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Original article

Effectiveness of First Aid Training on Knowledge Among Students in Pathanamthitta District, Kerala: A Pre-Post Study

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ABSTRACT

Background: Sudden illness, injury, or animal bites can often be serious unless proper care is administered promptly. First aid is immediate attention to one suffering from illness or injury. Everyone should be able to give effective assistance so that an injured person can receive professional medical care. **Objectives**: This study was conducted to evaluate the effectiveness of first aid knowledge among students regarding common health emergencies and their corresponding first aid measures, through training sessions on first aid delivered via lectures. **Methods**: In this prospective cross-sectional study, 500 students were selected from 5 different streams. Data were collected using a seven-part questionnaire, with the first part including demographic information and general questions, and the remaining six parts covering knowledge on common injuries such as electric shock, burns, snake bites, heart attacks, choking, and fractures. Pre-test and post-test assessments of knowledge scores were carried out immediately after a training session on first aid for all students. **Results**: The findings revealed that the majority of the students possessed good knowledge of first aid for snake bites and burns compared to other injuries. Training on first aid significantly improved knowledge about all health emergencies among all students, as evident from post-test scores. Training sessions have brought about significant improvement in the knowledge of all participants. **Conclusion**: First aid training significantly improved students' knowledge of managing common health emergencies, highlighting the importance of incorporating regular first aid education programs to enhance emergency preparedness and response skills among students.

1. INTRODUCTION

First aid is the crucial, immediate care provided to a person who has been injured or suddenly taken ill. Immediate first aid when provided to patients who require emergency care makes a huge difference to the outcome (Missel et al., 2023). First aid knowledge is a prerequisite for individuals to provide immediate care in emergencies, potentially saving lives and preventing further injuries (Ganfure et al.,2018). A first aid provider delivers care using appropriate competencies, acknowledges their limitations, and seeks additional assistance when necessary. A first aid kit is an essential component of safety preparedness, whether at home, school, or on travel (Aras et al., 2022). Globally, injuries account for approximately 5 million deaths annually, with many more suffering from disabilities. In India, road traffic injuries alone claim

over 150,000 lives each year. Students are particularly vulnerable, as they spend most of their day in school and are more likely to be involved in sports and extracurricular activities, increasing their risk of accidents and injuries (Tse et al., 2023). In fact, studies suggest that up to 20% of sudden injuries occur during school and college hours (Banfai et al., 2017). Having adequate knowledge of first aid can enhance confidence in responding to emergencies, reducing panic and anxiety. Moreover, research shows that timely and effective first aid can reduce mortality rates by up to 40%. Despite its importance, many students lack basic first aid knowledge, highlighting the need for targeted education and training programs (Vinay & Sushmitha, 2022). The pre-test and post-test design evaluates the effectiveness of a first aid training intervention by assessing baseline knowledge, measuring knowledge gain, and comparing pre-post scores, which is more typical of quasi-experiments than traditional cross-sectional studies, potentially making the study's classification misleading. This study aims to assess the effectiveness of first aid education among students in Pathanamthitta district, Kerala, and evaluate the impact of a targeted training program on improving their knowledge and skills.

2. MATERIALS AND METHODS

2.1 Study design

Prospective cross-sectional study

2.2 Study Site:

Randomly selected schools and colleges in Pathanamthitta district, Kerala.

2.3 Study Duration

The study was conducted for a period of 6 months (December 2024 – May 2025).

2.4 Sample Size

The study involved 500 students, i.e., 100 each from 5 streams (High School, Higher Secondary, Arts & Science, Engineering, and Pharmacy).

Sample size formula:

$$\text{Sample size} = \frac{z2 \times p(1-p)/e2}{1 + [z2 \times p(1-p)/e2N]}$$

N = Population size
z = Score
e = Margin of error
p = Standard deviation

2.5 Study Approval

The study was approved by the Institutional Review Board of Nazareth College of Pharmacy.

2.6 Study Criteria

The study will be conducted based on the following criteria.

Inclusion Criteria

- Population of age 15 – 24 years willing to voluntarily participate.
- Able to read and understand English or Malayalam.
- Students studying in high school and higher secondary, and those studying various courses like Pharmacy, Engineering, Arts, and Science.

Exclusion Criteria

- Unwilling to participate.
- Incomplete participant response.

2.7 Study Sources

The data required for the study were collected from the school and college students.

2.8 Study Materials

Self-administered questionnaire.

2.9 Study Procedure

The study procedure involved obtaining permission from the school and college authorities to conduct our study on first aid knowledge assessment among students. An informed consent form was given, and after obtaining consent, the self-administered questionnaire was given to the subjects. Data were collected using a seven-part questionnaire, with the first part including demographic information and general questions, and the remaining six parts covering knowledge on common injuries such as electric shock, burns, snake bites, heart attacks, choking, and fractures. The survey was conducted in two languages – English and Malayalam, depending on the preferences of the respondents. Participant names were collected on the questionnaire for tracking pre-post responses. To maintain confidentiality, names were removed and replaced with unique IDs before data analysis, ensuring responses weren't linked to individual identities. The questions were explained to

the students when needed. A PowerPoint presentation [PPT] on first aid procedures for selected common injuries was delivered to the students. Following this, a post-education questionnaire was administered to analyse students' understanding of the presentation.

2.10 Data Analysis

The data collected were entered into Microsoft Excel 2021, and the results were tabulated, with graphs created.

3. RESULTS

This was a cross-sectional study conducted in schools and colleges. The study aimed to obtain data and to evaluate the effectiveness of first aid education among students. A total of 500 students participated in the study, with a mean age of 15-24. The data were collected using a questionnaire (Table 1).

The pre-test assessment revealed inadequate knowledge of first aid for various emergencies, with a high proportion of participants scoring poorly (0-2) in electric shock (38.2%), heart attack (57.6%), choking (60.2%), and fracture (51%). In contrast, moderate knowledge was observed for snake bite (45.4% scored 3-4) and burns (36.6% scored 3-4).

However, the post-test results showed significant improvement in knowledge, with a substantial increase in the proportion of participants scoring good (5-6) in all areas: electric shock (84%), burns (90.4%), snake bite (92.6%), heart attack (79.2%), choking (79.8%), and fracture (79.6%). Notably, the proportion of participants scoring poorly (0-2) decreased drastically, indicating a positive impact of the training program.

Pre-test and post-test scores showed statistically significant improvement ($p<0.05$) in a t-test.

The data suggest that the first aid training program was effective in enhancing students' knowledge of emergency care procedures, with a significant shift from poor to good knowledge categories across all assessed areas.

4. DISCUSSION

First aid is typically administered by a non-expert or a trained individual until medical professionals can take over. The aim of this study was to evaluate the effectiveness of first aid education among students in schools and colleges. The study population consists of 500 students from schools and colleges. The study was a cross-sectional study. The data of the participants were collected using self-administered questionnaires and Google Forms. From our study, it was found that out of 500 participants, the majority of the participants possess good knowledge of first aid for snake bite and burns compared to other common injuries. After training, it was significantly increased. The level of knowledge about first aid was not good among the majority of the students before training, and there is a need for formal first aid training to be introduced in the medical curriculum. Many people in need of medical care in emergency situations die due to delayed first aid. Considering that brain death occurs in the first 3–5 minutes after cardiac arrest, emergency care provided by first responders (persons without medical education) before the arrival of the emergency crew is necessary to save lives. Some researchers have assessed the effectiveness of first aid training among schoolchildren, students, teachers, drivers and security personnel, non-professionals, and university academic and administrative staff.

In our study, among the 500 students, only 15.6% of students had good knowledge of electric shock before training and it significantly increased to 90.4% after training (Table 2). A similar study conducted by Chandrachood et al., 2019 shows that only 15.1% of students have good knowledge of electric shock before training.

In our study, among the 500 students, only 29.6% of students had good knowledge of burns before training and this significantly increased to 90.4% after training. A study conducted by Riaz Z et al., 2020 regarding first-aid management, aspects shows that one of the findings was the positive impact of burn first-aid training on the average knowledge score of the participants. Students who have received some form of formal training have gained a higher mean knowledge score ($P < 0.01$).

In our study, among the 500 students, only 38.2% of students had good knowledge of snake bite before training and this significantly increased to 92.6% after training. A similar study conducted by Shinde et al., 2020 shows that 17.7% of students have good knowledge of snake bite before training and it is significantly increased to 62.2% after training.

In our study, among the 500 students, only 5% of students had good knowledge of heart attack before training and it significantly increased to 79.8% after training. Siddiqui et al. (2018) reported that their study, which was carried out on high school students in Riyadh, Saudi Arabia, indicates that school students lacked CPR knowledge before training. As regards cardiopulmonary resuscitation among adults & children, the study results reported that there were highly statistically significant improvements in the total

Table 1. Important first aid questions from each sections.

Questions	Answer
(1) Items should be avoided when trying to help someone experiencing an electric shock	(a) Wood, plastic
	(b) Metal, water
	(c) Insulated tools
	(d) Fire extinguisher
(2) First step in treating a burn	(a) Cool the burn with cool tap water
	(b) Apply ice directly to the burn
	(c) Covering the burn with a bandage
(3) First aid measure for snake bite	(a) Immobilize the affected limb
	(b) Clean the wound with soap and water
	(c) Apply heat
	(d) All of the above
(4) Number of compressions do per minute while performing CPR	(a) 30-60
	(b) 70-90
	(c) 100-120
	(d) 140-160
(5) Correct sequence for choking first aid	(a) Back blows, Heimlich, call 112
	(b) Cough, back blows, Heimlich
	(c) Call 112, back blows, Heimlich
(6) Action to be avoided when treating an open fracture	(a) Cleaning the wound
	(b) Applying antibiotic ointment
	(c) Moving the affected limb
	(d) All of the above

Table 2 : Knowledge about first aid for common injuries

SL.NO.	QUESTIONS ABOUT	KNOWLEDGE					
		PRE TEST		POST TEST (IMMEDIATELY)			
		POOR (0-2)	MODERATE (3-4)	GOOD (5-6)	POOR (0-2)	MODERATE (3-4)	GOOD (5-6)
1	First aid for electric shock	191(38.2%)	231 (46.2%)	78 (15.6%)	6 (1.2%)	74 (14.8%)	420 (84%)
2	First aid for burns	169(33.8%)	183 (36.6%)	148(29.6%)	5 (1%)	43(8.6%)	452(90.4%)
3	First aid for a snake bite	82(16.4%)	227(45.4%)	191(38.2%)	5(1%)	32(6.4%)	463(92.6%)
4	First aid for a heart attack	288(57.6%)	187(37.4%)	25(5%)	14(2.8%)	90(18%)	396(79.2%)
5	First aid for choking	301(60.2%)	170(34%)	29(5.8%)	20(4%)	81(16.2%)	399(79.8%)
6	First aid for a fracture	255(51%)	195(39%)	50(10%)	14(2.8%)	88(17.6%)	398(79.6%)

practice post-training program at $p = 0.001$.

In our study, the knowledge post-test score of students was significantly higher compared to the pre-test knowledge score about first aid management of selected minor injuries such as electric shock, burns, snake bite, heart attack, choking, and fracture. The reports were found similar to the study conducted by Sharma et al. (2014), which also shows that 72-80% of primary school teachers have improved their knowledge regarding first aid management for emergency conditions on school campuses. In our study, among the 500 students, only 10% of students had good knowledge of fractures before training and it significantly increased to 79.6% after training. Concerning the management of fracture, a study conducted by Karaca et al., 2020 revealed that there were highly significant improvements in the level of knowledge throughout the study at $p=0.0001$ following training, suggesting an increase in knowledge among the participants after the training program.

Further research is needed to examine the long-term impact of first aid training on people's

ability to respond effectively to emergencies. Organisations and institutions should continue to prioritise first aid training for non-medical professionals to ensure they are prepared to act quickly and decisively in emergencies.

5. CONCLUSION

The educational session on first aid was effective, enhancing students' understanding of first aid. Our study intends to educate and raise general knowledge on selected common injuries of first aid among the students. There is a definite need for strengthening the knowledge among students through regular quality training programs on first aid in schools and colleges. Training sessions combining knowledge and skills have brought about significant improvement in the knowledge of all participants.

List of Abbreviations

BLS : Basic Life Support
CPR : Cardio Pulmonary Resuscitation

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Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this manuscript.

Declaration of Generative AI

No artificial intelligence (AI) tools were used in the preparation of this manuscript

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