



EFFECTIVENESS OF THE EDoP METHOD IN IMPROVING ADOLESCENTS' KNOWLEDGE OF FIRST AID FOR VENOMOUS ANIMAL BITES: A QUASI-EXPERIMENTAL STUDY

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Abstract

Knowledge of first aid during a venomous animal bite is a skill that must be possessed by every individual, because this condition requires appropriate and immediate assistance at the scene. The right learning method will determine the success of the learning objectives. This study aims to analyze the effectiveness of learning using the EDoP (Education Demonstration and Practice) method on knowledge of first aid for venomous animal bites. The research design employed a one-group pre-posttest quasi-experimental study, which was analyzed using the Wilcoxon Signed-Rank Test. The research sample consisted of 50 adolescent students (12-18 years old) who were studying in junior high school and senior high school. The results showed that the majority of respondents fell into the Early Adolescence age category (53.3%), identified as female (56.7%), and had a senior high school education (58.3%). Before the intervention, 13.3% of respondents had low knowledge, and 15.0% had moderate. Then, after the EDoP intervention, 98.3% of respondents had high knowledge. The results of the Wilcoxon Signed Ranks test showed a significant difference between the percentage values before and after the intervention ($Z = -4.922$; $p < 0,001$), so it can be concluded that the intervention provided suggests potential effectiveness in increasing respondents' knowledge in providing first aid in the event of a venomous animal bite.

Keywords: Adolescents, EDoP Methods, First Aid, Knowledge, Venomous Animal Bites

Abstrak

Pengetahuan tentang pertolongan pertama pada gigitan hewan berbisa merupakan keterampilan yang harus dimiliki oleh setiap individu, karena kondisi ini memerlukan penanganan yang tepat dan segera di lokasi kejadian. Metode pembelajaran yang tepat akan menentukan keberhasilan tujuan pembelajaran. Penelitian ini bertujuan untuk menganalisis efektivitas pembelajaran menggunakan metode EDoP (Education Demonstration and Practice) terhadap pengetahuan pertolongan pertama pada gigitan hewan berbisa. Desain penelitian yang digunakan adalah quasi-experimental one-group pre-posttest, yang dianalisis menggunakan Uji Wilcoxon Signed-Rank. Sampel penelitian terdiri dari 50 remaja (usia 12–18 tahun) yang sedang menempuh pendidikan di sekolah menengah pertama dan sekolah menengah atas. Hasil penelitian menunjukkan bahwa mayoritas responden berada pada kategori usia remaja awal (53,3%), berjenis kelamin perempuan (56,7%), dan memiliki tingkat pendidikan sekolah menengah atas (58,3%). Sebelum intervensi, sebanyak 13,3% responden memiliki pengetahuan rendah dan 15,0% memiliki pengetahuan sedang. Setelah intervensi EDoP, sebanyak 98,3% responden memiliki pengetahuan tinggi. Hasil uji Wilcoxon Signed Ranks menunjukkan adanya perbedaan yang signifikan antara nilai persentase sebelum dan sesudah intervensi ($Z = -4,922$; $p < 0,001$), sehingga dapat disimpulkan bahwa intervensi yang diberikan berpotensi efektif dalam meningkatkan pengetahuan responden dalam memberikan pertolongan pertama pada kejadian gigitan hewan berbisa.

Kata kunci: Remaja, Metode EDoP, Pertolongan Pertama, Pengetahuan, Gigitan Hewan Berbisa

Introduction

Venomous animal bites are a common health problem in tropical and subtropical regions, including Indonesia and Southeast Asia. One of the most common venomous animal bites is that of a venomous snake. An estimated 5.4 million snakebite victims worldwide, An estimated 5.4 million snakebite victims worldwide with 81,410 and 137,880 deaths, and about three times as many victims suffer amputations or other permanent disabilities (WHO, 2023). Meanwhile, a systematic meta-analysis estimated the highest incidence rate in Asia to be approximately 130.7 per 100,000, and the highest mortality rate in Asia to be 0.96 per 100,000 (Afroz, Siddiquea, Chowdhury, Jackson, & Watt, 2024).

Furthermore, there were 135,000 cases of venomous animal (snake) bites in Indonesia (Suryanda, Komala, & Khairunnisa, 2020).

Venomous animal bites can be extremely hazardous to a victim's health. They can impede the respiratory system due to paralysis, cause chronic or permanent kidney failure, fatal bleeding due to blood-clotting disorders, and permanent disability or limb amputation due to tissue damage (WHO, 2023). However, the problem of venomous animal bites is often overlooked by many parties. In fact, the World Health Organization lists them as one of the "Neglected Tropical Diseases." However, venomous animal bites require immediate first aid to avoid potentially fatal consequences (WHO, 2024)

Prompt and appropriate first aid is essential, yet public awareness and medical access remain limited, particularly in some areas of Indonesia. Local studies show fatalities often result from a lack of prompt first aid, highlighting the need to improve public knowledge and rapid response strategies to prevent death and disability (Kemenkes RI, 2023; Wintoko & Prameswari, 2020). The Ministry of Health of the Republic of Indonesia and the World Health Organization have issued first aid guidelines for venomous animal bites and stings (Kemenkes RI, 2023; WHO, 2016). However, current data shows that the knowledge of the general public and health workers regarding venomous animal bites is 56.0%, which is considered adequate. This indicates a need to improve public knowledge and skills to ensure they are able to provide appropriate first aid for venomous animal bites and stings (Sinta, Manangkot, Kamayani, & Suindrayasa, 2025).

The right learning method will determine the success of achieving learning objectives (Deak & Santoso, 2021; Sugiyantoro, 2025). Therefore, the EDoP (Education, Demonstration, and Practice) learning method is an appropriate method for improving the community's ability to provide independent first aid for venomous animal bites and stings. The EDoP method consists of three sequential steps: Education, which provides information and influences attitudes or behaviors as expected by the educator (Gunawan, 2022); Demonstration, where trained instructors explicitly show the first aid techniques and explain each step to enhance understanding (Hidayatillah, 2021); and Practice, also known as role-play, where participants simulate first aid scenarios to reinforce learning through experience (Mulyono, 2021). Furthermore, previous research has also shown that implementing training using a combination of these methods tends to be effective in improving first aid knowledge in adolescents (Amni, Jufrizal, & Akbar, 2025)

Previous research has examined Education, Demonstration and Practice separately, and there is very little research that combines these three methods simultaneously in providing training (intervention) to adolescents. This study will specifically combine all three methods education-demonstration-practice in one research intervention, with the aim of improving their knowledge of first aid for Venomous Animal Bites. Therefore, this study has the novelty of implementing all three methods in one intervention. So, this study aims to analyze the effectiveness of the EDoP (Education, Demonstration, and Practice) method on public knowledge about Venomous Animal Bites.

Methods

This research is a quantitative study with a quasi-experimental approach, one group pre-posttest without control. The research was conducted at a private Islamic boarding school in Aceh Besar Regency in August 2024. The research population consisted of adolescent students currently attending the Islamic boarding school (12-18 years old). A sample of 60 respondents was taken using a consecutive sampling technique. Before the intervention, respondents' knowledge was assessed, and their consent was obtained by signing an informed consent form. Then, a three-stage intervention was carried out, namely (Stage 1) Education, about venomous animals, venomous animal bites, and first aid that can be done independently by students at the scene of the incident, (Stage 2) Demonstration, the researcher demonstrated first aid procedures when a venomous animal bite occurs in front of all respondents, (Stage 3) Practice, all respondents were given the opportunity to practice first aid for venomous animal bites accompanied by the research team. Furthermore, after the intervention was completed, a post-test was conducted to measure respondents' knowledge of first aid for venomous animal bites at the scene of the incident (pre-hospital).

Data collection in this study used a first aid questionnaire for venomous animal bites. The questionnaire consisted of statements about symptoms and actions that can be taken at the scene (pre-hospital) when venomous animal bites occur with the answer options "yes" and "no". The questionnaire has been subjected to expert validity by a nursing faculty lecturer who is an expert in the field of emergency. In addition, the questionnaire has also passed a reliability test using a computerized program with a Cronbach alpha value of 0.73. Therefore, this questionnaire is valid and reliable for use in this study. Data were input and analyzed using a computerized Wilcoxon Signed Rank Test. This research has passed the ethics approval from the Ethics Team of the Faculty of Nursing, Universitas Syiah Kuala, with ethics number skema 113022110624.

Results

Table 1 Distribution of Characteristics Respondents (N=60)

Characteristics	f	%
Gender		
Men	26	43,3
Female	34	56,7
Education		
Junior High School	25	41,7
Senior High School	35	58,3
Age		
Early Adolescence (13-15 years)	32	53,3
Late Adolescence (16-18 years)	28	46,7

Table 1 shows that the majority of respondents were female (56.7%), with the highest level of education being senior high school (58.3%), and most respondents fell within the Early Adolescence age category (53.3%).

Table 2 Distribution of students' knowledge about first aid for venomous animal bites before and after implementation of the EDoP intervention (N=60)

Level of Knowledge	F	%
Before		
Low (<56%)	8	13,3
Moderate (56-75%)	9	15,0
High (>75-100%)	43	71,7
After		
Low (<56%)	0	0,0
Moderate (56-75%)	1	1,7
High (>75-100%)	59	98,3

Table 2 shows that before the intervention, 71.7% of respondents had high knowledge and 28.3% had low or moderate knowledge about first aid for venomous animal bites. After the Education, Demonstration, and Practice (EDoP) intervention, 98.3% of respondents had high knowledge, none had low knowledge, and only one person had moderate knowledge about first aid for venomous animal bites. This could be related to more intense exposure to the material during the intervention.

Table 3 Crosstabulation of Respondents' Knowledge about First Aid for Venomous Animal Bites Before and After the EDoP Intervention (N=60)

		N	Mean Rank	Sum Rank	Z-score	Asymp.Sig (2-tailed)
Pre-Post Test First Aid for Venomous Animal Bites	Negatif Rank	2	6,00	12,00	-4,922	p-value
	Positif Rank	32	18,22	583,00		<0,001
	Ties	26				

The Wilcoxon Signed Ranks test results showed a significant difference between the percentage values before and after the intervention ($Z = -4.922$; $p < 0.001$), indicating that the intervention suggested potential effectiveness in improving measurement results. Furthermore, negative rank values were fewer than positive rank values. This further strengthens the evidence that the EDoP intervention has a tendency to increase respondents' knowledge about Venomous Animal Bites.

Discussions

The findings of this study indicate that the majority of respondents were female (56.7%), with early adolescence and a high school education. The predominance of female respondents indicates a crucial point in the effectiveness of this intervention. This is linked to literature studies showing that adolescent girls tend to be more open (receptive) and compliant with health promotion than boys. This finding will facilitate the adaptation and acceptance of practice-based health education materials in the school environment (Shanan & Jasim, 2025). This finding also emphasizes that the age range of 13 to 15 is a critical period for building health literacy. In early adolescence, thinking skills begin to develop to understand procedural ideas, but materials still need to be adapted to their literacy level. These results align with previous studies showing that demographic factors such as gender and education serve as key determinants of the success of public health education (Shanan & Jasim, 2025).

Furthermore, individuals with educational backgrounds, generally secondary school, desire practical instruction. In first aid training, modifying teaching methods to suit the characteristics of the audience significantly impacts the effectiveness of knowledge transfer. The suitability between the method of delivering the material and the demographic data of respondents not only improves theoretical knowledge but also strengthens the psychomotor memory of adolescents when facing emergencies (Perangin-angin, Tumanggor, & Tondang, 2025).

The initial evaluation results indicated that before the implementation of the EDoP intervention, same respondents still demonstrated inadequate knowledge, with low (13.3%) and moderate (15.0%) percentages regarding first aid for venomous animal bites. This lack of knowledge indicates a gap in understanding of how to manage certain emergencies among students. This reflects a common phenomenon in society, where venomous animal bites are often perceived as rare events, resulting in proper treatment procedures not being prioritized in individuals' mindsets (Alqahtani et al., 2022).

The delay in the introduction of first aid materials in the formal school curriculum is suspected to be the main reason for respondents' low level of knowledge. Without planned training, adolescents' knowledge is often superficial or derived from myths with no valid medical basis. This finding aligns with previous research showing that first aid skills among students tend to be inadequate without systematic clinical teaching. In addition to the curriculum, limited direct experience and inadequate health training also contributed to respondents' reduced confidence in handling emergency situations. In the context of community nursing, these results confirm that understanding venomous animal bites requires a more in-depth educational approach than general health information. Therefore, the basic conditions of the respondents in this study provide a strong reason for the need to implement educational interventions such as the EDoP method to improve students' readiness to face critical situations (Perangin-angin et al., 2025).

After implementing the EDoP method, there was a significant change in the participants' cognitive profiles, with 98.3% achieving a high level of knowledge. This increase in percentage indicates that the synergy between theoretical knowledge transfer, visual observation through demonstrations, and skill acquisition through hands-on practice can foster in-depth understanding. This success indicates that the EDoP method successfully overcomes learning barriers in adolescents by transforming complex medical concepts into clear and easy-to-understand procedural steps. The success of EDoP in this study aligns with experiential learning theory, where knowledge emerges through a process of transformation from experience. The combination of demonstration and practice provides a more powerful multisensory stimulus than traditional, one-sided counseling methods. This finding is supported by a growing body of literature indicating that activity-based educational interventions have a significantly greater impact on the retention of first aid knowledge among school students (Viana, Milkhatun, & Rizal, 2025).

Furthermore, this significant improvement confirms that adolescents have a high adaptability to health education when delivered through an appropriate pedagogical approach. This study underscores the importance of integrating training models such as EDoP into School Health Unit (UKS) programs or extracurricular curricula. Based on previous research, it is stated that by providing students with the opportunity to practice simulated handling of venomous animal bites, this intervention not only improves cognitive aspects but also builds psychomotor readiness, which is important in real emergency situations (Awaludin & Ramdani, 2024).

The Wilcoxon Signed Ranks test showed a significant difference in participants' knowledge levels before and after the intervention ($Z = -4.922$; $p < 0.001$). These findings indicate that the EDoP intervention was associated with improvement rather than random variation. This non-parametric test is methodologically sound for paired data that are not normally distributed. The result suggests that the EDoP model improved participants' cognitive aspects, consistent with sources reporting that direct training methods have a significantly greater effect on first aid knowledge retention than traditional

methods (Perangin-angin et al., 2025). Similar findings have been demonstrated in previous research, where the EDoP method increased first-aid knowledge in fracture cases (Amni, Fikriyanti, & Aklima, 2026). However, this study could not explain respondents' knowledge retention due to the lack of follow-up.

The potential effectiveness of the EDoP technique in this study supports the scientific consensus that structured educational interventions, whether through simulation exercises or specific teaching modules, contribute significantly to improving first aid knowledge. These results confirm that without adequate education, public knowledge is often suboptimal, posing a risk of misuse and worsening clinical outcomes (Pandey, Khanal, & Sapkota, 2025). Furthermore, the literature highlights that the importance of first aid literacy is not only felt by the general public but also crucial for medical personnel to ensure an appropriate response in emergency situations, such as dangerous animal bites. Therefore, improving knowledge and even skills through practical methods is crucial to reducing the risk of complications in the pre-hospital phase (Shanan & Jasim, 2025).

This study provides important contributions to professional nursing practice and health policy in school settings. From a clinical perspective, these results underscore the importance of nurses as strategic educators in managing evidence-based first aid programs tailored to community characteristics. The implementation of a planned teaching method impacts the need for changes in adolescent health curricula, where the integration of psychomotor training is crucial for transforming theoretical knowledge into applicable practical skills. More broadly, increased understanding through this intervention directly contributes to improved public safety and community preparedness in addressing the risk of errors in pre-hospital emergency care, ultimately aiming to reduce morbidity from venomous animal bites.

This research is an important first step, but the researchers acknowledge several aspects that need improvement. The study design without a control group requires researchers to maintain a low profile when understanding the causal impact of the intervention. Furthermore, current measurements only capture knowledge, while the essence of first aid is the ability to act and the courage to take action in real-life situations, which cannot be fully measured over a long period of time. Furthermore, the researchers strongly recommend further research involving a control group to strengthen the validity of the results. Because the current study did not use a control group, the impact of confounding factors could not be further analyzed. Furthermore, the absence of a control group also risks potential threats to internal validity, including testing effects, maturation, and the Hawthorne effect. This study also focused only on knowledge scores, so it is hoped that future research should investigate how this education can permanently change behavior and practical skills. Researchers sincerely hope that health education in nursing will not just stop at the level of understanding but can truly become part of a lifelong attitude of alertness and responsiveness to help others in crisis situations.

Conclusions

Learning using the Education, Demonstration, and Practice (EDoP) method shows potential as an educational approach to improve adolescents' knowledge of first aid for venomous animal bites. Therefore, further controlled studies are recommended to confirm its long-term effectiveness. Furthermore, it is hoped that future researchers will consider providing a control group for comparison.

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