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The Effect of Syncope First Aid Training on The Knowledge and Practice of Youth Red Cross Students

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ABSTRACT

Introduction: Syncope is a common medical emergency among adolescents and frequently occurs during school activities, particularly during prolonged standing at flag ceremonies. A Youth Red Cross (Palang Merah Remaja/PMR) members frequently assisted students experiencing syncope but had limited knowledge and practical skills. This study aimed to analyze the effect of syncope first aid training on the knowledge and practice of PMR students.

Methods: A pre-experimental study with a one-group pretest–posttest design was conducted among 25 PMR students selected using total sampling. Syncope first aid training program consists of lectures, demonstrations, discussions, and practical simulations. Knowledge was assessed using a structured questionnaire, while practice was evaluated using a Standard Operating Procedure (SOP)-based observation checklist. The data were analyzed using the Wilcoxon Signed-Rank Test with a significance level of $p < 0.05$.

Results: Before the intervention, students showed moderate knowledge (44%) and passed the practice (56%). After training, students showed good knowledge (44%) and passed the practice (72%).. The Wilcoxon Sign Rank Test showed there was an effect of syncope first aid training on the knowledge ($p<0.001$) and practice ($p = 0.004$).

Conclusion: Knowledge and practice scores of PMR students improved following the syncope first aid training. These findings suggest that structured educational programs incorporating simulation may enhance students' preparedness to provide first aid for syncope in school settings. Community health nurses should collaborate to improve the capacity of Youth Red Cross members as first responders.

Keywords: First aid, Knowledge, Practice, Syncope and Youth Red Cross

INTRODUCTION

Syncope is a transient loss of consciousness caused by temporary cerebral hypoperfusion, characterized by rapid onset, short duration, and complete spontaneous recovery (Shen et al., 2017). It is one of the most common medical emergencies among adolescents, with approximately 15–25% of individuals experiencing at least one syncopal episode before adulthood (Brignole et al., 2018). Although syncope is generally considered benign, delayed or inappropriate first aid may lead to falls, traumatic injuries, prolonged recovery, psychological distress, disruption of school activities, and unnecessary healthcare utilization (Ruwald et al., 2021). Because syncope frequently occurs in school-aged populations, prompt and appropriate first aid is essential to minimize complications and ensure student safety.

School environments present several conditions that may precipitate syncope, including prolonged standing during flag ceremonies, strenuous physical activities, dehydration, heat exposure, emotional stress, and fatigue (Brignole et al., 2018). In Indonesia, syncope is commonly reported during school ceremonies and outdoor activities where students remain standing for extended periods under high environmental temperatures. In such situations, members of the Youth Red Cross (Palang Merah Remaja [PMR]) are often the first individuals expected to provide immediate assistance before professional healthcare services become available. As the school's first responders, PMR members are expected to recognize syncope promptly, perform appropriate first aid, prevent secondary injuries, and determine when further medical assistance is required. These responsibilities require not only willingness to help but also adequate knowledge and practical competence in evidence-based syncope first aid.

A preliminary assessment conducted at Muhammadiyah 7 Vocational High School Gondanglegi revealed that syncope was the most frequently encountered emergency case managed by PMR members and occurred during almost every Monday flag ceremony, with approximately five to six students experiencing syncope during school activities. Consequently, first aid management was generally limited to transferring victims to the school health unit, loosening restrictive clothing, and applying aromatic oil, while several essential procedures recommended in current first aid guidelines. These gaps in knowledge and practical skills may delay recovery, increase the risk of secondary injuries resulting from falls, and reduce the effectiveness of emergency responses within the school environment. Considering that PMR members are expected to serve as the primary first responders during school emergencies, strengthening their competence through structured syncope first aid training is essential to ensure safe, timely, and evidence-based management of students experiencing syncope.

Educational interventions incorporating demonstrations and simulation-based learning have been widely recommended in first aid education because they promote active learning, improve psychomotor performance, increase learners' confidence, and strengthen decision-making skills during emergency situations (Greif et al.,

2021). Simulation enables participants to practice first aid procedures in realistic scenarios while receiving immediate feedback, thereby narrowing the gap between theoretical knowledge and practical application. (Greif et al., 2021).

Several previous studies have demonstrated that educational interventions can improve first aid knowledge and skills among adolescents and school students. However, these studies have predominantly focused on basic life support, cardiopulmonary resuscitation, disaster preparedness, choking management, or general first aid education (Abelsson et al., 2021; Greif et al., 2021).

Unlike previous studies that primarily examined general first aid competencies or single learning outcomes, this study specifically evaluates syncope management through an integrated training program consisting of lectures, demonstrations, discussions, and simulation-based practice. Considering that syncope was identified as the most frequently encountered emergency managed by PMR members in the study setting, this study provides practical evidence for strengthening school-based emergency preparedness and developing competency-based first aid education for adolescent volunteers. This study aimed to analyze the effect of syncope first aid training on the knowledge and practice of PMR students.

METHOD

This study employed a pre-experimental one-group pretest–posttest design to evaluate improvements in knowledge and first aid practice following a structured syncope first aid training program. The study was conducted at Muhammadiyah 7 Vocational High School Gondanglegi, Malang Regency, Indonesia, during the 2023/2024 academic year. The study population comprised all members of the Youth Red Cross (Palang Merah Remaja [PMR]). Total sampling was applied, and all 25 PMR members who completed both the pretest and posttest were included in the study.

Participants attended a one-day syncope first aid training program conducted from 08:00 a.m. to 01:00 p.m. The training combined lectures, demonstrations, interactive discussions, and simulation-based practice covering the definition, causes, signs and symptoms, prevention, and first aid management of syncope. During the simulation session, participants practiced the essential steps of syncope first aid under instructor supervision, including scene safety, victim assessment, appropriate positioning, airway maintenance, lower limb elevation, and post-recovery monitoring.

Knowledge was assessed using a researcher-developed questionnaire consisting of 20 multiple-choice questions based on relevant literature and educational materials on syncope first aid. Each correct answer was scored 5 and each incorrect answer 0, yielding a maximum score of 100. Knowledge levels were classified as good (75–100), moderate (55–74), and poor (<55). Practical competence was evaluated using an observation checklist developed by the researchers based on the syncope first aid guidelines of the American Heart Association (AHA) and the Palang Merah Indonesia (PMI). The checklist assessed participants' performance in essential first aid

procedures using a three-point scale (0=not performed, 1=performed incompletely, and 2=performed correctly). Participants achieving at least 75% of the total score were categorized as pass, whereas those scoring below 75% were categorized as fail.

Data collection consisted of three stages: pretest, intervention, and posttest. Before the training, participants completed the knowledge questionnaire and practical assessment to establish baseline measurements. Following the one-day training program, participants completed the same questionnaire and practical assessment using identical procedures to evaluate improvements in knowledge and first aid practice. Participation was voluntary, and all participants received information regarding the study objectives and procedures before providing informed consent.

Data were analyzed using IBM SPSS Statistics version 22. Descriptive statistics were used to summarize participant characteristics and pretest–posttest results. Differences in knowledge and practice scores before and after the intervention were analyzed using the Wilcoxon Signed-Rank Test, with statistical significance set at $p < 0.05$.

RESULTS

A total of 25 Youth Red Cross (PMR) students participated in this study. The majority of respondents were female (88%), while male students accounted for 12%. More than half of the respondents had never provided first aid to a syncope victim before the training (56%).

Changes in participants' knowledge and first aid practice before and after the syncope first aid training are presented in Table 2. Overall, participants demonstrated improvements in both knowledge and practical performance following the training. An increase was observed in the proportion of participants with good knowledge and passing practical performance, whereas the proportions of participants with poor knowledge and failing practical performance decreased after the intervention. The Wilcoxon Signed-Rank Test showed statistically significant differences between pretest and posttest scores for both knowledge and first aid practice ($p < 0.05$), indicating significant improvements following the structured syncope first aid training program.

DISCUSSION

This study demonstrated significant improvements in both knowledge and first aid practice among Youth Red Cross (Palang Merah Remaja [PMR]) students following syncope first aid training. Compared with the pretest assessment, participants showed higher levels of knowledge and better practical performance after completing the training program. The Wilcoxon Signed-Rank Test confirmed statistically significant differences between pretest and posttest scores for both outcomes. These findings suggest that a structured training program combining lectures, demonstrations, discussions, and simulation was associated with improved preparedness of PMR students to recognize and provide appropriate initial management for syncope in the school setting.

The present study found a significant improvement in participants' knowledge following syncope first aid training.

Table 1. Characteristics of Respondents (n=25)

Characteristics	n	(%)
Gender		
Male	3	12%
Female	22	88%
Total	**25**	**100%**
Experience in Assisting Syncope Victims		
Ever assisted	11	44%
Never assisted	14	56%
Total	**25**	**100%**

This finding suggests that the structured educational intervention enhanced participants' understanding of syncope recognition and appropriate first aid management. Adequate knowledge is essential for Youth Red Cross (Palang Merah Remaja [PMR]) students because recognizing emergency situations accurately is the foundation for providing timely and appropriate first aid. The improvement in knowledge may be explained by the educational approach employed in this study,

Table 2. Knowledge and first aid practice before and after training

Variable	Pretest		Posttest		p-value
	n	(%)	n	(%)	
Knowledge					
Good	5	20.0%	11	44.0%	
Moderate	11	44.0%	10	40.0%	0.001
Poor	9	36.0%	4	16.0%	
First aid practice					
Pass	14	56.0%	18	72.0%	0.004
Fail	11	44.0%	7	28.0%	

which combined lectures, demonstrations, discussions, and simulation. According to Banfai et al. (2017) and Pakpahan et al. (2021), educational interventions facilitate the acquisition of new knowledge and encourage behavioral change through active participation in the learning process. In the present study, the integration of theoretical instruction with practical activities enabled participants to understand both the principles and application of syncope first aid, which may have contributed to the observed improvement in knowledge.

The findings of this study are consistent with previous studies on school-based first aid education. Abelsson et al. (2022) and Nur'aeni et al (2023) reported that structured first aid training significantly improved students' emergency response knowledge and preparedness. Similarly, Kelleher et al. (2022) found that school-based first aid education enhanced adolescents' ability to recognize emergency situations and increased their confidence in providing appropriate initial assistance. These findings suggest that structured educational programs delivered in school settings can effectively strengthen students' knowledge and preparedness to respond to health emergencies.

Furthermore, the active learning strategies used during the training may have contributed to better knowledge retention. The increase in knowledge

observed in this study may also be explained by the active learning approach used during the training. Ajani et al. (2022) reported that simulation-based learning significantly improved emergency preparedness among junior high school students by providing opportunities for active participation and experiential learning. Through simulated emergency scenarios, students were able to apply theoretical knowledge in practical situations, thereby enhancing both understanding and readiness to respond appropriately during emergencies. Lockey et al. (2023) emphasized that simulation-based learning promotes greater learner engagement and facilitates a deeper understanding than traditional lecture-based instruction alone. Through observation, demonstration, and simulated emergency scenarios, participants were able to connect theoretical concepts with practical experiences, thereby strengthening their understanding of syncope first aid. This learning process may explain why participants demonstrated better knowledge following the training intervention.

In addition to improving knowledge, this study also demonstrated a significant improvement in participants' first aid practice following syncope first aid training. This finding suggests that the training program enhanced participants' ability to perform appropriate first aid procedures for syncope. Practical competence is a critical outcome of first aid education because effective emergency response requires not only cognitive understanding but also the ability to apply knowledge accurately and confidently in real-life situations.

The improvement in practical performance may be attributed to the use of demonstrations and simulation-based learning during the training. According to the European Resuscitation Council (2021), first aid skills are psychomotor competencies that are best developed through observation, demonstration, repeated practice, and performance feedback. In the present study, participants actively practiced each step of syncope first aid under supervision, allowing them to develop procedural skills while receiving immediate guidance and correction. This experiential learning process likely contributed to the improvement in first aid performance.

This finding is further supported by Mujlli et al. (2024), who emphasized that simulation-based education provides realistic learning experiences that enhance psychomotor competence, critical thinking, and decision-making during emergency situations. Repeated exposure to simulated scenarios enables learners to perform first aid procedures more accurately and confidently when encountering actual emergencies.

The findings of this study are consistent with previous research demonstrating the effectiveness of simulation-based first aid education. Lockey et al. (2023) reported that practical simulation exercises improved students' confidence and ability to perform emergency procedures correctly. Similarly, Hung et al. (2021) reported that non-resuscitative first aid training delivered to junior secondary school students using a pretest–posttest approach significantly improved participants' knowledge, practical skills, and confidence in providing first aid. These findings suggest that structured first

aid training enhances not only cognitive competence but also the psychomotor skills required to respond effectively to emergency situations.Likewise, Abelsson et al. (2022) concluded that hands-on first aid training was associated with better skill acquisition and longer retention than theoretical instruction alone. These findings indicate that combining theoretical instruction with supervised practical training provides an effective approach for developing first aid competencies among adolescents.

Furthermore, the improvement in practical skills observed in this study may also be related to the increase in participants' knowledge. Knowledge provides the cognitive foundation for selecting and performing appropriate first aid actions. As reported by Kelleher et al. (2022), students who understand the rationale underlying first aid procedures are more likely to apply those procedures correctly during emergency situations. In the present study, participants first acquired theoretical knowledge before applying it through demonstrations and simulation, enabling them to translate knowledge into practical competence.

CONCLUSION

This study demonstrated that syncope first aid training significantly improved the knowledge and practical skills of Youth Red Cross (Palang Merah Remaja [PMR]) students. A structured educational program combining lectures, demonstrations, discussions, and simulations may enhance students' preparedness to respond to medical emergencies. However, this study has several limitations, including the use of a one-group pretest–posttest design without a control group, a relatively small sample from a single vocational high school, immediate post-intervention assessment without long-term follow-up, and the absence of formal validity and reliability testing of the instruments. Future research should employ controlled experimental designs with larger and more diverse samples, validated measurement instruments, and long-term follow-up to evaluate knowledge retention and practical skill performance.

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