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Efforts to increase nursing students' knowledge on the management of progressive mobilization in the intensive care unit

Wahyu Rima Agustin[1], Hermiana Ernastin Tobi[2], Ari Prabowo[1]
[1] Universitas Kusuma Husada, Surakarta, Indonesia
[2] Instituto Ciencias Da Saude, Timor Leste

wra.wahyurimaagustin@gmail.com
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Abstract
Progressive mobilization is a stepwise intervention provided to critically ill patients in the intensive care unit (ICU) to support the recovery of hemodynamic status through physical activities such as head-of-bed (HOB) elevation and range-of-motion (ROM) exercises. This intervention is an essential part of nursing care plans in the ICU. This community service program aims to enhance the knowledge and skills of nursing students in implementing progressive mobilization for ICU patients. The program utilized interactive lectures and question-and-answer sessions delivered through educational media such as slide presentations and the Zoom Meeting platform. Evaluation results demonstrated a significant improvement in participants' understanding. Before the training, the pre-test revealed that 60% (97 participants) had limited knowledge of progressive mobilization techniques. After the training, the post-test showed that 90% (146 participants) had a proper understanding of these techniques.

Keywords: Knowledge; Nursing students; Progressive mobilization; ICU patients

Upaya peningkatan pengetahuan mahasiswa keperawatan tentang penatalaksanaan mobilisasi progresif di ruang intensive care unit

Abstrak
Mobilisasi progresif adalah intervensi bertahap yang diberikan kepada pasien kritis di ruang perawatan intensif (ICU) untuk mendukung pemulihan status hemodinamik melalui aktivitas fisik, seperti peningkatan posisi tempat tidur (head of bed, HOB) dan gerakan rentang sendi (range of motion, ROM). Intervensi ini menjadi bagian penting dari perencanaan perawatan yang dilakukan oleh perawat ICU. Kegiatan pengabdian kepada masyarakat ini bertujuan untuk meningkatkan pengetahuan dan keterampilan mahasiswa keperawatan dalam melaksanakan mobilisasi progresif pada pasien ICU. Program ini menggunakan metode ceramah interaktif dan tanya jawab yang disampaikan melalui media pembelajaran, seperti presentasi berbasis slide dan platform Zoom Meeting. Hasil evaluasi menunjukkan peningkatan pemahaman yang signifikan di kalangan peserta. Sebelum pelatihan, hasil pre-test menunjukkan bahwa 60% (97 partisipan) kurang memahami teknik mobilisasi progresif. Setelah pelatihan, hasil post-test menunjukkan peningkatan, dengan 90% (146 partisipan) telah memahami teknik mobilisasi progresif secara benar.

***Kata Kunci**: Pengetahuan; Mahasiswa keperawatan; Mobilisasi progresif; Pasien ICU*

1. Introduction

Progressive mobilization, a staged and tailored approach to physical activity, is crucial for critical care patients in the Intensive Care Unit (ICU) to maintain hemodynamic

stability (Agustin et al., 2020). Hemodynamic instability can impede such mobilization efforts. Nursing interventions incorporating early physical activity, including head of bed (HOB) elevation and range of motion (ROM) exercises, administered two to three times daily for 15-20 minutes, have been shown to aid hemodynamic recovery in non-ventilated patients (Apriyani & Tirtayanti, 2021; Mohamed et al., 2021; Pagonas et al., 2020). Progressive mobilization encompasses a gradual increase in HOB elevation, progressing through stages such as 30°, 45°, and 65° to an upright sitting position. Range of motion (ROM) exercises address the full spectrum of joint movement, and continuous lateral rotation therapy (CLRT) involves continuous in-bed repositioning. The benefits of progressive mobilization include improved blood circulation and respiratory function, facilitation of normal movement, meeting daily activity needs, and enhancing post-operative patient independence (Suyanti et al., 2019).

Patients in the ICU are characterized by life-threatening conditions or organ dysfunction often accompanied by hemodynamic instability (Hartoyo et al., 2018). Hemodynamics refers to the dynamics of blood circulation and cardiac function, essential for delivering oxygen and nutrients to vital organs and removing metabolic waste (Sirait, 2020). Compromised hemodynamic status significantly impacts oxygen delivery and cardiac function, necessitating meticulous management and monitoring, particularly in critically ill patients. Reduced mobility in patients with decreased consciousness can further destabilize blood pressure and oxygen saturation. Hemodynamic monitoring typically includes measurements of blood pressure (BP), mean arterial pressure (MAP), heart rate (HR), and oxygen saturation (Waddell, 2022). Early progressive mobilization strategies, such as HOB elevation, ROM exercises, and lateral rotation, offer a potential intervention to address these issues (Hartoyo et al., 2018; Rezvani et al., 2022; Şenduran et al., 2012). These Level I progressive mobilization techniques have demonstrated positive effects on oxygen saturation by improving respiratory rate, depth, and alveolar ventilation, thereby reducing the work of breathing and promoting diaphragmatic function (Nugroho et al., 2020).

Observations during clinical practice in the ICU rotation at Universitas Kusuma Husada Surakarta and Instituto Ciencias da Saude Timor Leste indicate that many nursing students lack comprehensive knowledge regarding the management of prolonged bed rest in critical patients, specifically concerning progressive mobilization. These students often perceive critical care management as primarily focusing on fluid and electrolyte balance, medication administration, nutritional support, oxygenation, and vital sign monitoring. Therefore, this community service initiative aims to educate nursing students on the principles and application of progressive mobilization in the ICU. The goal is to equip them with the knowledge necessary to implement these strategies during their critical care clinical rotations, given the prevalence of prolonged bed rest among ICU patients. Ultimately, this community service seeks to foster an understanding and application of progressive mobilization techniques among nursing students to improve the hemodynamic status of patients in the ICU.

2. Methodology

In June 2024, Universitas Kusuma Husada Surakarta (UKH), in collaboration with Instituto Ciencias da Saude (ICS) Timor Leste, conducted a community service activity on the topic of mobilization management in the intensive care unit. The activity was held

online via Zoom and targeted nursing students. The educational intervention employed a pre-test, lecture, question-and-answer discussion, and post-test design to assess knowledge change. Presentation slides and a Zoom meeting link served as the learning tools. The activity comprised the following stages:

a. Coordination Meeting: A preliminary meeting was held with the community service team members, including student representatives from Universitas Kusuma Husada Surakarta's KNC Emergency unit and Instituto Ciencias da Saude Timor Leste, to coordinate the activity planned for June 2024.
b. Target Audience Definition: Collaborative discussions with the KNC Emergency unit and Instituto Ciencias da Saude Timor Leste identified nursing students as the target audience for the educational intervention in June 2024.
c. Material and Tool Preparation: The community service team collaboratively developed the learning session plan and prepared the necessary materials, ensuring the appropriateness of the chosen media.
d. Implementation: The online community service activity was conducted in June 2024. It commenced with instructions to the team members, followed by a pre-test to evaluate the baseline knowledge of the nursing students. Subsequently, a lecture and interactive question-and-answer session were delivered. The activity concluded with a post-test to measure any changes in the participants' knowledge.
e. Monitoring and Evaluation: Following the completion of the activity, the coordinator and team members conducted a presentation to review the progress and outcomes of the community service initiative.

3. Results and Discussion

The community engagement activity was conducted via Zoom with 162 nursing student participants from UKH and ICS. The session involved three speakers and one moderator/MC (Figure 1).

3.1. Pre-test Knowledge of Progressive Mobilization

Prior to the intervention, a pre-test revealed that 60% (n=97) of the 162 nursing student participants demonstrated a limited understanding of progressive mobilization management in the intensive care unit (ICU). This finding is consistent with prior research indicating low knowledge levels among nurses regarding progressive mobility in spinal cord injury (SCI) (Ali et al., 2022; Kaydok, 2023).

3.2. Educational Intervention and Engagement

Figure 2 shows the process during the material presentation. The first material, titled "Progressive Mobilization in SCI (Spinal Cord Injury) Cases," was presented for 60 minutes. The second material, titled "Progressive Mobilization Level 1-5," was presented for 60 minutes, and the third material, titled "Management of Progressive Mobilization," was presented for 60 minutes (Echemendía del Valle et al., 2023; He et al., 2024; Meng et al., 2023; Nangarwal et al., 2022; Panizzolo et al., 2022; Zipser et al., 2022). Following the material presentation, a question-and-answer discussion session was held. During the Q&A session, representatives from both participating institutions provided positive feedback on the conducted activity. The high number of questions posed to the speakers indicated the participants' enthusiasm.

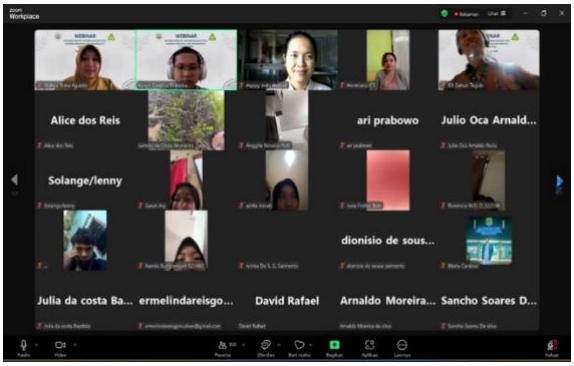

Figure 1. Online socialization on medication and vitamin use

Figure 2. Presentation of progressive mobilization concepts

3.3. *Post-test Knowledge Improvement*

Post-intervention, a significant increase in understanding was observed. The post-test results showed that 90% (n=146) of the 162 nursing student participants demonstrated comprehension of progressive mobilization management in the ICU. Paired sample t-test analysis revealed a statistically significant improvement in knowledge ($p < 0.001$), indicating the effectiveness of the educational intervention.

Progressive mobilization is known to elicit positive hemodynamic responses by enhancing pulmonary function through improved distribution and perfusion during upright positioning and movement. Positional changes during mobilization influence blood circulation via perfusion, diffusion, and the systemic distribution of blood and oxygen. A study by Hartoyo et al. (2018) (n=15, 10 female, 5 male) using a dependent t-test demonstrated significant improvements in systolic blood pressure ($p = 0.024$), diastolic blood pressure ($p = 0.002$), and peripheral oxygen saturation (SpO2) ($p < 0.001$) following the implementation of progressive mobilization level I. These findings are supported by the research of Reynolds et al. (2018) and Rumão et al. (2019).

4. Conclusion

This community service initiative demonstrated a significant improvement in nursing students' understanding of progressive mobilization management in the ICU. Pre-test results showed that 60% of participants had limited knowledge, while post-test results indicated that 90% achieved comprehension ($p < 0.001$, Paired Sample t-test). This statistically significant increase confirms the students' ability to learn and understand the material presented, thereby achieving the activity's goal of enabling them to

understand and apply progressive mobilization to enhance the hemodynamic status of ICU patients.

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Authors Contribution

Project conceptualization and planning: AP, WRA; Activity implementation: WRA, HET; Manuscript preparation and revision: WRA, AP; Presentation of the community engagement outcomes: HET.

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