

Empowering Middle School Students with First Aid Knowledge for Everyday Injuries

A Cross-Cultural Community Engagement Program in Krabi, Thailand

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ABSTRACT

Children and adolescents aged 6 to 15 years are a vulnerable age group prone to injuries due to high curiosity and limited awareness or response to hazards. Data indicate that approximately 42.56% of middle school students experience injuries, ranging from minor to severe. The most common types of injuries include falls, sprains, puncture wounds, lacerations, fractures, bruises, foreign body intrusion, and traffic accidents. The most frequent injury sites are the lower limbs (67.9%), followed by the upper limbs (32.7%) and the head (11.9%). This community service program was designed to equip middle school students at Ekkapap International School, Krabi, Thailand, with essential first aid knowledge for everyday injuries. The theme was selected to provide basic health literacy through practical, interactive, and engaging approaches. The methods included wound illustration, hands-on activities such as wound cleaning, dressing with gauze, applying adhesive bandages, and simulation and role-play as first responders in emergencies. The results demonstrated a significant improvement in the knowledge of 40 participating students. The average pre-test score was 61, which markedly increased to 93 in the post-test. Statistical analysis confirmed a highly significant difference between pre- and post-intervention scores. Visual and hands-on methods proved highly effective, even in a cross-cultural context, highlighting that empathy and the willingness to help are universal values.

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Introduction

Student health and safety are fundamental aspects of the educational environment, particularly at the middle school level. Children and adolescents aged 6 to 15 are especially vulnerable to injuries due to their developmental characteristics marked by high curiosity, a tendency to experiment, and an underdeveloped capacity to recognize or respond to potential hazards. Such injuries can occur in various settings, from the home to public spaces such as schools.

Globally, injuries remain a significant public health concern. In the ASEAN region, an estimated 35.5 million injury cases were reported in 2021, resulting in approximately 317,000 deaths. In Southeast Asia, 42.2% of adolescents reported experiencing at least one serious injury in the past 12 months, with Thailand showing a higher prevalence at 46.8%. Consistent with these figures, recent data indicate that 42.56% of middle school students experienced injuries, most commonly affecting the lower limbs (67.9%), upper limbs (32.7%), and head (11.9%). The most frequent causes include sports or play (9.9%), walking or running (5.1%), cycling or scooter use (3.5%), and traffic accidents (6.1%). These statistics highlight an urgent need for first aid education tailored to the types of injuries most prevalent among this age group.

First aid education in schools is widely recognized as an essential life skill, empowering individuals to respond effectively in emergencies while fostering a culture of care and responsibility. Adequate first aid preparedness can reduce preventable injury severity and mortality by enabling timely intervention for conditions ranging from minor wounds and sprains to more serious incidents. In Thailand, the School Health Program provides a strong policy framework to support such initiatives, prioritizing health education, healthy school environments, school health services, and strong school–home connections. Within this context, first aid training at Ekkapap International School aligns with national priorities and offers potential for integration into broader health promotion strategies.

Despite the high prevalence of injuries among adolescents, significant gaps persist in their essential knowledge and practical skills related to first aid and wound care. Baseline assessment in the current program revealed an average pre-test score of 61, indicating insufficient understanding of basic first aid principles. Inadequate or delayed intervention can exacerbate injuries, increase the risk of complications such as infection, prolong recovery time, and, in severe cases, lead to avoidable disability or death. Beyond knowledge, many adolescents lack the confidence and willingness to act as first responders due to limited training or fear of making mistakes, a phenomenon often called the “bystander effect.”

Addressing these barriers requires programs that teach what to do and build the courage to act. This program aimed to empower middle school students with essential theoretical knowledge, practical first aid skills, and confidence through interactive methods such as wound illustration, hands-on practice, and role-play. Specific objectives were to (1) significantly improve students' theoretical understanding of common injuries and wound care; (2) develop fundamental first aid skills, including wound cleaning, dressing, and bandaging; (3) increase students' confidence and willingness to act in emergency scenarios; and (4) promote empathy and social responsibility toward peers and the wider community. These objectives position the program as a skills-based intervention and a holistic educational approach contributing to individual development and public health outcomes.

Material and Methods

A. Target Audience

The primary target audience of this community engagement program was middle school students at Ekkapap International School, Krabi, Thailand, generally aged between 11 and 17 years. This demographic was selected based on both strategic and scientific considerations. Adolescents at this age possess sufficient cognitive abilities to understand complex first aid concepts and the physical coordination required to perform basic first aid techniques. They are also highly vulnerable to everyday injuries within and outside the school environment, making first aid knowledge directly relevant to their safety and well-being. Providing these skills at an early stage can reduce injury severity and enhance their capacity to respond effectively in emergencies.

B. Program Design and Approach

The program was designed as a comprehensive and interactive intervention to optimize knowledge acquisition, skill development, and confidence-building. Four primary instructional methods were employed:

1. Lectures – Delivery of foundational concepts and key principles of first aid and wound care in a structured format.
2. Discussion and Q&A – Opportunities for students to ask questions, share experiences, and analyze scenarios to deepen understanding and encourage critical thinking.
3. Hands-On Simulation – Direct practice using demonstration tools to identify wound types, clean wounds with clean water, apply gauze dressings, and use adhesive bandages. These simulations aimed to develop muscle memory and confidence in applying the technique.

4. Role-Play as First Responders – Students alternated roles as first responders and injured individuals in realistic emergencies, enabling them to practice decision-making under pressure, effective communication, and calm crisis responses.

These methods were selected based on evidence in first aid education literature, which shows that active learning approaches, remarkably realistic simulations, increase retention rates and self-confidence compared to lecture-based instruction alone.

C. Procedures

1. Preparation

The preparation stage began with securing official assignment letters from the Institute for Research and Community Engagement, Universitas Aisyiyah Bandung, which formally authorized the program. A needs assessment was conducted through an informal situational analysis to identify the most common types of injuries locally, assess students' baseline knowledge, and anticipate potential cultural or linguistic barriers. In Thailand, coordination meetings were held with the President of the Association for Education and Cultural International (AECI) to ensure that the program content was relevant and culturally appropriate. Additionally, educational materials and pre-/post-test questionnaires were developed; the questionnaires were designed to gather respondents' demographic characteristics and knowledge of first aid practices.

2. Implementation

During implementation, technical coordination was conducted with the school principal and the Krabi International Community Engagement Coordinator to determine the schedule and align program activities with school routines. Logistical arrangements were made with AECI, including preparing laptops, LCD projectors, and printed questionnaires. The program commenced at 10:00 a.m. local time, starting with an introductory session and an ice-breaking quiz to engage students, followed by storyboard-based lectures, hands-on practice, and role-play activities. A total of forty students participated in the session. For data collection, a pre-test was administered prior to the educational session. At the same time, the post-test was conducted one week later to measure short-term retention rather than immediate recall.

3. Evaluation

The evaluation phase measured the program's effectiveness by comparing students' pre- and post-test scores. The deliberate one-week interval between the delivery of the session and the post-test ensured that the assessment captured retained knowledge rather than short-term memorization, providing a more accurate picture of the intervention's educational impact.

Results

A. Participant Characteristics

A total of 40 middle school students participated in the program. The age distribution was as follows: <13 years (n = 3; 7.5%), 13–15 years (n = 27; 67.5%), and >15 years (n = 10; 25%), with the majority (n = 27) falling within the core middle school age group of 13–15 years. Regarding gender, 23 participants (57.5%) were female and 17 (42.5%) were male, indicating a slightly higher proportion of female students.

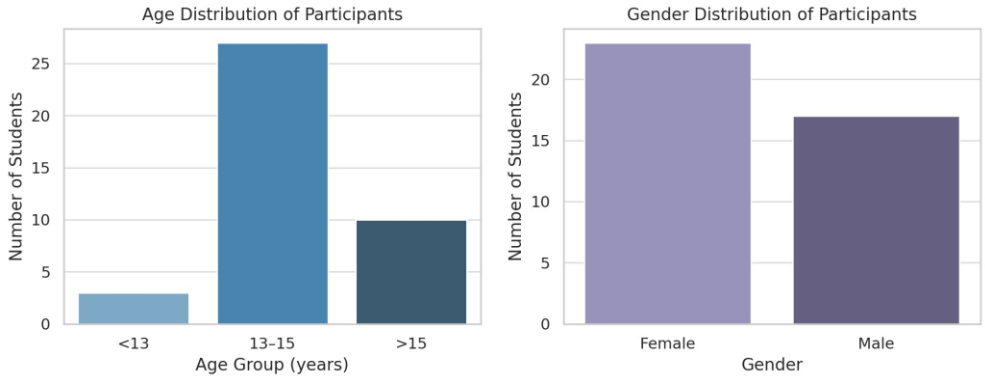


Fig. 1. Participant's Characteristics

B. First Aid and Wound Care Knowledge

During the implementation of this activity, students received an explanation and demonstration of first aid procedures. Interactive discussions and hands-on practice by the students followed the session. Fig. 1 captures the situation in the classroom during the explanation session.

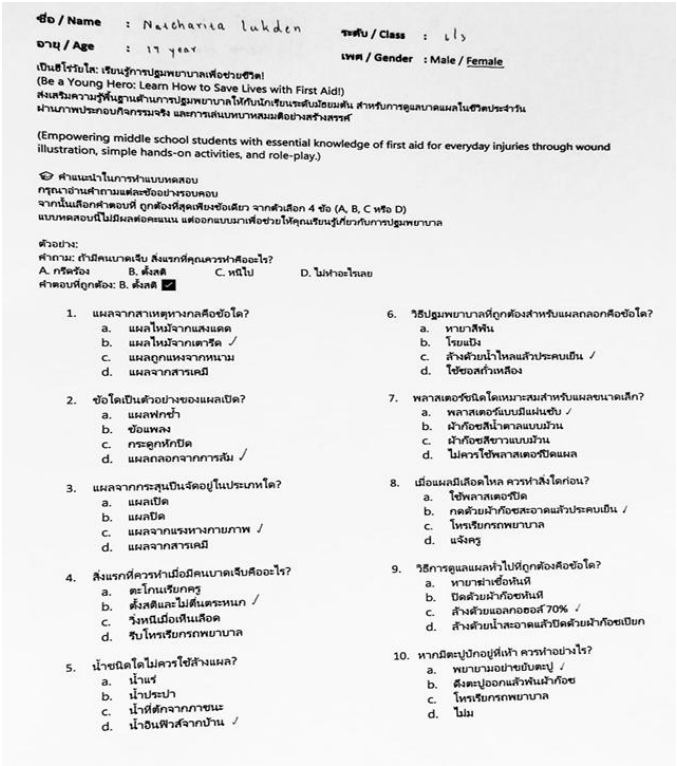


Fig. 2. Activity demonstrating the explanation of first aid procedures during an accident scenario

The assessment instrument (Fig. 3) was designed to measure students' understanding of first aid procedures in the event of an accident. The instrument, presented in Thai to ensure linguistic and cultural relevance, consisted of multiple-choice and short-answer

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questions. These questions evaluated knowledge of common injury types, appropriate immediate responses, and the correct sequence of first aid actions. The use of the local language aimed to minimize comprehension barriers and accurately reflect students' baseline knowledge and their learning progress following the educational intervention.



ชื่อ / Name : Natcharita Lukden ระดับ / Class : ม.1/3
อายุ / Age : 13 year เพศ / Gender : Male / Female

เป็นฮีโร่วัยใส: เรียนรู้การปฐมพยาบาลเพื่อช่วยชีวิต!
(Be a Young Hero: Learn How to Save Lives with First Aid!)
ส่งเสริมความรู้พื้นฐานด้านการปฐมพยาบาลให้กับนักเรียนระดับมัธยมต้น สำหรับการดูแลบาดแผลในชีวิตประจำวัน
ผ่านภาพประกอบกิจกรรมจริง และการสนับสนุนทางสังคมอย่างสร้างสรรค์

(Empowering middle school students with essential knowledge of first aid for everyday injuries through wound illustration, simple hands-on activities, and role-play.)

คำแนะนำในการทำแบบทดสอบ
กรุณาอ่านคำถามแต่ละข้ออย่างรอบคอบ
จากนั้นเลือกคำตอบที่ ถูกต้องที่สุดเพียงข้อเดียว จากตัวเลือก 4 ข้อ (A, B, C หรือ D)
แบบทดสอบนี้ไม่มีผลต่อคะแนน แต่ออกแบบมาเพื่อช่วยให้คุณเรียนรู้เกี่ยวกับการปฐมพยาบาล

ตัวอย่าง:
คำถาม: ถ้ามีคนบาดเจ็บ สิ่งแรกที่คุณควรทำคืออะไร?
A. กรีดร้อง B. ตั้งสติ C. หนีไป D. ไม่ทำอะไรเลย
คำตอบที่ถูกต้อง: B. ตั้งสติ ✓

1. แผลจากสาเหตุทางกลคือข้อใด?
   a. แผลไหม้จากแสงแดด
   b. แผลไหม้จากเตารีด ✓
   c. แผลถูกแทงจากหนาม
   d. แผลจากสารเคมี

2. ข้อใดเป็นตัวอย่างของแผลเปิด?
   a. แผลฟกช้ำ
   b. ข้อแพลง
   c. กระดูกหักปิด
   d. แผลถลอกจากการล้ม ✓

3. แผลจากกระสุนปืนจัดอยู่ในประเภทใด?
   a. แผลเปิด
   b. แผลปิด
   c. แผลจากแรงทางกายภาพ ✓
   d. แผลจากสารเคมี

4. สิ่งแรกที่ควรทำเมื่อมีคนบาดเจ็บคืออะไร?
   a. ตะโกนเรียกครู
   b. ตั้งสติและไม่ตื่นตระหนก ✓
   c. วิ่งหนีเมื่อเห็นเลือด
   d. รีบโทรเรียกกรมพยาบาล

5. น้ำชนิดใดไม่ควรใช้ล้างแผล?
   a. น้ำแร่
   b. น้ำประปา
   c. น้ำที่ต้มจากภาชนะ
   d. น้ำอินฟิวส์จากบ้าน ✓

6. วิธีปฐมพยาบาลที่ถูกต้องสำหรับแผลถลอกคือข้อใด?
   a. หายาสีฟัน
   b. โรยแป้ง
   c. ล้างด้วยน้ำไหลแล้วประคบเย็น ✓
   d. ใช้ขอสกั๋วเหลือง

7. พลาสเตอร์ชนิดใดเหมาะสมสำหรับแผลขนาดเล็ก?
   a. พลาสเตอร์แบบมีแผ่นซับ ✓
   b. ผ้าก๊อซสีน้ำตาลแบบม้วน
   c. ผ้าก๊อซสีขาวแบบม้วน
   d. ไม่ควรใช้พลาสเตอร์ปิดแผล

8. เมื่อแผลมีเลือดไหล ควรทำสิ่งใดก่อน?
   a. ใช้พลาสเตอร์ปิด
   b. กดด้วยผ้าก๊อซสะอาดแล้วประคบเย็น ✓
   c. โทรเรียกรถพยาบาล
   d. แจ้งครู

9. วิธีการดูแลแผลทั่วไปที่ถูกต้องคือข้อใด?
   a. หายาฆ่าเชื้อทันที
   b. ปิดด้วยผ้าก๊อซทันที
   c. ล้างด้วยแอลกอฮอล์ 70% ✓
   d. ล้างด้วยน้ำสะอาดแล้วปิดด้วยผ้าก๊อซเปียก

10. หากมีตะปูปักอยู่ที่เท้า ควรทำอย่างไร?
    a. พยายามอย่าขยับตะปู ✓
    b. ดึงตะปูออกแล้วพันผ้าก๊อซ
    c. โทรเรียกรถพยาบาล
    d. ไม่ม

Fig. 3. Assessment instrument for measuring understanding, presented in the Thai language

Knowledge levels were assessed through a pre-test conducted before the educational intervention and a post-test administered one week later. The mean pre-test score was 61, indicating limited baseline understanding of first aid and wound care among participants. After the intervention, the mean post-test score increased to 93, reflecting a substantial improvement of 32 points. This gain strongly suggests the program's effectiveness, which combined wound illustrations, hands-on activities, and role-play to enhance theoretical understanding and practical application skills. The magnitude of improvement indicates that students absorbed the information and were likely to retain and apply it in real-life situations.

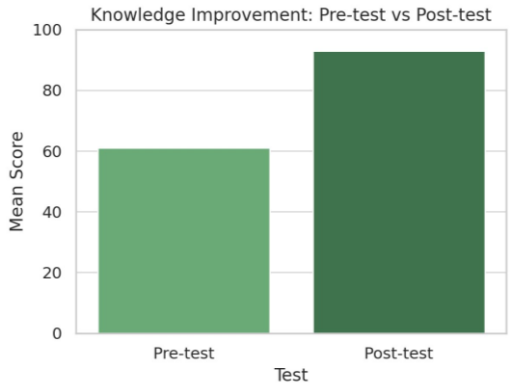


Fig. 4. Knowledge Improvement: Pre-test and Post-test

C. Statistical Analysis

To evaluate the significance of the observed improvement, a paired t-test was conducted, comparing pre- and post-test scores from the same participants. The analysis met key assumptions for the paired t-test: the dependent variable (knowledge score) was continuous, the data were paired, and, with n = 40, the Central Limit Theorem supports robustness to minor deviations from normality. The mean difference ($\bar{d}$) between pre- and post-test scores was 32 points (93 – 61). With a standard deviation of the differences (s_e) 15, the standard error (SE_e) was approximately 2.37, yielding a t-statistic of 13.5 with 39 degrees of freedom. This result corresponds to a p-value far below 0.001, indicating a statistically significant increase in students' knowledge following the intervention.

Discussion

The statistical analysis revealed a highly significant difference between pre- and post-test scores, with a *p*-value of less than 0.001. This result indicates that the 32-point increase in mean scores from 61 before the intervention to 93 afterward is improbable to have occurred by chance. This improvement's magnitude suggests statistical significance and substantial practical relevance in the context of health education. Students did not merely acquire marginally more information; they developed a more profound, functional understanding of first aid, aligning well with the program's objective of empowering middle school students with essential first aid knowledge.

The paired *t*-test was particularly suited for this evaluation, as it controlled for inter-individual variability by comparing each student's performance before and after the intervention. This approach enhanced the test's power to detect the actual effect of the program. The findings are consistent with previous studies demonstrating the effectiveness of school-based first aid training in improving adolescent knowledge and skills.

The marked improvement supports the effectiveness of the interactive learning methods, wound illustrations, hands-on practice, and role-play scenarios. These approaches facilitated cognitive understanding and enhanced students' confidence and ability to apply first aid skills in real-life situations, which is a crucial component of competence.

Despite these successes, several challenges emerged. The limited duration of the program restricted opportunities for repeated simulations and deeper role-play exercises, which are essential for skill mastery and confidence-building. Language barriers also posed a notable challenge; the inability to fully understand Thai-language questionnaires may have affected data validity by introducing potential response bias. This underscores the need for linguistically and culturally validated evaluation tools in cross-cultural settings.

Nevertheless, participant engagement remained high, as evidenced by the active participation of all 40 students and the substantial post-test score improvement. These findings suggest that adolescents perceive first aid training as an important and motivating component of their education, primarily through engaging, active learning methods.

In summary, the "Be a Young Hero: Learn How to Save Lives with First Aid" program achieved its primary objective of significantly enhancing students' first aid knowledge. However, to maximize future impact, program refinements should address identified limitations—specifically, extending training duration, adopting multilingual and culturally adapted evaluation materials, and exploring integrating first aid education into school curricula. Additionally, follow-up studies examining long-term retention of knowledge and skills would provide valuable insights into the sustainability of the program's benefits.

Conclusion

The "Be a Young Hero: Learn How to Save Lives with First Aid" program significantly improved first aid knowledge among middle school students, as evidenced by the substantial 32-point increase in mean test scores and the statistically significant p-value (< 0.001). The interactive, hands-on learning methods effectively engaged students and fostered understanding and confidence in applying first aid techniques. While the program successfully met its objectives, limitations such as limited training time and language barriers highlight the need for enhancements. Future implementations should extend practice opportunities, integrate culturally and linguistically adapted materials, and consider embedding first aid training into regular school curricula. By addressing these areas, such initiatives can have a sustained impact, empowering youth with essential life-saving skills that extend beyond the classroom into their communities.

Conflict of Interest

The authors declare no conflict of interest.

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