "High". 35 respondents rated the probability of being able to provide safe patient care as "Very High or High".

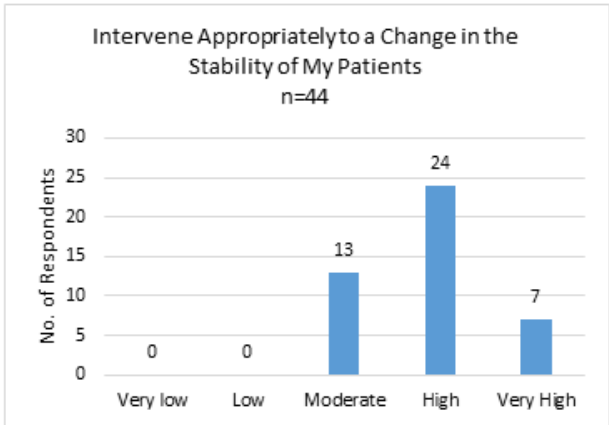


Figure 6: Cohort 1 feedback on the course impact on appropriately intervening in response to changes in patient condition

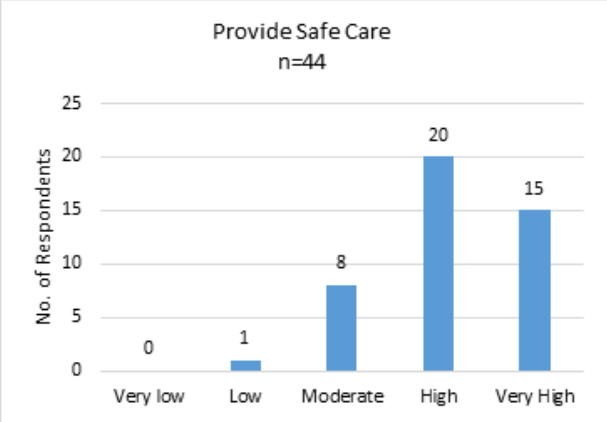


Figure 7: Cohort 1 feedback on the course impact on the nurses' confidence in providing safe patient care

Cohort 2–The program was completed by 41 learners and 8 facilitators over 12 months.1 learner dropped out from the program. The learners completed 16 modules, covering 64 lessons. Cohort 2 pre-test scores averaged 60.6% while post-test score averaged 85.6%, a 41.0% increase. The program feedback survey was modified and disseminated over a different platform for cohort 2.37 nurse learners and 2 facilitators responded to the program feedback survey. All 39 respondents were satisfied with the course content and EPM. The majority of nurses in cohort 2 rated accessibility and ease of review of lessons as "Excellent" or "Good". 38 respondents found the course content appropriate for their learning needs and practice. 30 nurses found it convenient to continue learning in their own time and place. 35 respondents perceived their interventions were more suitable for their patients after going through the course while 38 respondents felt more confident about providing safer care.

Discussion

Critical care services in Vietnam suffer from a shortage of trained, specialized nurses. Continuous professional development of nurses in practice is crucial to ensure high quality, evidence-based patient care. Our aim was to demonstrate the impact of a web-based western-oriented learning program, delivered through a preceptor-facilitator-group learning model, on the knowledge and skills of Vietnamese critical care nurses. The increase in average test scores in pre- and post-tests of 34.0% for cohort 1 and 41.0% for cohort 2 demonstrates the positive impact on nurses' knowledge and skills from the AACN ECCO 4.0 course. Moreover, group average test score of 86.6% in the repeat test for cohort 1 indicates knowledge retention over a period of time.

Prior to this initiative the healthcare system with the 7 hospitals had no organized critical care orientation or education process to develop the knowledge and skills of CCNs. It depended on experienced CCNs with a few years in practice to provide teaching at the bedside and basic competency assessments conducted sometimes with difficulty due to manpower crunch. There was no didactic component to CCN orientation or education. Moreover, education was provided without testing or application strategies. Most nurses had an IELTS scores less than 4.5. Therefore, language created barriers to using didactic education from English speaking experts and this was also recognized as an unsustainable model from experience.

Sari et. al pointed to several challenges associated with CPD that can be addressed through online platforms, such as, time, resources and costs tied into a CPD program, accessibility of the program to all nurses, time required by nurses to complete the learning, and language barriers[7]. Our teaching methodology addressed all these challenges as reflected in the survey feedback. The EPM system allows the preceptor and facilitator to customize the structure and pace of the program to the nurses' needs. Through EPM, learners were able to access lessons digitally from a setting of their choice and were able to complete the lessons through self-learning. Vietnamese translation of the content is effective as it helps improve lesson understanding while the facilitator-led group discussions further augment nurses' understanding and learning of the concepts. Delivering an internationally recognized, peer-reviewed course like AACN ECCO 4.0 helps elevate the hospital's reputation as a care provider that meets global standards and practices evidence-based healthcare.

Hamill et. al demonstrate that a standardized professional development course in critical care conducted for multidisciplinary teams comprising nurses, clinicians and other healthcare professionals improves the participants' confidence in identification and management of critical illnesses[10]. Our study

shows similar results wherein nurses felt they were able to recognize better and intervene more appropriately to a change in a patient's condition after completing the course; they were more confident about advocating on behalf of their patients to other care team members and felt more confident about providing safe patient care.

Success of the first cohort of nurses who completed the AACN ECCO 4.0 course delivered over EPM led the management of the health system to approve investment in the second cohort. The second cohort was an opportunity for the team to refine the lesson selection and the calendar so that learners could be more efficient and targeted in their learning. The teaching methodology created in this study, whereby, an international consultant, proficient in English and well-versed in globally recognized critical care best practices and the AACN ECCO 4.0 course trains facilitators, who in turn conduct translation, training and group discussions to support local nurses depends significantly on people's availability and willingness. In our study, 3 learners from the first cohort and 1 from the second cohort voluntarily dropped out of the program due to changes in their work and/or personal environment. All nurses along with the management documented their commitment to the program at the initiation of each cohort. These are important considerations when selecting a CPD program and its participants. Without firm commitment from the learners, facilitators and the hospital management, neither could our CPD program have been completed, nor would it have generated the positive learning outcomes observed here.

An indirect outcome of the first cohort was that a few of the facilitators went on to become unit-based educators for the intensive care units (ICUs). They are currently assisting in developing an ICU orientation program, offering continuing growth and development for the ICU nurses. Institutionalizing evidence-based practice and improving patient outcomes is the key reason for investment in healthcare workforce training and development. Our sustainable model of nurse CPD ensures continuity of workforce training and development.

Limitations

The study demonstrates increased subject knowledge, and greater confidence in practice for nurses, however, we do not have sufficient data to correlate this with direct improvements in patient outcomes. Post-program feedback survey questions and the survey dissemination platform were different between the two cohorts. There were also leadership changes at the hospital group between the execution of cohort 1 and cohort 2, which may have indirectly impacted nurses' willingness to participate, learning journey and outcomes. As a result, we cannot provide a direct comparison of the feedback from the nurses across the cohorts, even though the feedback remains similar at a high level.

Other motivations for private hospitals to invest in nurse training and development include staff retention, healthier working environment, preparing future nurse leaders and/or improvements in patient experience. Public hospitals, on the other hand, may not be able to prioritize these over cost-optimization and large volumes of patient care. Nonetheless, the study indicates that significant improvements can be made in nurse training and development in an efficient and effective manner through web-based western learning programs. Also, investment in nurse CPD might help improve staff efficiency in a delicate and vital area of care delivery such as critical care where trained resources are already constrained.

Conclusion

A standardized, evidence-based online learning course in critical care, developed in a western country, delivered via a preceptor-facilitator-learner model augmented by translation, group discussions and practical application helps improve nurses' subject knowledge and skills. It also gives them more confidence in practice and enables them to provide perceived safer care to patients.

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Ethical Clearance: This project was approved as a Quality Improvement project by the Leadership

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Conflict of interest: There are no conflicts of interest.

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