

Overview of Knowledge of Anesthesiology Nursing Students Regarding Pre-Post Clinical Practice Anesthesia Machine Preparation

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ABSTRACT

Introduction: Lack of mastery of tools and negligence in checking machine function are the most common causes. This accident accounts for 2% of cases in the American Society of Anesthesiology (ASA) Close Claim Project Database. As one of the universities that has an Anesthesiology Nursing study program that is committed to meeting both national and international competencies, before practicing at Harapan Bangsa University, there is a laboratory learning evaluation using the OSCE (Objective Structured Clinical Examination) method. However, from the evaluation score, 34 out of 89 with a presentation of 38.2% of students had not passed the preparation and use of anesthesia machine phase. This is a concern where the ability to use machines is a must-have.

Objective: The aim of this research is to determine the knowledge of anesthesiology nursing students at Harapan Bangsa University regarding pre- and post-clinical practice preparation for anesthesia machines.

Methods: This research is quantitative research with the type of research used, namely descriptive observation. The approach used during the research was cross sectional. The population in this study was 178 respondents from 5th semester Anesthesiology Nursing students at Harapan Bangsa University. The sample in this study was 45 respondents from the 5th semester of Anesthesiology Nursing at Harapan Bangsa University who were willing to fill out the questionnaire. The sampling technique in this research used the total sampling method. The measuring instrument used in this research is an observation sheet. Data analysis uses univariate analysis.

Results: Based on the results of this research, the mean knowledge of students pre-clinical practice was 11.11, post-clinical practice was 11.93, and with a deviation of 0.82.

Conclusion: Based on the data, there was an increase of 0.82 after students carried out clinical practice

Keywords : Anesthesia machine, Knowledge , Students.

INTRODUCTION

Knowledge is the basis for forming behavior (1). One factor influencing knowledge is experience. Students can gain experience through clinical practice. One of the learning methods used in the Anesthesiology Nursing study program is clinical practice. Clinical practice in Anesthesiology Nursing is one of the learning activities that anesthesiology nursing students must go through to achieve learning outcomes and competencies as anesthesiologists (2).

An anesthesiologist's job is to ensure that their equipment can deliver adequate oxygen levels to the patient through the anesthesia machine. Lack of equipment mastery and negligence in checking the machine's function are the most common causes of accidents. This take notes 2 % of cases on *American Society of Anesthesiology (ASA) Close Claim Project Database*. Circuit breath is source most frequent occurrence accidents (39%) and causes 70% of deaths or damage brain , almost all incident relate with connection misconnection And disconnection tool for a expert anesthesia (3).

As Wrong One Universities that have study program Nursing Anesthesiology program Bachelor Committed application fulfil competence Good National and International . Students of study program nursing anesthesiology undergraduate program applied start enter to room operation on during semester 4. At during the 4th semester of students only do observation And orientation related action anesthesia room operations . For the next semester student Already start do action in accordance with directions mentor clinic . Study program This will produce stylist professional , thorough anesthesia in carry out tiredness pre anesthesia , intra anesthesia , and post anesthesia in the setting service House sick , so can play a role in increase degrees health all over a healthy , independent Indonesian society And justice (4).

Before practice at the University Hope Nation , there is evaluation lab learning that uses The OSCE (*Objective Structured Clinical Examination*) method was used . However, based on the evaluation scores, 34 out of 89 students, representing 38.2%, had not passed the preparation and use of the anesthesia machine (OSCE Data Semester 5, 2024). This raises concerns, as machine use skills are essential. However, practical learning is expected to improve the competency of Harapan Bangsa University students. Based on the aforementioned background, the researcher is interested in understanding the knowledge of anesthesiology nursing students at Harapan Bangsa University regarding *pre- and post- clinical practice preparation for anesthesia machines*.

MATERIALS AND METHODS

This research is a quantitative research with a descriptive correlational design, with a *Cross sectional approach*. This research was conducted on December 26, 2023, pre-clinical practice data collection was carried out and on May 28, 2024, post-clinical practice data collection was carried out at Harapan Bangsa University . The population in this study were 5th semester students of Harapan Bangsa University totaling 178 *total sampling* but only 45 respondents were obtained . The tool used in data collection in this researcher was a tool in the form of a "true-false" questionnaire compiled by the researcher consisting of 13 statements. Positive statements are at numbers 1, 2, 3, 4, 5, 6, 7, 9, 10, and 13, while negative statements are at numbers 8, 11, and 12. The primary data of this study is about the knowledge obtained from 5th and 6th semester students of the Anesthesiology Nursing Study Program, Applied Undergraduate Program, Harapan Bangsa University through a questionnaire. The descriptive analysis test used a ratio scale with a mean from the Health Research Ethics Commission of Harapan Bangsa University with Decree No. B.LPPM-UHB/413/05/2024.

RESULTS

Table 1Distribution of Students' Knowledge Regarding Anesthesia Machine Preparation Before Clinical Practice.

Characteristics	Knowledge		
	Mean	ST Dev	Min-Max
Before	11.11	1.318	8-13

Based on table 1, the results of the knowledge of students of the Anesthesiology Nursing Study Program, Applied Undergraduate Program, Harapan Bangsa University regarding the preparation of anesthesia machines before clinical practice were obtained with an average questionnaire score of 11.11 with a minimum value of 8 and a maximum value of 13.

Table 2 Distribution of Students' Knowledge About Anesthesia Machine Preparation After Clinical Practice

Characteristics	Knowledge		
	Mean	ST Dev	Min-Max
After	11.93	1.009	9-13

Based on table 2, the results of the knowledge of students of the Anesthesiology Nursing Study Program, Applied Undergraduate Program, Harapan Bangsa University regarding the preparation of anesthesia machines after clinical practice were obtained with an average questionnaire score of 11.93 with a minimum value of 9 and a maximum value of 13 .

Table 3 Mean and difference in students' knowledge about pre- and post- clinical practice anesthesia machine preparation at Harapan Bangsa University

Question	Pre	Post	Difference
1	1	1	0
2	1	1	0
3	0.91	1	0.09
4	0.98	0.96	-0.02
5	1	1	0
6	0.67	0.8	0.13
7	0.96	0.93	-0.03
8	0.89	0.89	0
9	0.73	0.78	0.05
10	0.98	1	0.02
11	0.53	0.84	0.31

12	0.64	0.8	0.16
13	0.82	0.93	0.11
Amount	11.11	11.93	0.82

Based on Table 3, the *pre- clinical* practice score obtained *a mean* of 11.11 and *the post- clinical* practice score obtained *a mean* of 11.93 with a difference of 0.82 between the two. Question items 1, 2, 5, and 8 did not show any increase in knowledge. Items 3, 6, 9, 10, 11, 12, and 13 experienced an increase, with item 11 experiencing a significant increase compared to the other items with a difference of 0.31. However, there were also question items that experienced a decrease, namely items 4 and 7 with a difference of 0.02 and 0.03, respectively.

DISCUSSION

Pre- Clinical Practice

Based on table 1, the *mean result* of students' knowledge about the preparation of anesthesia machines is 11.11. This has a deviation of 1.89 from the maximum value of 13. The researcher's assumption is that this is because the learning technique at Harapan Bangsa University has involved active learning from students, namely lab skills, in-depth studies, and OSCEs about Anesthesia Machines before they carry out clinical practice. The researcher has interviewed 2 Harapan Bangsa University students with the initials A and H, they said they had understood most of the questions about the preparation of Anesthesia Machines from campus learning taught by lecturers. This is in line with other studies which state that the results of research on third-year anesthesiology nursing students obtained the results of the level of student knowledge in the good category amounting to 25.2%, there are several factors that influence students so that students are able to understand the preparation and use of anesthesia machines, these factors include internal factors such as education. (9)

Post Clinical Practice

Based on table 2, the *mean result* of students' knowledge about anesthesia machine preparation was 11.93, an increase of 0.82 from the previous *pre- result* of 11.11. It only took 1.07 to reach the perfect *mean value* of 13. The researcher's assumption is that this is because the role of the field supervisor appointed by the Hospital can be said to be good. According to the researcher's experience, there is some knowledge gained through practice that is not obtained on campus. This causes an increase in students' knowledge of practical knowledge, for example, machine calibration. This is in line with previous research which states that clinical practice has a weak or small influence on student competence with an *r Square value* showing 4.8%. (5)

Changes in Knowledge Pre-Post Clinical Practice

If we look at each question point about the preparation of the anesthesia machine in table 3.3, it shows an increase in question items number 3, 6, 9, 10, 11, 12, 13 about the preparation of the anesthesia machine which is directly related to the components of the anesthesia machine itself. This is because students during practice feel more or gain more skills in using the anesthesia machine itself, such as in question item number 9 about checking for leaks in the anesthesia machine. When on campus, students rarely calibrate the anesthesia machine, so students will understand the calibration of the anesthesia machine better during Clinical Practice. In question item number 12 about *one get test* N₂O and O₂, there was also an increase, because students will be more alert when in the hospital because they are in direct contact with patients who will undergo surgery. In *the Education Corner article* about " *The Learning Pyramid*", it states that the practical learning method will increase memory by 75% compared to lectures and reading which when combined only increase memory by 15%. (6)

Question item number 11, regarding Anesthesia Machine Calibration, saw the largest increase, at 0.31. This is because during clinical practice, students will more directly calibrate the Anesthesia Machine every day in preparation for surgery, so that students' knowledge of machine calibration will increase compared to before their Clinical Practice.

Clinical practice is a core component that plays a vital role in the implementation of nursing education programs. During clinical practice, nursing students will learn to apply theoretical knowledge in real-world settings, develop nursing attitudes, and practice technical skills through interactions with healthcare workers and patients. Students will further develop their skills when meeting patients, thus increasing their knowledge (7).

Table 3 shows questions that were answered correctly by all students during *the Pre- and Post-clinical practice*, namely questions 1, 2, and 5 regarding the definition of examining Anesthesia Machine Components. This is basic and is often encountered on campus and in clinical practice, so students already have a good understanding of the definition of examining Anesthesia Machines, with guidance from lecturers, field supervisors, and interactions with other students. This is in line with previous research which stated that several external factors of knowledge are education, experience, and sources of information. Education is knowledge gained while studying on campus. Experience is knowledge gained during practice. Meanwhile, sources of information are knowledge gained from lecturers, field supervisors, and other fellow students. (1)

However, there are also question items that have decreased, namely in items number 4 and 7 regarding the examination and installation of *curogeted*, with a decrease of 0.02 and 0.03 for each item. According to the researcher's experience as a student, this is because when in the hospital, *curogeted* is very rarely removed, so students rarely practice skills regarding color checking and installation of *curogeted*. Even though the material about *curogeted* has been obtained when studying on campus, students will tend to forget because they rarely check and install *curogeted*. According to the researcher's interview with 2 students from Harapan Bangsa University, they said that students also sometimes interact less with fellow students or with anesthesiologists, especially for students undergoing Clinical Practice 1, because it is the first time for students to enter the operating room. This is in line with other studies which state that student interaction partially influences academic achievement, meaning that the better the interaction of students with other students, the better the academic achievement of students. (8)

CONCLUSION

Based on the results of research and discussion of the Overview of Knowledge of Nursing Anesthesiology Students at Harapan Bangsa University Regarding *Pre-Post* Clinical Practice Anesthesia Machine Preparation using a 13-question questionnaire, it can be concluded that the average knowledge of students in the Nursing Anesthesiology Study Program, Applied Undergraduate Program, Harapan Bangsa University regarding pre-clinical practice anesthesia machine preparation is 11.11, The average knowledge of students in the Nursing Anesthesiology Study Program, Applied Undergraduate Program, Harapan Bangsa University regarding *post-* clinical practice anesthesia machine preparation is 11.93, and there is an increase in the average knowledge of students regarding pre-clinical practice anesthesia machine preparation with a figure of 0.82.

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