

Enhancing Students' First Aid Skills on Wound Dressing and Bandaging through Simulation-Based

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ABSTRACT: Students actively participate in Physical Education (PE) classes; however, many lack the practical skills needed to respond effectively to common injuries such as cuts, sprains, and wounds. This study aimed to enhance students' first aid skills in wound dressing and bandaging through simulation-based instruction. A one-group pretest–post test quasi-experimental design was employed, involving 30 Citizenship Training Program (CTP) students from one of the DepEd schools in District 8 in Cadiz City. Participants were selected through purposive sampling. A validated performance-based rubric was used to assess students' skills before and after the intervention. The intervention consisted of eight sessions of simulation-based instruction integrating hands-on activities and guided practice. Results revealed that before the intervention, students demonstrated a moderately skilled level of performance ($M = 1.78$, $SD = 0.89$), with the lowest competency observed in time efficiency and safety. Following the intervention, students' performance significantly improved to a highly skilled level ($M = 3.43$, $SD = 0.77$). Paired sample t-test results indicated a statistically significant difference between pretest and post test scores ($t(29) = -29.84$, $p < 0.05$), confirming the effectiveness of the intervention. The findings suggest that simulation-based instruction effectively bridges the gap between theoretical knowledge and practical application of first aid skills, enhancing students' competence, confidence, and readiness to respond to emergencies. Therefore, integrating simulation-based activities into PE and health education curricula is strongly recommended.

KEYWORDS: Bandaging, first aid skills, physical education, simulation-based learning, wound dressing

INTRODUCTION

Students actively participate in Physical and Health Education classes, where minor injuries may occur during activities. These injuries often include cuts, wounds, and bleeding. In the observed class, many students are not adequately prepared to respond to such situations. They lack essential skills in wound dressing and bandaging. Some students hesitate, while others perform the procedures incorrectly. This situation indicates a gap between students' theoretical knowledge and their actual performance. Classroom observations show that students rely mainly on lecture-based instruction. They have limited opportunities to practice first aid skills. This limitation affects their confidence and overall performance. Studies indicate that school-based first aid training improves students' knowledge, practical skills, and confidence [1]. Early exposure to first aid education also enables learners to respond more effectively during real emergencies [2]. The main objective of this study is to improve students' practical skills in wound dressing and bandaging. This study utilizes Simulation-Based Instruction (SBI). Simulation-Based Instruction (SBI) is a teaching approach that uses guided and realistic practice activities. In this study, Simulation-Based Instruction (SBI) serves as the independent variable, while students' knowledge and practical skills are the dependent variables. The intervention focuses on providing structured, hands-on learning experiences. Students will practice first aid skills through simulated situations. Simulation allows safe and repeated practice, which helps students understand and perform the procedures correctly. Research shows that simulation-based learning enhances student engagement, skill performance, and critical thinking [3]. The identified classroom problem is the low level of students' skill performance. Although many students understand the basic steps of first aid, they struggle to apply them in practice. This issue is evident in tasks such as wound dressing and bandaging. There is a clear need for structured and repeated practice. Studies confirm that simulation-based training improves both knowledge and practical skills [4]. It also enhances knowledge retention and actual performance [5]. This study is significant for classroom improvement. It aims to develop students who are more confident and prepared to respond to injuries. It also supports teachers in improving instructional strategies. The findings of this study may serve as a guide for enhancing first aid instruction in similar classroom settings.

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REVIEW OF RELATED STUDIES

RESEARCH QUESTIONS

This study aims to enhance students' first aid skills during physical activity situations through simulation-based instruction. Specifically, it sought to:

1. What is the level of students' first aid skills before the intervention in the wound dressing and bandaging procedures?
2. What is the level of students' first aid skills after the intervention in the wound dressing and bandaging procedures?
3. Is there a significant difference in the students' first aid skills in the wound dressing and bandaging procedures before and after the intervention?

SCOPE AND LIMITATIONS

This study focuses on assessing the effectiveness of a simulation-based instructional module in improving the first aid skills of 30 CTP students from one of the DepEd schools in District 8 of Cadiz City during the School Year 2025–2026. Specifically, it examines the students' level of skills in wound dressing and bandaging before and after the implementation of the intervention. The study utilizes a pretest-post test design and employs an adapted and modified performance-based rubric to measure students' skills during simulated first aid scenarios. The intervention was limited to eight (8) sessions that emphasize guided practice and simulation-based activities. The content of the module is confined to basic first aid procedures, particularly dressing and bandaging, and does not include other emergency skills such as CPR, fracture management, or advanced medical care. The participants are selected through purposive sampling and are limited only to students currently an officer of CTP class, which may affect the generalization of the findings to other groups or settings. Furthermore, the assessment of skills was conducted in simulated situations rather than actual emergency conditions, which may not fully reflect real-life responses. The study also depends on the accuracy of the rubric scoring and the consistency of expert observation, which, despite validation, may still involve some degree of subjectivity. Lastly, the duration of the study was limited, and it does not measure the long-term retention of students' first aid skills.

MATERIALS AND METHODS

A. Research Design

This study used a one-group pretest–post test quasi-experimental research design to determine the effectiveness of simulation-based instructional modules in improving students' first aid skills on wound dressing and bandaging. In this design, students' skills were measured before and after the intervention to determine if there was improvement. This method is appropriate in classroom settings where random assignment is not possible, as it allows comparison of performance before and after the treatment.

B. Participants of the Study

The participants of the study were thirty (30) Citizen Training Program (CTP) students during AY 2025–2026. They were selected using purposive sampling based on specific characteristics relevant to the study. In this case, the selected students were CTP officers who are exposed to first aid lessons as part of their curriculum.

C. Research Instrument

The study utilized an adapted and modified performance-based checklist rubric to assess the students' first aid skills in wound dressing and bandaging. The instrument evaluated key performance areas, including proper procedure, accuracy, wound cleaning, correct application of dressing and bandaging techniques, and adherence to safety measures. It was specifically designed to measure students' actual demonstration of first aid skills rather than their theoretical knowledge alone. The checklist rubric was adapted and modified [6] and [7] published in the Journal of Emergency Nursing. These sources provide standardized first aid procedures and evidence-based assessment criteria, ensuring the validity and reliability of the instrument. Minor modifications were made to align the rubric with the learning objectives and the context of the participants in this study while maintaining the essential principles of proper first aid practice.

D. Validity and Reliability of the Instrument

To ensure validity, the instrument was evaluated by three experts in Physical Education and Health. They assessed the clarity, relevance, and alignment of each item with the study objectives using a five-point scale. The computed validity rating was 4.79, interpreted as very good, indicating that the instrument was appropriate for the study. Reliability was ensured by using the same rubric for both pretest and post test and by having trained evaluators supervise and score the students consistently during the assessments.

E. Data Gathering Procedure

Before conducting the study, permission was obtained from the school authorities. The participants were informed about the purpose of the study, and consent from both students and parents were secured. The data collection was done in three phases. First, a pretest was conducted to assess students' initial first aid skills using the performance rubric. Second, the intervention was implemented through eight sessions of simulation-based instruction from February to March 2026. Each session included discussions,

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demonstrations, and hands-on activities focusing on wound dressing and bandaging. Students practiced skills step-by-step through simulation activities. Finally, a post test was conducted using the same rubric to measure improvement.

F. Data Analysis

To address the problems proposed in this study, the researchers employed both descriptive and inferential statistics. For Problems 1 and 2, which determined the level of students' first aid skills in Dressing and Bandaging before and after the intervention, the researchers used the mean and standard deviation. The scores were derived from the specific criteria in the Performance Rubric (Wound Cleaning for Dressing and Bandaging). To interpret the levels of proficiency, the following scale was used:

Range of Mean	Verbal Interpretation
3.26 – 4.00	Highly Skilled
2.51 – 3.25	Skilled
1.76 – 2.50	Moderately Skilled
1.00 – 1.75	Low Skilled

For Problem 3, which aimed to determine if there is a significant difference in the students' first aid skills before and after the intervention, a t-test for paired samples was utilized. This inferential statistic was chosen because it compares the means of the same group of participants at two different points in time (Pre-test vs. Post-test) to measure the effectiveness of the intervention.

G. Intervention Procedure

The intervention phase was conducted for eight sessions an equivalent of 2 months during their CTP class. The purpose of the intervention was to facilitate the first aid skills particularly on wound dressing and bandaging. At the beginning of each session, students were required to submit their signed consent forms to the researchers. Throughout the intervention, each session focused on specific basic first aid skills, particularly wound dressing and bandaging, allowing students to practice step by step under the guidance of the researchers. After each discussion, a simulated activity was conducted to provide hands-on practice. Emphasis was placed on proper procedures, correct use of materials, cleanliness, and accuracy in applying dressings and bandages. The sessions were designed to build skills gradually. Students first learned the steps, then practiced them, and finally performed all skills together. Using simulation activities helps students learn by doing and experiencing, which is easier to remember than just reading or listening.

H. Ethical Consideration

Ethical standards were observed throughout the study. Participants were informed about the purpose and procedures of the research, and their participation was voluntary. Consent was obtained from both students and parents. The confidentiality and anonymity of the participants were maintained, and all data collected were used only for research purposes.

RESULTS AND DISCUSSION

Table 1. The level of CTP students first aid skills before the intervention on wound dressing and bandaging.

Criterion	Mean	Standard Deviation	Verbal Interpretation
Procedures (Sequence and Completeness)	2.00	.00	Moderately Skilled
Wound Cleaning	1.80	.40	Moderately Skilled
Application of Dressing and Bandaging Technique	1.76	.43	Moderately Skilled
Time Efficiency and Safety	1.56	.50	Low Skilled
As a Whole	1.78	.89	Moderately Skilled

Note. 1.00 – 1.75 Low Skilled, 1.76 – 2.50 Moderately Skilled, 2.51 – 3.25 Skilled, 3.26 – 4.00 Highly Skilled

Table 1 shows the level of Citizen Training Program (CTP) students' first aid skills before the intervention in wound dressing and bandaging. Using a one-group pretest–post test quasi-experimental research design, the pretest results serve as the baseline measure of students' skills prior to the implementation of the simulation-based instruction. The findings reveal that students obtained an overall mean score of 1.78 with a standard deviation (SD) of 0.89, interpreted as Moderately Skilled. This indicates that, quantitatively, students demonstrated limited competence in performing first aid procedures, with noticeable variability in their performance.

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Across the different criteria, Procedures (Sequence and Completeness) obtained the highest mean ($M = 2.00$), suggesting that students had some knowledge of the correct steps involved in wound dressing and bandaging. However, Time Efficiency and Safety had the lowest mean ($M = 1.56$), interpreted as Low Skilled, indicating difficulty in performing the procedures efficiently and safely. These results highlight that although students possessed basic procedural knowledge, their ability to execute the skills accurately and consistently was still insufficient.

In the context of a quasi-experimental design, these pretest results confirm the need for an intervention, as they establish that students' initial skill levels were not yet at the desired level of proficiency. The moderate mean score and relatively high standard deviation further suggest inconsistent skill performance among participants, which supports the rationale for implementing simulation-based instruction to improve both competence and consistency.

These findings are consistent with previous studies. Research reported that learners often demonstrate basic theoretical understanding of first aid but show low performance in practical application [8]. Similarly, a study emphasized that without structured and repeated hands-on practice, students' psychomotor skills remain underdeveloped [9]. These studies support the present findings that students require guided simulation experiences to enhance their first aid performance.

Table 2. The level of CTP students first aid skills after the intervention on wound dressing and bandaging

Criterion	Mean	Standard Deviation	Verbal Interpretation
Procedures (Sequence and Completeness)	3.53	.50	Highly Skilled
Wound Cleaning	3.43	.56	Highly Skilled
Application of Dressing and Bandaging Technique	3.36	.66	Highly Skilled
Time Efficiency and Safety	3.43	.50	Highly Skilled
As a Whole	3.43	.77	Highly Skilled

Note. 1.00 – 1.75 Low Skilled, 1.76 – 2.50 Moderately Skilled, 2.51 – 3.25 Skilled, 3.26 – 4.00 Highly Skilled

Table 2 shows the level of Citizen Training Program (CTP) students' first aid skills after the intervention in wound dressing and bandaging. Using the one-group pretest–post test quasi-experimental research design, the post test results represent the students' performance after exposure to the simulation-based instructional modules. The findings reveal an overall mean score of 3.43 with a standard deviation (SD) of 0.77, interpreted as Highly Skilled. This indicates that, quantitatively, students demonstrated a high level of competence in performing first aid procedures, with relatively more consistent performance as shown by the lower SD compared to the pretest. Across all criteria, including Procedures (Sequence and Completeness), Wound Cleaning, Dressing Technique, and Time Efficiency and Safety, students achieved high mean scores, reflecting improved mastery of both the technical steps and safety considerations. This suggests that students were able to perform the procedures more accurately, efficiently, and confidently after the intervention. In the context of the quasi-experimental design, the post test results indicate that the simulation-based instruction had a positive effect on students' first aid skills. The increase in mean score from the pretest to post test demonstrates a substantial improvement in skill level, while the reduced variability implies more consistent performance among students after the intervention. These findings are supported by previous studies. Research reported that structured and simulation-based learning significantly enhances students' clinical performance and retention of practical skills [10]. Similarly, the World Health Organization emphasized that repeated guided practice is essential in developing accurate, efficient, and safe clinical competencies [11]. These findings support the effectiveness of simulation-based instruction in improving students' first aid skills.

Table 3. The level of CTP students first aid skills before and after the intervention in wound dressing and bandaging

Criterion	N	Mean (Before)	Mean (After)	Mean Difference	Standard Deviation	t	df	sig.	Verbal Interpretation
Procedures (Sequence and Completeness)	30	2.00	3.53	1.53	.50	-16.55	29	.00	Significant
Wound Cleaning	30	1.80	3.43	1.63	.61	-14.54	29	.00	Significant
Application of Dressing and Bandaging Technique	30	1.76	3.36	1.60	.85	-10.25	29	.00	Significant
Time Efficiency and Safety	30	1.56	3.43	1.86	.68	-15.00	29	.00	Significant
As a Whole	30	1.78	3.43	1.65	1.21	-29.84	29	.00	Significant

Note. If $p < .05$, Reject H_0

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Table 3 show the pretest–post test results of Citizen Training Program (CTP) students' first aid skills in wound dressing and bandaging (N = 30). Using the one-group pretest–post test quasi-experimental research design, the results compare students' performance before and after the simulation-based intervention. The findings reveal that the pre intervention mean scores ranged from 1.56 (Time Efficiency and Safety) to 2.00 (Procedures), with an overall mean of 1.78 (SD = 0.89), interpreted as Moderately Skilled. After the intervention, the mean scores increased significantly, ranging from 3.36 to 3.53, with an overall mean of 3.43 (SD = 0.77), interpreted as Highly Skilled. The computed mean differences ranged from 1.53 to 1.86, with an overall mean gain (ΔM) of 1.65, indicating substantial improvement in students' performance.

To determine whether the observed differences were statistically significant, a paired-samples t-test was conducted. The results showed that all criteria yielded a p-value of .00, which is less than the level of significance ($p < .05$). The overall result, $t(29) = -29.84$, indicates a statistically significant difference between pretest and post test scores. Therefore, the null hypothesis is rejected, confirming that the simulation-based instructional intervention had a significant effect on improving students' first aid skills. In the context of the quasi-experimental design, the large increase in mean scores and the statistically significant results demonstrate the effectiveness of the intervention in enhancing both skill proficiency and consistency among students. Notably, the greatest improvement was observed in Time Efficiency and Safety ($\Delta M = 1.86$), which was identified as the weakest area during the pretest. This suggests that simulation-based activities effectively addressed students' initial limitations, particularly in performing tasks accurately under time and safety considerations. These findings are consistent with previous studies. Alrashidi et al. [10] reported significant improvements in students' clinical skills following simulation-based training, with comparable increases in performance scores. Similarly, study found that simulation enhances students' psychomotor skills and practical competence [8]. Studies emphasized that guided practice and structured debriefing are essential in improving learners' efficiency and safety in performing clinical procedures [12]-[9].

Furthermore, these results support established standards and guidelines. The World Health Organization [9] highlights the importance of repeated practice in developing safe and effective first aid skills, while the International Nursing Association for Clinical Simulation and Learning (INACSL) Standards [13] emphasize that simulation-based learning promotes critical thinking, problem-solving, and skill mastery. Consistent with these principles, the findings validate the effectiveness of experiential learning approaches in improving students' emergency response skills.

Although the study was limited to a short intervention period, the results strongly suggest that integrating simulation-based instruction into Physical Education curricula can significantly enhance students' first aid competence and preparedness in real-life situations.

CONCLUSIONS

Based on the findings, the following conclusions are made.

The simulation-based instruction is an effective approach in enhancing students' first aid skills in wound dressing and bandaging.

The result after eight-session intervention shows students achieved a high level of proficiency across all criteria.

There results demonstrated a statistically significant improvement confirmed that the intervention had a meaningful impact on their performance.

The results highlight the importance of experiential learning, as structured demonstrations, guided practice, and simulation activities helped improve students' accuracy, confidence, and consistency in performing first aid procedures.

The significant increase in students' performance from the pretest to the post test supports the effectiveness of simulation-based instruction as a teaching strategy for developing practical first aid skills.

Overall, the study concludes that integrating simulation-based learning into Physical and Health Education classes can effectively strengthen students' preparedness and competence in responding to real-life injury situations.

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