Using Objective Structured Clinical Examination (OSCE) in evaluation of a training program for newly-graduated nurses: A case study of Veteran General Hospital in Taiwan

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Abstract- Background: Adequate preparation for newly graduated nurses is a critical nursing development component for new nurses' success. The two-year training program for postgraduate nurses at Veteran General Hospital in Taichung (VGH- Taichung) was initiated in 2008. The mission of this program was to foster the nurses to become competent clinicians who are able to provide high quality patient-centered care.

Method & Design: The paper describes the process of how VGH-Taichung adopted OSCE for evaluating first year trainee's psychomotor, cognitive and affective skills in a simulated environment to improve their performance scores among newly graduate nurses.

Results: The results from this pilot study provided evidence on the implementation of OSCE-based evaluation and instructions with improved core competencies of postgraduate training programs in VGH-Taichung. The OSCE appears to be a useful and feasible method for trainees' clinical performance.

Discussion: The implementation reported in this study was a positive learning experience for the trainees. The quantitative data and qualitative information from this pilot study provide information for improving the design and implementation of postgraduate nursing education.

Index Terms- respiratory system, physical assessment, objective structured clinical examination (OSCE), Nurse Post Graduate Year

I. INTRODUCTION

Adequate preparation for newly graduated nurses is a critical nursing development component for new nurses' success. Previous studies suggest that effective educational strategies, for example, orientation programs and preceptor/mentor models are successful in improving new nurses confidence and competencies (e.g., knowledge and critical-thinking skills), in caring for patients in the clinical environment result in improved patient outcomes with reductions in falls, medication errors, and hospital-acquired pressure ulcer rates.[1,2]

Strategies that have been developed or adapted include: residency programs, simulation exercises, assignment of a preceptor/mentor, and inclusion of socialization activities designed to assimilate the new graduate into the established workforce. [3-6] Health-care administrations recognize the importance of orientation processes that may impact new nurses' satisfaction and increase stability and retention. Providing graduate nurses with support, adequate training, and professional guidance may empower new nurses by increasing their sense of belonging and giving them the confidence to provide quality patient care.

With recognition of the current nursing shortage, heath care executives are forced to assess orientation processes and the option of nurse internship/residency programs that may impact new nurse satisfaction in order to increase job stability, satisfaction, and retention. Although several factors affect new graduate satisfaction, an understanding of what is satisfying to new graduate nurses will allow administrators to develop strategies such as residency or internship programs that may increase new nurse satisfaction, making them more comfortable in their professional nursing role.

In order for the Department of Health in Taiwan to plan and implement improvement for continuing education among healthcare providers, the Taiwan Joint Commission on Hospital Accreditation (TJCHA) was authorized to initiate the Teaching Quality Improvement Program for Teaching Hospitals. The program assists healthcare professionals to establish and implement a postgraduate clinical training system. The two-year training program for postgraduate nurses at Veteran General Hospital in Taichung (VGH- Taichung) was initiated in 2008. The mission of this program was to foster the nurses to become competent clinicians who are able to provide high quality patient-centered care.

During the first year of implementation of this training program in 2008, VGH-Taichung monitored 56 nurses and compared their skills in physical assessment during the baseline and post-test at two years after completion of training. The evaluation showed that there was only 15% improvement on physical assessment scores after the training. At the post-test in 2010, one of the systems in physical assessment that scored lower

than other areas was breast sound auscultation skills. Among the trainees, majority (56.7%) scored in the category of less than good (2 points) in a 5-point system, and 52.9% could not correctly identify abnormal breast sounds during auscultation during simulation. As a result, this is an area identified for further instructional improvement.

The Professional Development Committee for Nursing at VGH-Taichung identified and implemented the objective structured clinical examination (OSCE) as an approach to evaluate trainees' clinical performance. Developed by Harden and his colleague,[7] OSCE provides a comprehensive tool to evaluate students' interpersonal and communication skills, decision-making and problem-solving abilities, and teaching and assessment skills. It offers an innovation learning experience based upon the interaction among trainees/students, standardized patients, and instructions/preceptors.[8] OSCEs have been widely used in the context of undergraduate and postgraduate education because of their advantages in terms of good validity and reliability[9,10] in nursing, medicine, and other medical-related professions.

In 2012, a pilot OSCE was implemented with an objective to assess the clinical competencies of nursing trainees to provide feedback on their performance in the two-year postgraduate training program at VGH-Taichung. However, little is known about the effectiveness of OSCE for nurse trainees after implementing this OSCE curriculum. The mission of this program was to foster the nursing trainees to become competent clinicians who are able to provide high quality patient-centered care. The framework of this VGH-Taichung training program was constructed based on the five core competencies identified in the *Health professions education* document from the Institute of Medicine (IOM) (2003). These competencies are: 1) patient-centered care, 2) teamwork and collaboration, 3) evidence-based practice, 4) quality improvement, and 5) informatics.

II. PURPOSE

Because little is known about the effectiveness of the postgraduate program in Taiwan on trainee learning. Therefore, the purpose of this paper is to describe the process of how VGH-Taichung adopted OSCE for evaluating first year trainee's psychomotor, cognitive and affective skills in a simulated environment to improve their performance scores among newly graduate nurses in postgraduate training program. We hope that the quantitative data can be used to improve program design and accurately evaluate the implementation of postgraduate Nursing training in Taiwan.

III. MATERIALS AND METHODS

Study Overview and Participants

This study has a cross sectional descriptive design and participants were newly-graduated nurse trainees (within 4 years of graduation) working at VGH-Taichung. A convenient sample of 376 trainees who were in the postgraduate straining program between 2012-2014 were included in the current study.

Procedure

An ethical approval was obtained from VGH-Taichung Nursing Department Research Committee. During the 3-month training period for the respiratory system module, nursing trainees learned how to perform clinical physical assessment skills by using simulation-based learning with OSCE procedures. The examination team involved all the staff in each department who received training on OSCE before the actual exam.

The education training included a certified Nursing preceptor instruction. The trainee received an online curriculum that provided cognitive aspects of respiratory system health assessment. Next, the curriculum included video demonstration using the VitalSim high-fidelity simulator for human breath sounds ausculation assess skills. The preceptor discussed the simulated scenarios provided by the online curriculum and provided additional guidance on challenges raised by the students. Next, the preceptor arranged time for the trainees to visit the Clinical Skills Center site, so trainees could use the VitalSim high-end simulator which was designed to simulate various respiratory sounds for trainees to practice auscultation skills. With simulation, trainees improved their health assessment skills by repeated practices identifying abnormal breath sounds. The trainees were required to complete two clinical scenarios with one normal and another one abnormal breast sounds.

After completing the online instructional module and simulation experience, the trainees were required to complete a respiratory system assessment test as part of OSCE procedure where the preceptor evaluated trainees' interpersonal and communication skills, problem-solving abilities, teaching and assessment skills, and ethical and professional decisions. OSCE also provided innovative teaching strategies with situational simulation that was complemented with interactive reflections during debriefing.

During the simulation experience, the preceptor used Direct Observation of Procedural Skills (DOPS), an assessment checklist to evaluate the students' ability in health assessment on the respiratory system. Using the objective DOPS, the preceptor was able to evaluate if trainees possessed the knowledge of specific skills and know how to apply this knowledge into practice.

During the debriefing, the preceptor provided students feedback on their knowledge and skills, pointed out deficiencies in knowledge, and gave suggestions on how to improve the performance of clinical skills. At the debriefing, both trainees and the preceptor completed scenario discussions with interdisciplinary staff, for example, a respiratory therapist. Trainees gained confidence in performing clinical skills in a simulated environment before performing the same skills in actual clinical settings. The process of OSCE evaluation can be shown in Figure 1-4 with briefing/introduction by the preceptor, testing with high-fidelity simulation, evaluation, and debriefing and group discussion. Once trainees passed the respiratory system evaluation with DOPS, the preceptors informed the trainees that they were able to apply their health assessment skills in clinical practice.
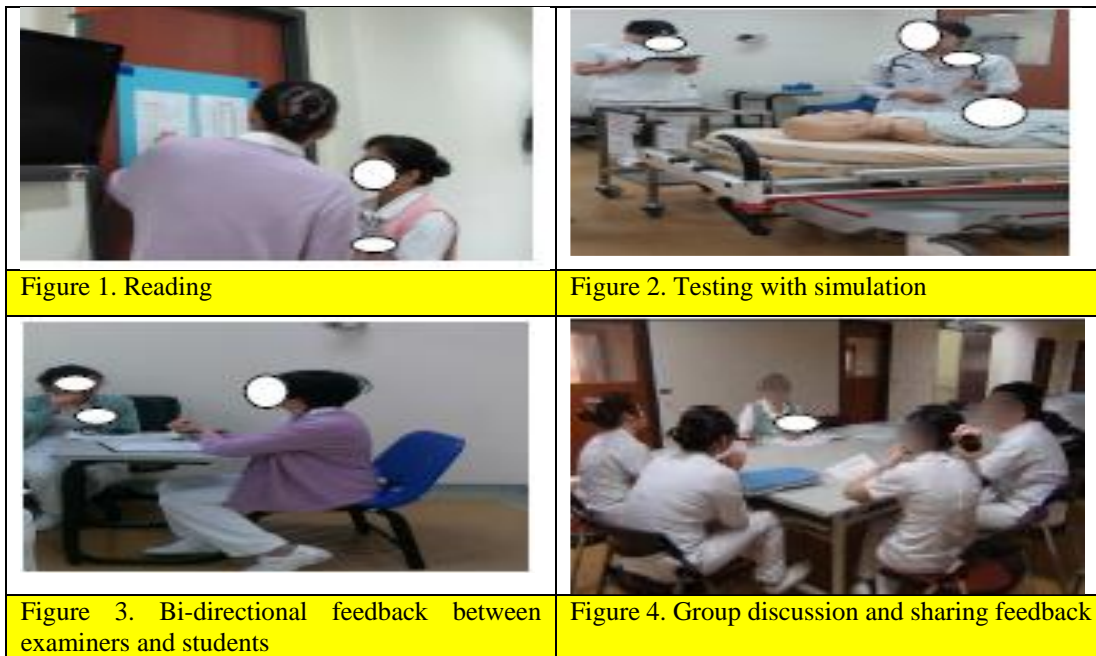
Figure 1. Reading	Figure 2. Testing with simulation
Figure 3. Bi-directional feedback between examiners and students	Figure 4. Group discussion and sharing feedback

Figure 1-4: The postgraduate program flow

Tools of Data Collection

The measurement tool was developed and reviewed by five panels of content experts in the field of medical and surgical nursing with needed modifications before the study was carried out. The 12-item Observation of Procedural Skills (DOPS) provides accurate judgment on trainees' adequacy regarding three domains of attributes (i.e., cognitive, attitudes, and technical/skills) in respiratory system health assessment (Table 1).

Before using DOPS, preceptors received training in order to achieve inter-rater reliability of using DOPS. The training included instructional videos, review of the rating procedures using interactive response system (IRS), observing two master trainers on using DOPS with two clinical case scenarios, and questions and answers by master trainers. Consensus of assessment standards were shared during the training. Any discrepancies on DOPS results were expected to be resolved among preceptors in order to achieve the consistency in ratings.

Preceptors were asked to rate on a 5-point scale ranging from 5-excellent, 4-good, 3-acceptable, 2-less than expected, and 1-not passed- 1 point. The trainees were informed that they had to achieve a rating of 3 on each item. The overall performance grading: at the end of the test, overall performance was calculated using a global ratings scale (GRS) with standards divided into A, B, and C levels: A-Excellent, which means fully understanding what they learn: overall points of 95-100, B-Good, with total points of 85-94, which means understanding most of what they learn, and C: Not passed, 84 points or less -5 points, not passed, which means they did not understand most of what they learned. The trainees needed to pass with level B or higher in GRS. Statistical analysis was performed using SPSS version 26.0 (SPSS Inc., Chicago, IL, USA).

IV. RESULTS

Participant Demographics

The participants were new graduate nurses with less than four years of nursing experience working in direct patient care settings. All nurses (n=376) included women (95.2%) and men (4.8%). The mean age was 23.3 years (SD 1.16 years; range 20–26 years). They were all graduated with undergraduate degrees or above.

Table 1 Participant Demographics (N=376)

Variable	Number (%)	Minimum	Maximum	Mean score Mean(SD)
Gender				
woman	358 (95.2)			
man	18 (4.8)			
Age		20	26	23.3(±1.16)
Education				

Undergraduate or above	376 (100)			

Assessment of performance by preceptors

Between 2012 -2014, there were 155, 103 and 118 trainees with a total of 376 students. Figure 5 shows that the objective structured clinical evaluation using DOPS by preceptors showed improvement over the 3-year period in all three aspects, i.e., cognition, affection, and skills. For the cognitive aspect, more than 95% of trainees achieved competency on the two items in 2014, "correctly distinguish abnormal breath sounds" and "be able to tell what abnormal breath sounds mean."

For the affective aspect, trainees demonstrated competency in respecting patient privacy and rights, organizing and integrating the assessment process of the respiratory system, and maintaining the comfort of the patients with the percentage of below 95% in 2012 on the items "introduction of self and verifying patient identification" and "describing assessment procedures and potential discomfort for the patients," which increased to 95% and 98% in 2014. With item, "be able to help patients take a comfortable supine position," the percentages increased to 100% in 2013 and 2014.

For the technical/skills aspect, the deficient areas for the trainees included "able to identify the location of the lower, middle and upper right lobe, and left upper and lower lobe from body surface" whereas the percentages were 88.1%, 89.9% in 2012 and 2013, which increased to 92.5% in 2014. Four items in the skills aspect achieved 100% in 2014 (Figure 1).
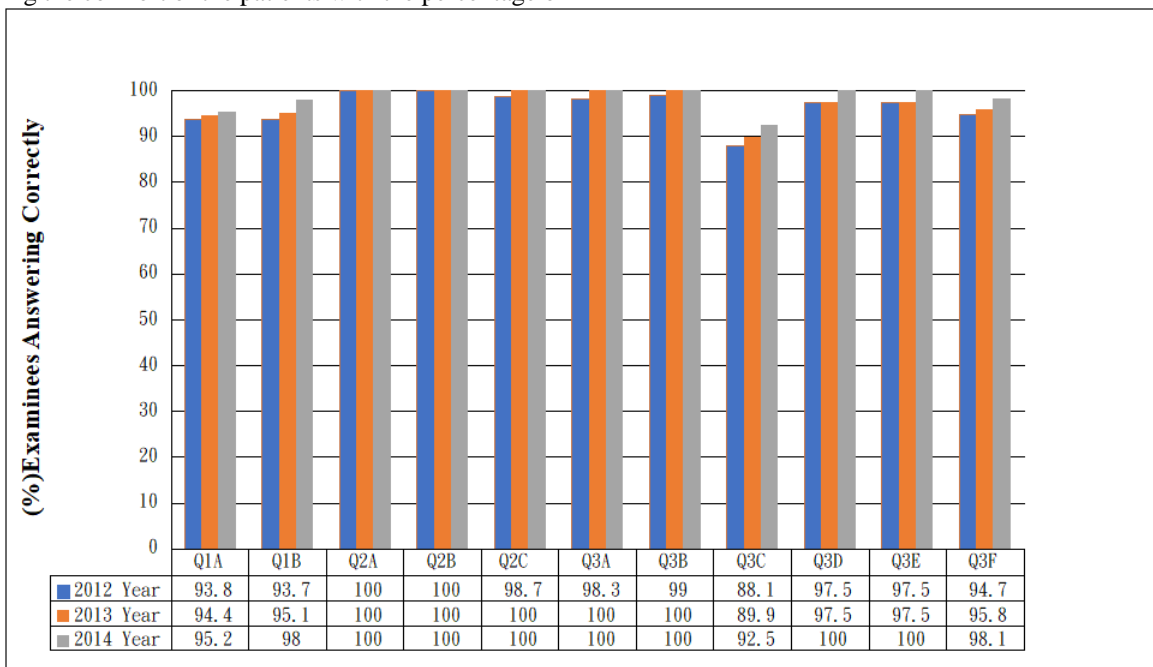

	Q1A	Q1B	Q2A	Q2B	Q2C	Q3A	Q3B	Q3C	Q3D	Q3E	Q3F
2012 Year	93.8	93.7	100	100	98.7	98.3	99	88.1	97.5	97.5	94.7
2013 Year	94.4	95.1	100	100	100	100	100	89.9	97.5	97.5	95.8
2014 Year	95.2	98	100	100	100	100	100	92.5	100	100	98.1

Figure 1 Respiratory System Assessment OSCE Test Results Chart.

Overall Performance with Global Rating System

Evaluation of the overall performance: based on integrated global rating system (GRS) assessment, the testing results were divided into A, B, and C levels, with level B as the passing standard. The results of using GRS are shown in Figure 6. Comparison of global ratings of trainees' performance between 2012 to 2014 showed improved performance from 2012 to 2014.

The percentages of trainees who did not reach level B in three years were 3.9%, 3.4%, and 1.9% (Figure 2). These trainees failed in four items, including "able to identify the location of the lower, middle and upper right lobe, and left upper and lower lobe from body surface," "able to tell abnormal breath sounds", "able to tell what abnormal breath sounds mean", and "able to perform nursing interventions for abnormal breathing sounds." The OSCE evaluation protocol helped to identify the deficiency areas for the trainees. With the guidance from the head nurse of the department and preceptors, these trainees were able to retake the OSCE test and passed with evaluation of level B and above.
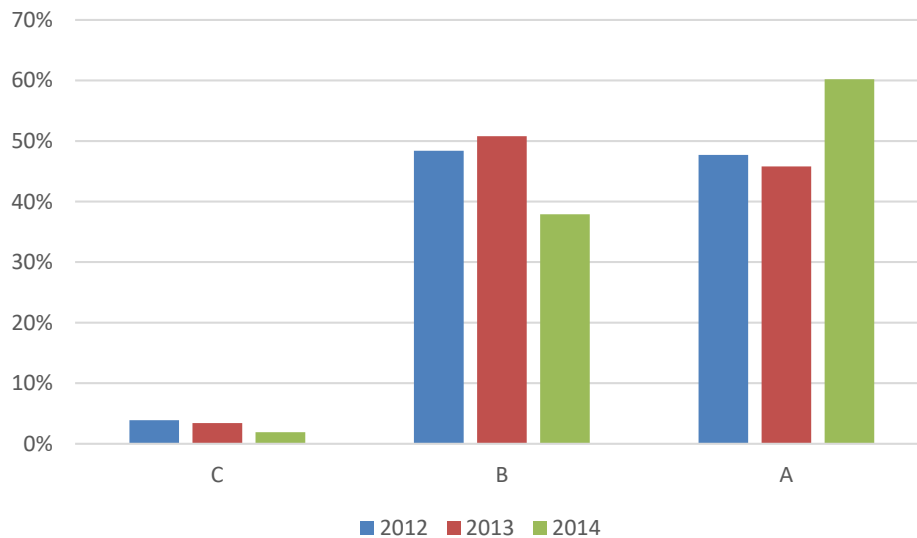
Figure2. Evaluate the overall performance

Trainees' Feedback and Comments

After the OSCE test, students were asked to complete satisfaction surveys which included their self-reflection of overall performance, and also feedback was encouraged during debriefing group discussion. The satisfaction on overall learning effectiveness was greater than 90.75%. In qualitative data, trainees highly acknowledged the bi-directional feedback and group discussion during the debriefing. Through guiding and encouraging the ability of critical thinking, trainees were able to identify areas of weakness. Usually, trainees were too busy to think during normal clinical work period; with simulation experience, they were able to take time to experience nursing processes with a thorough learning experience. Through discussion at the debriefing, trainees reported that they were encouraged to solving a patient's problem and also they are more confident with nursing practice after they received training for interdisciplinary team collaboration and respiratory disease care management with comorbidities.

V. DISCUSSION

The postgraduate training program for the nursing profession was implemented by by the TJCHA with the aim of improving the competency of nursing graduates with respect to patient-centered care as well as developing their the ability to perform competent nursing care. In Taiwan, nursing graduates have been required to complete a general postgraduate training program since August 2008.

The OSCE curriculum reported in the current study for Taiwanese postgraduate nurses was developed in responding to limited improvement and performance on respiratory system health assessment by postgraduate nurse trainees in VGH-Taichung in 2008-2010. The profession of medicine in Taiwan also adopted OSCE for residents to perform holistic medical care and competency in medical knowledge, clinical skills, and professional attitude as postgraduate medicine training program.[11,12]

Based on "learner-centered" pedagogy, VGH-Taichung developed a curriculum for trainees to assess the respiratory system, diagnose patients' problems, and provide quality nursing care. With a simulation-based learning environment, it facilitates experiential learning that trainees obtain content-related knowledge, critical thinking and communication skills, and gain confidence in a non-threatening safe environment without fear of personal failure or patient endangerment. The preceptor in our study provided oral feedback to trainees immediately after the assessment while other studies reported that the feedback in the OSCE was helpful and promoted learning.[13] With debriefing, the trainees were guided to self-reflect on insights that can improve their ability to integrate newly-obtained skills into clinical practice.

Despite the OSCE-based evaluation and teaching having several advantages that strengthen trainees' skills in history taking, health assessment, and communication skills, as well as skills on making nursing diagnosis and appropriate nursing intervention, the issues that hinder the large-scale implementation of the OSCE include its high cost and the complex logistics in its organization. Similar to studies reviewed in Rushforth (2007), OSCE implementation in VGH-Taichung was labor intensive, which cost a lot of resources and funding, particularly in high-fidelity simulation and OSCE-based evaluation.[14] During early phases of implementation in 2010, each unit only could afford to have one staff to be trained as an OSCE preceptor while there were more than 100 trainees each year scheduled to participating in the training. Due to the large number of trainees under examination with limited preceptors, the evaluation was time consuming. In addition, the cost for training at the clinical skills center was high. Starting in 2015, the hospital was able to train additional preceptors and each ward is equipped with at least 2-3 preceptors, which significantly increased the capacity to allow numbers of trainees completed the required curriculum.

This study has limitations. The participants/trainees were from one hospital; therefore, the limitation is the difficulty of extrapolating the results to other populations. The results of this study may be relevant to other hospitals that undergo a similar

situation and attempt to implement the OSCE for their postgraduate training programs. Another limitation is that, in our study, only tasks in respiratory system health were assessed. Future studies are warranted to include a wider perspective of clinical skill tasks that could have increased the generalizability of the study.

VI. CONCLUSION

Overall, the results from this pilot study provided evidence on the implementation of OSCE-based evaluation and instructions with improved core competencies of postgraduate training programs in VGH-Taichung. The OSCE appears to be a useful and feasible method for evaluating and improving trainees' clinical performance. The implementation reported in this study was a positive learning experience for the trainees. The quantitative data and qualitative information from this pilot study provide information for improving the design and implementation of postgraduate nursing education.

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Table 1: Description of DOPS Evaluation Tool

Q1A: Self-introduction and patient identification (Aff.)

Q1B: Explain to the patient examination procedures, possible discomfort, and breathing guide (Aff.)

Q2A: Help the patients take a comfortable recumbent position (Aff.)

Q2B: Observe the patient's breathing patterns, whether there is cyanosis with respiratory accessory muscles (Skl.)

Q2C: Wear a stethoscope correctly and choose the right membrane mask to listen to high-frequency sound (Skl.)

Q3A: Identify the right upper, middle and lower, left upper and lower lobe position from body surface (Skl.)

Q3B: Able to assess the breath sounds of corresponding parts and identify the location of the lower, middle and upper right lobe, and left upper and lower lobe in an appropriate manner.

Q3C: Listen to breath sounds of the patient while patient is lying (Skl.)

Q2D: Correctly distinguish abnormal breath sounds (Cog.)

Q3E: Be tell what abnormal breath sounds means (Cog.)

Q3F: Perform management of abnormal breath sounds (Skl.)

Aff.: Affective aspect; Cog.: Cognitive aspect; and Skl: Skills aspect