IMPACTS OF AUDIOVISUAL EDUCATION ABOUT ANAPHYLAXIS MANAGEMENT TRIGGERED BY LOCAL ANESTHESIA ON TARUMANAGARA MEDICAL STUDENTS'S KNOWLEDGE

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Abstract: Impacts of Audiovisual Education About Anaphylaxis Management Triggered By Local Anesthesia on Tarumanagara Medical Students's Knowledge. *The use of local anesthesia in daily practice, of course, is inseparable from the risk of adverse reactions, one of which is anaphylactic reaction. An anaphylactic reaction is a frequently encountered medical emergency characterized by a life-threatening acute hypersensitivity response. The objective of this research is to assess the impacts of audiovisual education about anaphylaxis management triggered by local anesthesia on third-year Tarumanagara medical student's knowledge. This research is a quasi-experimental study with a one-group pre-test post-test design research plan carried out on 71 medical students of Tarumanagara University. Data collection and intervention were carried out online using an electronic questionnaire and were analyzed using Wilcoxon statistical test. In this study, there was a significant increase in the median value of student knowledge after the intervention with educational video, from 33,33 (Q1-Q3 = 26,67-53,33) to 86,67 (Q1-Q3 = 80-93,33) with a median difference of 53,34 (p-value = 0,0001). There was a statistically significant difference in the value of student's knowledge about anaphylaxis management due to local anesthesia after the intervention with educational video.*
Keywords: *Anaphylaxis, Local Anesthesia, Posttest, Pretest*

Abstrak: Pengaruh Edukasi Audiovisual Terhadap Pengetahuan Mahasiswa Fakultas Kedokteran Universitas Tarumanagara Tentang Penanganan Anafilaksis Akibat Anestesi Lokal. Penggunaan anestesi lokal dalam praktik sehari-hari, tentunya tidak akan lepas dengan risiko reaksi yang merugikan, salah satunya adalah reaksi anafilaksis. Reaksi anafilaksis adalah keadaan darurat medis yang umum terjadi dan merupakan reaksi hipersensitivitas akut yang mengancam jiwa. Penelitian ini bertujuan untuk mengetahui pengaruh edukasi audiovisual terhadap nilai pengetahuan mahasiswa Fakultas Kedokteran Universitas Tarumanagara angkatan 2021 tentang penanganan reaksi anafilaksis akibat anestesi lokal. Penelitian ini merupakan studi quasi-eksperimental dengan rancangan penelitian *one group pre-test post-test design* yang dilakukan pada 71 mahasiswa Fakultas Kedokteran Universitas Tarumanagara angkatan 2021. Pengumpulan data dan intervensi dilakukan secara daring dengan menggunakan kuesioner elektronik dan dianalisa menggunakan uji statistik *Wilcoxon*. Pada penelitian ini didapatkan adanya peningkatkan nilai median pengetahuan mahasiswa setelah dilakukannya intervensi dengan edukasi audiovisual, yaitu dari 33,33 (Q1-Q3 = 26,67-53,33) menjadi 86,67 (Q1-Q3 = 80-93,33) dengan selisih 53,34. Didapatkan adanya perbedaan yang bermakna secara statistik terhadap nilai pengetahuan mahasiswa tentang penanganan reaksi anafilaksis akibat anestesi lokal setelah dilakukan intervensi berupa edukasi audiovisual (*p-value* = 0,0001).
Kata Kunci : Anestesi Lokal, *Posttest*, *Pretest*, Reaksi Anafilaksis

INTRODUCTION

Loss of feeling in a specific part of the body due to suppression of nerve excitation or inhibition of nerve conduction processes is known as local anesthesia. (Stanley F. Malamed, 2019). Local anesthesia procedures in everyday practice can cause a variety of adverse reactions, ranging from clinically insignificant side effects to life-threatening ones. Anaphylactic reactions are still one of the concerns in medical practice (Grzanka et al., 2016). According to the WHO ICD-11 in 2019, anaphylaxis is a life-threatening systemic hypersensitivity reaction, that occurs rapidly and has the potential to cause respiratory, cardiovascular, and often accompanied by changes in the skin and mucosa (Cardona et al., 2020).

A case of anaphylactic reactions was reported, in which a 40-year-old woman who had no previous history of allergies, developed angioedema of the lips, extensive urticaria, and shortness of breath three minutes after lidocaine hydrochloride injection (Bostan et al., 2020). Another anaphylaxis reaction case was reported where a 12-year-old girl experienced swelling in the body, itching, urticaria, and decreased consciousness after receiving lidocaine injections (Al-Dosary et al., 2014). Hypersensitivity reactions to local anesthesia are rare, but if they occur, they can be fatal and life-threatening. Therefore, quick and appropriate treatment of anaphylactic reactions is needed (Volcheck & Mertes, 2014).

Previous research regarding the level of student knowledge about anaphylaxis management due to local anesthesia found that there are 110 students (72,8%) with poor knowledge, 40 students (26,5%) with adequate knowledge, and only one student (0,7%) with good knowledge. It was discovered that there still needs to be more knowledge about handling anaphylactic reactions (Paparang, 2023). Based on *SKDI*, the competence of general practitioners against anaphylactic reactions is 4A, where doctors are able to make clinical diagnoses and carry out disease management independently and completely (*Konsil Kedokteran Indonesia*, 2012). Thus, there still needs to be more research in Indonesia regarding the level of knowledge of the first treatment in patients with anaphylactic reactions after the use of local anesthesia. Therefore, concerning the gap described earlier, the researcher is interested in researching Tarumanagara medical student's knowledge before and after intervention through audiovisual education about anaphylaxis management triggered by local anesthesia.

METHOD

This study is a quasi-experimental analytical research with a one-group pre-test post-test research design. This research was conducted at the Faculty of Medicine, Tarumanagara University, in February 2024. The minimum requirement for this research is 64 respondents. The research respondents are active third-year medical students of Tarumanagara University who are willing to be research respondents, follow research procedures, and attend the implementation of the research. We excluded medical students who are taking academic leave and students who are absent in the implementation of the research.

This study used a simple random sampling technique. The researcher conducted an intervention through online audiovisual education. This study used an electronic pretest-posttest questionnaire to collect the data. Respondents who met the inclusion criteria were invited to an electronic social platform. The researcher explained the research outline, the screening of educational videos, and guidance to fill out the pretest and posttest questions. The collected data was analyzed using Wilcoxon statistical test by SPSS software. This research has been approved by the research ethics committee of Tarumanagara University, which has been confirmed by the research ethics suitability letter No. 277/KEPK/FK UNTAR/XII/2023.

RESULT

In this study, 71 third-year medical students were obtained. In Table 1, the results were found that the majority of respondents were female, with 48 students (68,6%). The majority of respondents in this study were 20 years old, with 36 students (41,9%), with an average age of 20,46.

Table 1. Respondent Characteristics

Variable	Frequency (%)	Mean (SD)
Gender		
Male	22 (31,4%)	
Female	48 (68,6%)	
Age		20,46
19 years old	5 (5,8%)	
20 years old	36 (41,9%)	
21 years old	24 (27,9%)	
22 years old	3 (3,5%)	
26 years old	1 (1,2%)	

Table 2 compares the number of correct questions before and after the intervention through educational videos about local anesthesia and anaphylactic reaction management. It was discovered that there was an increase in the number of correct questions in all questions after the intervention.

Table 2. Overview of the Distribution of the Number of Correct Questions in the Pretest and Posttest on Local Anesthesia and Anaphylaxis Management

Number	Question	*Pretest* (true)		*Posttest* (true)	
		F	%	F	%
1	Which of the following is characteristic of local anesthesia?	55	77,46	64	90,14
2	What is the mechanism of action of local anesthetic drugs?	15	21,13	52	73,24
3	What structure distinguishes the amide and ester groups of local anesthesia?	10	14,08	59	83,10
4	Which of the following is a local anesthetic drug of the amide group?	42	59,15	64	90,14
5	Which of the following is the product of the metabolism?	18	25,35	54	76,06
6	Which of the following statements is NOT CORRECT about anaphylactic reactions?	26	36,62	37	52,11
7	The first step in managing patients with anaphylactic reactions is to conduct a 5-component initial assessment. What are the 5 components?	35	49,30	66	92,96
8	Which is the right position for patients with Airway and Breathing disorders?	18	25,35	67	94,37
9	If an anaphylactic reaction patient is found to be breathing normally but unconscious, what position is appropriate for the patient?	23	32,39	62	87,32
10	If the anaphylactic reaction patient is a pregnant woman, what position is right for the patient?	25	35,21	65	91,55

11	What is the first-line pharmacological management for patients with anaphylactic reactions?	30	42,25	67	94,37
12	A 25-year-old woman developed anaphylaxis after administration of local anesthetic injection of lidocaine reaction. What dose of epinephrine (adrenaline) will be injected to treat the patient's anaphylactic reaction?	28	39,44	67	94,37
13	What should be done if the patient's condition does not improve after the first dose of epinephrine (adrenaline) IM?	16	22,54	64	90,14
14	In a 26-year-old anaphylaxis patient accompanied by hypotension/shock or a poor response to the initial dose of epinephrine (adrenaline), what management can be done?	26	36,62	62	87,32
15	The severity of anaphylaxis based on the World Allergy Organization is divided into grade 1 - grade 5. Which of the following are the symptoms/signs of grade 5?	45	63,38	64	90,14

In Table 3, it was discovered that the median difference between posttest and pretest about local anesthesia is 40 and the median difference between posttest and pretest about anaphylaxis management is 50. Based on the Wilcoxon statistical test results, a p-value = 0,0001 (< 0,05) was obtained. Thus, there was a statistically significant difference in the knowledge value of Tarumanagara's third-year medical student after an educational video about local anesthesia anaphylactic reaction management.

Table 3. Comparison of Student's Knowledge Score Before and After Educational Videos Intervention about Anaphylaxis Management Due to Local Anesthesia

Student's Knowledge	Median	Q1-Q3	p-value	Median Difference
Local Anesthesia Knowledge				
Pretest	40	20 - 60	0,0001	40
Posttest	80	80 - 100		
Anaphylaxis Management Knowledge				
Pretest	40	20 - 50	0,0001	50
Posttest	90	80 - 100		
Overall Knowledge				
Pretest	33,33	26,67 – 53,33	0,0001	53,34
Posttest	86,67	80 – 93,33		

DISCUSSION

This study recruited respondents from Tarumanagara University, West Jakarta in February 2024. The respondents of this study are active third-year medical students of Tarumangara University who have met the inclusion criteria. The number of samples obtained was 71 students with the majority of respondents being female, with a total of 48 students (68,6%). The majority of respondents were 20 years old with an average age is 20,46.

In this study, the median value of student's knowledge about local

anesthesia before the intervention was 40 (Q1-Q3 = 20-60). One of the questions about the types of local anesthetic drugs was only answered correctly by 42 students (59,15%). A previous study on Dentistry students in Brazil discovered that 18,87% of students were unaware of the various types of local anesthesia, and as many as 30,19% of students did not know the reason for choosing the local anesthesia to be used (Felipe et al., 2015).

After the intervention, the median value increased to 80 (Q1-Q3 = 80-100). The difference in median value between posttest and pretest scores regarding local anesthesia was 40. This demonstrates that educational video intervention has an impact on the increase in the median value of student's knowledge about local anesthesia (p-value = 0,0001). Knowledge of local anesthesia is essential for the safety of the drug, as local anesthesia is one type of anesthesia that is often used in daily medical practice (Pete & D'Souza, 2020).

The median value of students' knowledge about anaphylaxis management before the intervention was 40 (Q1-Q3 = 20-60). The question about the signs and symptoms of anaphylactic severity was only answered correctly by 45 students (63,38%). Based on previous research, it was discovered that only 38% of students had knowledge of anaphylaxis symptoms, whereas 68% of other students were unaware of the symptoms and consequences of anaphylaxis (Balaji & Jain, 2017). The question about the first-line pharmacological management for anaphylactic reactions was only answered correctly by 30 students (42,25%). The following question regarding the epinephrine (adrenaline) dose that will be injected into patients with anaphylactic reactions was only answered correctly by 28 students (36,63%). A previous study on 144 medical students of Kırıkkale University found that 80% of students could answer correctly about the pharmacological management of anaphylactic reactions. However, almost half of all students had insufficient knowledge about the dosage and minimum duration of epinephrine (adrenaline) re-administration (Baççioğlu et al., 2022).

After the intervention, the median value increased to 90 (Q1-Q3 = 80-100). The difference in median value between posttest and pretest scores regarding anaphylaxis management was 50. This demonstrates that educational video intervention has an impact on the increase in the median value of student's knowledge about anaphylaxis management (p-value = 0,0001). Based on the SKDI, the competence of general practitioners for anaphylactic reactions is 4A, where doctors are able to make clinical diagnoses and carry out disease management independently and completely (*Konsil Kedokteran Indonesia*, 2012).

According to previous study of 208 Medical students at Baghdad University, it was discovered that 38% of students had consideration to refer anaphylactic cases to an allergy specialist rather than handling the case independently and completely (Hasan & Jassem, 2022). Diagnosis of anaphylaxis is done clinically and is based on the pattern of early symptoms after exposure to an allergen. A previous study on 704 dentists found that only 28,7% of dentists had confidence in diagnosing anaphylactic reactions, and only 9,4% felt they had the ability to handle them (Cherrez-Ojeda et al., 2024).

In this study, it was discovered that there was an increase in the median value of student overall knowledge after the intervention with educational video, from 33,33 (Q1-Q3 = 26,67-53,33) to 86,67 (Q1-Q3 = 80-93,33) with a median difference of 53,34. Hence, with educational videos about local anesthesia and handling anaphylactic reactions, students can continue to expand their knowledge about local anesthesia and anaphylaxis management.

CONCLUSION

Based on this research, there was a significant difference in the median value of student's knowledge after the intervention with educational video about local anesthesia and anaphylaxis management from 33,33 (Q1-Q3 = 26,67-53,33) to 86,67 (Q1-Q3 = 80-93,33) with a median difference of 53,34.

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