

# Usefulness of Podcasts in Teaching Trauma Procedures

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## ABSTRACT

**Objective:** This study aimed to evaluate podcast as an alternative learning media for primary survey skills in medical students at Atma Jaya University.

**Design:** One group pretest-posttest design on 54 clinical clerkship students in surgery rotation and the pretest and posttest results were compared.

**Methods:** A podcast about the primary survey was made and given to students after the pretest. An assessment sheet for the scoring of primary survey skills was used in pretest and posttest to measure the students primary survey skill knowledge. The change between tests' scores was used to measure the students' skill knowledge improvement. A follow-up survey was also given for the students' opinions.

**Results:** There was a statistically significant increase in the primary survey knowledge between the pretest and posttest using a podcast as a learning media. The majority of students had an interest in learning using podcast media, increased their desire to learn, and interested in reading further primary survey theories.

**Conclusion:** Podcast is effectively used as a learning media for primary survey in medical students at Atma Jaya University. Students had an interest in learning with podcast media and reading further theories about the primary survey.

## KEY WORDS

podcast, primary survey, trauma, medical student, learning media

## INTRODUCTION

Students in the current generation have the characteristics of understanding the basis of technology and social media as well as being creative and dynamic, with the result that they are attached to digital technology which has some characteristics including open, independent, efficient, mobile, and flexible<sup>(2)</sup>. The current learning process can be done with various learning media. One of them currently developing is a podcast<sup>(3,4)</sup>.

The COVID-19 pandemic that has been taking place in Indonesia since March 2020 resulted in the imposition of activity restrictions, which results in face-to-face learning activities have been replaced with online learning<sup>(5)</sup>.

Podcast is a program containing material available in digital audio format and distributed via the internet and can be downloaded for users to listen through media devices<sup>(6)</sup>. Podcasts in Indonesia developed significantly in 2018, with various platforms for making podcast with ease and freely. In addition, the millennial generation in Indonesia is increasingly familiar with podcasts based on the results from surveys in 2018 and 2019<sup>(7,8)</sup>. The statement has become a starting point for podcasts to develop as a digital-based learning media. In the world of education, the use of podcasts can provide easy and flexible access to learning. With podcasts, students can easily listen to things they want to know.

Students can also listen to podcasts while doing other activities and can listen at any time or can be heard repeatedly at will<sup>(9)</sup>.

Various studies have been conducted with the application of podcasts as a learning media. A study at McMaster University and the University of Alberta used podcasts on medical students with the results significant increase in learning effectiveness<sup>(10,11)</sup>. In Indonesia, a study about podcast effectiveness as a learning media on Sriwijaya University students was conducted, which also had an effectivity impact<sup>(3)</sup>.

During the COVID-19 pandemic in Indonesia, the process of clinical clerkship learning in hospitals was cancelled until an undetermined time. Face-to-face learning such as bedside teaching, patient observation, and others was discontinued and replaced with online learning.

Trauma is an injury that occurs physically or psychologically or both which can be experienced due to violence, which leads to death if not handled properly<sup>(12)</sup>. The most common causes of death due to trauma are traffic accidents. Data from World Health Organization shows that deaths due to traffic accidents are the eighth leading cause of death in people of all ages. Developing countries have three times the death rate due to traffic accidents compared to developed countries<sup>(13)</sup>. Data from Indonesian Basic Health Research (*RISKESDAS Indonesia*) in 2018 mentions the prevalence of trauma cases in Indonesia is 9.2 percent that shows an increase from the data in 2013, which is 8.2 percent<sup>(4)</sup>. The increased evidence of trauma shows the importance of medical personnel knowing the early steps of handling trauma patients. One

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**Table 1: Comparison of Primary Survey Skills at Pretest and Posttest using podcasts as a learning media. MIN : minimum score obtained by the respondent. MAX : maximum score obtained by the respondent. SD : Standard Deviation.**

	N	MIN	MAX	Average	SD	P Value
Pretest	54	22/100	94/100	55.85	18.17	0.000
Posttest	54	44/100	97/100	78.80	13.13	

**Table 3: Results of Respondents' Pretest and Posttest based on Completion and Systematics.**

	Finished	Did not Finish	Worked Systematically	Did not work systematically
Number of Respondents (Pretest)	26	28	18	36
Number of Respondents (Posttest)	45	9	45	9

of the steps that need to be known is the primary survey implemented from the Advanced Trauma Life Support Program<sup>15,16</sup>.

The various benefits that can be used in a podcast as a learning media and related to the current technological developments and the necessity to provide education about the primary survey of trauma cases in medical students made the author interested in conducting this research. This study was conducted on clinical clerkship students who had previously been taught about the theory of medical emergencies at the preclinical stage.

## METHODS

This study is using one group pretest-posttest design to determine the student's knowledge at the Faculty of Medicine and Health Sciences Atma Jaya University regarding the primary survey in trauma cases. A follow-up survey was also provided to determine the descriptive picture of students' opinions and preferences regarding podcast learning media. The sample of this study was clinical clerkship students who were undergoing a surgery rotation at the time of the study taken by convenience sampling technique. The inclusion criteria of this study were active clinical students who agreed to participate in this study. The exclusion criteria for this study were the clinical students who did not complete their personal data, did not participate in pretest and posttest, and those who were not willing to participate in this study.

This research has received ethical approval from Atma Jaya University. The instruments used in this study included informed consent forms, pretest and posttest assessment sheets, podcast with primary survey topic included, follow-up survey forms, recording devices and the internet as well as devices for internet access. The audio podcast was given to respondents online. Students who entered the surgical rotation were divided into five groups for the pretest on the first day of admission. After the pretest, the podcast was given to students and was given 14 days or until the last day of the surgical rotation to listen the podcast. On the last day, students were taken the posttest and given the survey sheet to ask for their opinions. The pretest and posttest assessment sheets consist of airway, breathing, circulation, disability, environment, and systematic evaluation. Students were considered to have proper knowledge and skills about the primary survey if they had the minimum score of eighty out of one hundred points.

Students must do the primary survey steps with each step scored by given zero points if students did not do the step or were given a wrong diagnosis, given one point if the students did the step incompletely or were given an incomplete diagnosis, and given two points if the students did the step correctly or were given a complete diagnosis. The airway assessment consists of seven steps, breathing assessment consists of nine steps, circulation consists of fourteen steps, and five steps on both

**Table 2: Results of Pretest and Posttest based on the Passing Criteria.**

		Posttest		Total
		Passed	Failed	
Pretest	Passed	5	1	6
	Failed	30	18	48
	Total	35	19	54

disability and environment. Systematical assessment was assessed by examining whether students were taken the primary survey systematically or not with the score value of twenty points.

The podcast in this study contained an explanation and theory of primary survey and an example of a trauma case with a total duration of forty-five minutes. The pretest and posttest were taken online with individual interviews by giving a trauma case. Results of students scores were analysed with Wilcoxon and McNemar tests using SPSS version 22.

## RESULTS

This study was participated by 54 students with an age range of 20-23 years, mostly female (63%) and 22 years old (59.26%). Normality test using Kolmogorov-Smirnov obtained an abnormal data distribution. There is a difference in the average value of primary survey skills in students, with an average of 55.85 in pretest and 78.80 in posttest. Wilcoxon test analysis showed significant changes in the variables with a p-value of 0.000 (Table 1). Based on the passing criteria in this study, the number of respondents who passed the pretest were 6 students, and those who did not pass were 48 students. Respondents who passed the posttest were 35 students, and respondents who did not pass were 19 students (Table 2). McNemar statistical test showed a p-value of 0.000. The analysis results can be concluded that the podcast learning method effectively improves student skills regarding the primary survey of trauma cases.

This study also had variations in the number of respondents that completed the pretest and posttest in a timely and systematic manner. A total of 26 respondents were able to complete the pretest, while 28 other respondents did not complete it. In the posttest, 45 respondents could complete the test, while 9 other respondents did not finish. In the pretest, 18 respondents had a systematic working on the test, and 36 other respondents had not. In the posttest, 45 respondents had a systematic working, and 9 other respondents had not (Table 3).

In the evaluation of respondents who failed the test, 6 respondents did not complete the test but worked systematically at the pretest, and 1 respondent at the posttest. The number of respondents that failed the test and did not work systematically but could complete the exam were 15 respondents at the pretest and 2 respondents at the posttest. The number of respondents who failed with an unfinished test and did not work systematically in pretest and posttest were respectively 21 and 7 respondents. The number of failed respondents who could complete and work systematically were 6 respondents on the pretest, and 9 respondents on posttest.

In the assessment of each part of the primary survey, it could be concluded that there was an average increase in all parts. Students had the highest average score on the airway and the lowest in the environment compared to other primary survey sections (Table 4).

Based on the follow-up survey results, the most preferred learning methods from the students were listening to an audio or video. According to the survey results, most respondents chose to listen to recordings or using video with a total of 14 respondents (25.9%). The majority of students had heard podcasts before being given the intervention to listen to podcast about the primary survey of trauma cases. The majority of students used phones to listen to podcast with a total of 45 respondents (83.3%). The ideal podcast duration according to the respondents had the most preferred within 15-30 minutes with a total of 28 respondents (51.9%). Respondents listened to the primary survey podcast as an intervention in this study at most twice with a total of 24 respondents (44.4%). The majority of respondents took notes as an

**Table 4: Comparison of the Primary Survey Skills at the Pretest and Posttest of each Part of the Primary Survey.**

	N	MIN <i>Pretest</i>	MIN <i>Posttest</i>	MAX <i>Pretest</i>	MAX <i>Posttest</i>	Average <i>Pretest</i>	Average <i>Posttest</i>
<i>Airway</i>	54	5/14	7/14	14/14	14/14	11.17	13.06
<i>Breathing</i>	54	5/18	7/18	15/18	17/18	9.94	12.70
<i>Circulation</i>	54	5/28	15/28	28/28	28/28	18.80	23.91
<i>Disability</i>	54	0/10	0/10	10/10	10/10	5.19	7.46
<i>Environment</i>	54	0/10	0/10	7/10	9/10	2.61	5

activity carried out while listening to podcasts with a total of 32 respondents (59.3%).

All respondents understood the primary survey material from the podcast (100%). Majority of respondents liked to use podcast as a learning media (35 respondents, 64.8%), and increased their desire to reading further theories (51 respondents, 94.4%). Several respondents suggested that the podcast material should be provided with more varied case examples and increased speech pace.

## DISCUSSION

Based on the results, there was an increase in the mean value of 22.95 points between the pretest and posttest. The increase in value coupled with Wilcoxon test result showed podcast was effective as a learning media for students' primary survey skills. This study is similar to the study from Chin *et al.*, who also used podcasts as a learning media for asthma and toxicology in medical students and showed a difference in the posttest average that was higher than the pretest<sup>(10)</sup>. In addition, another study conducted by Asmi *et al.* also showed the effectiveness of podcast as a learning media by an increased posttest value from the intervention using podcasts with local history topic<sup>(3)</sup>.

This study had the results of an increase in the number of students who passed the test after being given podcast intervention. Students who worked systematically were higher in posttest than pretest. In addition, number of students who could complete the exam on time were also greater on posttest than pretest, which showed the effectiveness of podcast as a learning media for students in improving primary survey skills. Podcast is an audio recording that contains contents distributed over the internet and can be listened from phones, laptops, or other devices with the advantage of easy to control, portable, always available, and automatic<sup>(17)</sup>. Students could listen to podcasts easily and could be repeated many times in an unrestricted time, which became the reason podcast improved students skills in this study<sup>(3,17,18)</sup>.

In the pretest, there was a distribution of students who failed the test had the most number of students who did not finish the test and did not work systematically. It is suspected that students were lack of skills because they had not studied and joined the surgical rotation. The posttest results showed that some students were still lacked skills regarding the primary survey even though intervention had been given. This could occur because it is suspected that the respondents did not listen to the podcast well and did not focus on learning. The results showed that the respondent could do the test systematically but the steps that needed to do on primary survey were not done well. Therefore they got a total value near the passing criteria value but still had not passed or is still below the value of 80.

The primary survey was divided into five sections, namely airway, breathing, circulation, disability, and environment<sup>(19,20)</sup>. In the assessment of students based on each part, the average airway score was increased by 1.89 or 13% after being given podcast intervention. The step on the airway which had the lowest score was in the step of providing oxygen. On the breathing assessment, an average increase of 2.76 or 16% was found after the podcast intervention. Students had difficulty in diagnosing and carrying out correct management of the trauma case on breathing. In the circulation assessment, there was an increased average from pretest to posttest with the value of 5.11 or 18%. Students had the lowest score on the step to check the distal artery pulsation after placing the splint in the circulation section. In the assessment on disability section obtained an average increase of 2.27 or 23%. The results showed that students still had low scores on disability section because there were some students who did not complete the exam on time. Therefore they

did not perform in this section completely. Students had the lowest score in the step about determining a diagnosis from disability section. In the environment assessment showed an increase in the mean score of 2.39 or 24%, but had the lowest average value obtained by students compared to other primary survey sections because some students did not complete the test, and the environment section was the last part of the primary survey. Therefore they did not complete the environment section in the primary survey. Students mostly could not make a diagnosis of retroperitoneal hemorrhage in the environment section.

Most of the students chose the most preferred learning method by listening to recordings or viewing video compared to other learning methods. This could be the reason podcast was effective as a learning media in this study. Majority of students who took part in this study had listened to podcasts before being given the intervention. This result showed that most students were familiar with podcasts and had listened to them, which is suitable with a survey conducted by dailysocial.id in 2018 where the majority of respondents with the age of 20-25 years old were familiar with podcasts<sup>(9)</sup>. This study is also similar to a survey by *suarane.org* in 2019, which was also followed by the majority of respondents aged 21-25 years who were already familiar with podcasts<sup>(8)</sup>.

Majority of students listened to the podcast using laptops in this study, which is similar to the study by White *et al.* where more than half of the total respondents used laptops or computers<sup>(11)</sup>. The ideal podcast duration according to respondents in this study was within 15-30 minutes. This result is similar to a study from Chin *et al.* with the result of their respondent from the study preferred under 30 minutes, and similar to a survey by dailysocial.id with the most preference for a duration of 20-30 minutes<sup>(9,10)</sup>. The podcast duration used in this intervention is 49 minutes, which is longer than the ideal duration according to respondents. Students in this study mostly listened to the podcast twice, which showed that students used one of the advantages of podcasts as a media that can be played back to listen and understand the topic of the podcast.

The activities carried out by students while listening to podcasts in this study mostly only taking notes and only listening to podcasts. This result is similar to the research by Simon in the form of using podcasts as lecture material which showed that most respondents only concentrated on listening to podcast recordings and did not do other activities<sup>(21)</sup>. However, this result is different from the research from Chin *et al.* with the majority of respondents listened to podcasts while driving a motorized vehicle, doing homework, and doing sports<sup>(10)</sup>. This difference can occur due to differences in respondent characteristics and current environmental conditions, where in this study took place at the time during COVID-19 pandemic and the Indonesian community was applying social distancing.

All students in this study responded that the podcast made students understand the primary survey and were interested in further reading the theory, and majority of students had an interest in learning using podcast media. These results are similar to the study from White *et al.* which showed that 84% of respondents said podcasts were useful in understanding theories<sup>(11)</sup>. Research by Simon also showed that most of his respondents agreed that the use of podcast is more effective in understanding lecture material<sup>(21)</sup>. Other studies also show podcasts are more effective as a learning media than other media, such as a study conducted by Evans which shows the use of podcast was more effective than regular lectures and reading textbooks<sup>(22)</sup>. Podcasts can be said to be effective because they are linked by the advantages of easy-to-use, usefulness, mobility advantages, and others<sup>(23)</sup>.

This study has various limitations. The study includes the pretest and posttest on the respondents were done online due to the inability to do the tests face-to-face because of the ongoing COVID-19 pandemic, making it difficult to supervise respondents during the pretest and posttest. This study also had experienced some problems in the internet network, both from researchers and respondents. The duration of the

podcast used in this study is longer than the ideal duration according to the respondents, and researchers only monitor the effectiveness of podcasts as a learning media in a short term by comparing the pretest and posttest scores.

## CONCLUSION

Podcast is effectively used as a learning media for primary survey skills in trauma cases for students at the Faculty of Medicine and Health Sciences Atma Jaya University. Based on the survey, it is concluded that respondents understood the primary survey and had an interest in learning with a podcast and became interested in reading further theories.

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