

EFFECT OF ELECTRONIC EDUCATION WITH E-EDUCATION APPLICATIONS UNDERSTANDING OF NURSES IN PREVENTION DEEP VEIN THROMBOSIS

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ABSTRACT

This study aims to determine the effectiveness of electronic education with the application of e-Education to understand nurses in preventing DVT. This research uses an experimental method with a Pre-test and Post-test Control Group Design. The results of the study in the control group using an e-education application containing DVT material in the form of e-leaflets and the Experiment group using an e-Education application containing DVT material in the form of an e-book, meaning that both groups tend to experience changes in understanding, but the proportion of respondents who study e-application e-education containing DVT material in the form of e-books tends to experience a higher increase than respondents who look e-education applications containing DVT material in the form of e-leaflets. In conclusion, using the e-leaflet e-education and the e-education e-book applications can increase nurses' understanding of DVT prevention.

Keywords: DVT, Educational Electronics, Nurse Understanding

INTRODUCTION

Deep Vein Thrombosis (DVT) is a disease characterized by the formation of a thrombus and accompanied by an inflammatory response in the deep veins, which usually occurs in the lower extremities, with clot formation starting in the deep calf veins and spreading proximally (Azzahro & Mahmuda, 2020; Stubbs et al., 2018; Yokoi et al., 2017). Thrombus that forms in the veins, is generally also found in the pelvic area (Setiawan et al., 2020).

The incidence of DVT in Japan was reported to be 12 per 100,000 people in 2006 showing a 30-fold increase since 1996. In about 20% of patients with symptomatic distal DVT, the thrombus will extend to the proximal vein, thus anticoagulation therapy is indicated. The reported incidence of DVT in the proximal vein is 3-3.7% (Fujioka et al., 2020). The prevalence of DVT in the trauma population who did not receive prophylaxis has been reported to be as high as 40-80% (Aziz et al., 2018). In Indonesia, the frequency of DVT without prophylaxis will vary from 10% to 26% (Tambunan et al., 2020). Deep Vein Thrombosis is the third most common cardiovascular disorder after coronary artery disease and stroke. DVT occurs in approximately 0.1% of people/year (Azzahro & Mahmuda, 2020). Standard operating procedures are set by the hospital as a reference for implementing steps in the prevention of deep vein thrombosis.

The condition of the occurrence of DVT is potentially very dangerous, because encourage the emergence of other diseases to cause complications and in the end will cause morbidity and mortality. If left unchecked, DVT blood clots can dislodge and follow the bloodstream, causing serious complications including pulmonary embolism. Pulmonary embolism can trigger pulmonary hypertension and heart failure. Another complication of DVT is post-thrombotic syndrome, which is disturbance in blood flow in the veins (Jayanegara, 2016). The results of research conducted by Sukron in 2019 where the role of nurses' understanding of DVT is very large, especially in the prevention phase. It is not easy to recognize the early signs of the presence of real because the level of sensitivity and specificity is relatively little of the many clinical symptoms and other signs. DVT generally originates from veins that arise in the calves which are very low risk.

Non-pharmacological prevention of DVT can be done with the following methods, namely 1) Early postoperative mobilization, and Range of Motion (ROM) exercises (Jayanegara, 2016). 2) Elevation (elevating the lower extremity in bed so that it is higher than the heart is useful for reducing venous hydrostatic pressure) (Sukron, 2019). 3) Placement of inferior vena cava filter (Imai et al., 2017). 4) Use of compression elastic stockings (Najihah, 2018).

Prevention is the best therapy in cases of deep vein thrombosis, especially in high-risk patients. Various kinds of technology have been developed to support various conveniences in terms of health, one of which is electronic education using the Health application. The first benefit of health applications is to disseminate information to educate and increase public awareness of health. In addition to educating patients, health applications can also be used to increase nurses' knowledge and understanding of particular health science (Antoni & Suharjana, 2019). As with the application that will be used by researchers in this study, researchers use one of the android applications to determine nurses' understanding of DVT prevention. Increasing nurses' understanding of DVT prevention will be able to assist in establishing an early diagnosis (Selvia & Ernawati, 2019).

RESEARCH METHODS

The nature of this research is experimental design with pre-test and post-test design control group design. In this study, randomization was performed to determine the experimental and control groups. This study compared two groups, the experimental group, and the control group. The experimental group received treatment using the e-Education Experiment Application in the form of an e-book and the control group received treatment using the control e-Education Application in the form of an e-Leaflet. The sample of this study were nurses who served in the Merak room of the RSPAU dr S Hardjolukito Yogyakarta, amounting to 27 people, and the Mars ward of the RSAU Dr. Efram Harsana Madiun, amounting to 17 people.

The sampling technique in this study was carried out using simple random sampling. Inclusion criteria in the research to be conducted are 1) All nurses, both male and female with all ages and years of service, both military, civil servants, and first-aid workers (government employees with work agreements). 2) Have a cellphone with the android operating system. 3) Willing to be a respondent in the research. Exclusion Criteria: 1) Participants withdrew before the study was completed. 2) Mobile phone storage capacity < 100 MB.

The research instruments are questionnaires and e-education applications. The questionnaire used in measuring understanding in this thesis is a questionnaire about DVT with the help of e-Education applications for nurses in the peacock room and mars room. The questionnaire for understanding consisted of closed questions. The questionnaire has been tested for content validity by 3 surgeons, with the results of the questionnaire suitable to be used for data collection, further testing the validity of the questionnaire questions to the population other than the sample and reliability testing. The questionnaire consists of 26 questions. The answer to the question is right and wrong. The correct answer is given a score of 1 and the wrong answer is given a score of 0. The e-Education application consists of a pre-test link, the e-Education Intervention menu for the experimental group, e-Education Control for the control group, and a post-test link. e-Education Intervention contains DVT material in the form of e-books, and control e-Education contains DVT material in the form of e-leaflets. This app is installed via android but not via the google play platform.

The data collection method in this study is that the respondent performs informed consent, downloads the application, then fills out the pre-test contained in the application (maximum 1x24 hours), followed by studying e-leaflet material (control group) and e-book (experimental group) a maximum of 4x24 hours, the next stage the respondent fills out the test post contained in the application. The data analysis method is carried out by processing data through 4 stages, namely editing, coding, tabulating, and processing, and then data analysis is carried out by conducting normality test, homogeneity test, and hypothesis testing.

RESULTS

Characteristics of Respondents

Table. 1
Characteristics of Respondents in Control Group (n=17)
and Experiment Group (n=27)

Variable	Group			
	Control		Experiment	
Age				
17 - 25 years old	7	41.2%	4	14.8%
26 - 35 years old	7	41.2%	14	51.9%
36 - 45 years old	3	17.6%	7	25.9%
46 - 55 years old	0	0.0%	2	7.4%
Total	17	100.00%	27	100.00%
Gender				
Man	4	23.50%	3	11.10%
Woman	13	76.50%	24	88.90%
Total	17	100.00%	27	100.00%
Job-status				
Military	2	11.80%	1	3.70%
civil servant	2	11.80%	6	22.20%
First Aid (Government Employee By Employment Agreement)	13	76.50%	20	74.10%
Total	17	100.00%	27	100.00%

Years of service				
15 years	12	70.60%	12	44.40%
6 - 10 years	3	17.60%	8	29.60%
10 - 15 years	1	5.90%	5	18.50%
21 - 25 years old	1	5.90%	1	3.70%
> 25 years	0	0.00%	1	3.70%
Total	17	100.00%	27	100.00%

Based on table 1 shows that the average respondents in the control group are in the range of 17-25 years and 26-35 years, which are both seven respondents (41.2%, while in the experimental group, the majority of respondents are in the age range 26-35). years, namely, as many as 14 respondents (51.9%). The majority of respondents in both groups had first aid jobs, namely in the control group, as many as 13 respondents (76.50%), and in the experimental group, as many as 20 respondents (74.10). Based on years of service, most respondents in both groups worked for 15 years, namely, in the group. The control group consisted of 12 respondents (70.60%), and the experimental group as many as 12 respondents (44.40).

Description of Research Data

The data on the value of understanding DVT prevention by nurses before treatment (pretest) and after treatment (posttest) in the control group using the e-Education application contained DVT material in the form of e-leaflets and the Experimental group using the e-Education application containing DVT material in the form of an e-book about DVT are presented in table 7 as follows:

Table. 2
Pretest and Posttest Scores for the Control Group
and the Experimental Group

Statistics	Control		Experiment	
	Pretest	Posttest	Pretest	Posttest
Minimum	13	17	17	20
Maximum	23	24	23	25
Mean \pm SD	19.12 \pm 2.50	21.06 \pm 1.95	20.22 \pm 1.78	23.30 \pm 1.44

The description of the level of understanding of the pre-test and post-test in the control and experimental groups is shown by the results of the data description of the value of understanding the understanding of DVT prevention by nurses before treatment (pretest) and after treatment (posttest). The control group uses the e-Education application containing DVT material in the form of e-leaflets and the Experiment group uses the e-Education application containing DVT material in the form of e-books, meaning that both groups tend to experience changes in understanding, but the proportion of respondents who study the e-Education application containing DVT material in the form of e-books tended to experience a higher increase than respondents who studied e-Education applications containing DVT materials in the form of e-Leaflets.

In Figure 1, it can be seen that both the control group and the Experiment group experienced an increase in understanding of DVT prevention after receiving material from the e-Education application in the form of e-Leaflets and e-books, but the material in the form of e-books was more influential so that in the Experiment group there was more increase.

Normality Test Results

The normality test aims to test whether the variables used in this study have a normal distribution. To detect the normality of the data, it can be done through statistical analysis, one of which can be seen through Shapiro Wilk. The results of the normality test of variables in this study can be seen in the following table:

Table. 3
Normality Test Results

Group	p	Information
Understanding the prevention of DVT Posttest Control	0.27	Normal
Understanding the prevention of DVT Experiment Posttest	0.05	Normal

Based on the results of the normality test, it is known that all variables in the control group and the experimental group have a greater significance value equal to 0.05, so it can be concluded that all data variables in the control and experimental groups are normally distributed.

Homogeneity Test Results

The homogeneity test is used to determine whether some population variance is the same or not. In this study, the homogeneity test was used to test the similarity of variance between the control and experimental groups. The results of the homogeneity test of the variables in this study can be seen in Table 8 below:

Table. 4
Homogeneity Test Results

Variable	P	formation
Understanding the prevention of DVT Pretest	0.197	homogeneous
Understanding of Posttest DVT prevention	0.249	homogeneous

Based on the results of the homogeneity test, it is known that all variables have a significance value greater than 0.05. This shows that all data in both groups, namely the control and experimental groups, had the same variance (homogeneous).

Hypothesis Test Results

The Effect of Using E-Education Applications Containing DVT Material in the form of E-Leaflets

The analysis used to determine the effect of using e-Education applications containing DVT material in the form of e-leaflets on understanding DVT prevention is to use the paired t-test. The results of the paired t-test in the control group using the e-

Education application containing DVT material in the form of e-leaflets are presented in the following table:

Table. 5
Test Results Paired t-Test Control Group

Variable	Average	p
Understanding prevention of DVT Pretest	19.12	0.007
Understanding of Posttest DVT prevention	21.06	

The value of understanding nurses' DVT prevention values showed a difference before using the e-Education application containing DVT material in the form of e-leaflets (pretest) and after using the e-Education application containing DVT materials in the form of e-leaflets (posttest). This is evidenced by a significance value of 0.007 which is smaller than 0.05. The average value also shows the understanding value of nurses' DVT prevention before using the e-Education application containing DVT materials in the form of e-leaflets is 19.12 and after using the e-Education application containing DVT materials in the form of e-leaflets increases to 21.06. So it can be concluded that there is an effect of using e-Education applications containing DVT material in the form of e-leaflets on understanding DVT prevention.

The Effect of Using the E-Education Application Contains DVT Material in the form of an E-Book

The analysis used to determine the effect of using an e-book application on DVT on understanding DVT prevention is to use a paired t-test. The results of the paired t-test in the control group using the use of an e-book application about DVT are presented in the following table.

Table. 6
Test Results Paired T-Test Experimental Group

Variable	Average	p
Understanding the prevention of DVT Pretest	20.22	0.000
Understanding of Posttest DVT prevention	23.30	

The value of understanding the value of nurses' DVT prevention shows that there is a difference between before using the e-Education application in the form of an e-book on DVT (pretest) and after using the e-Education application in the form of an e-book on DVT (posttest). This is evidenced by the t arithmetic value of 6.48 and a significance value of 0.000 which is smaller than 0.05. The average value also shows the understanding value of nurses' DVT prevention before using the e-Education application containing DVT material in the form of an e-book is 20.22 and after using the e-Education application containing DVT material in the form of an e-book it increases to 23.30. So it can be concluded that there is an effect of using an e-Education application in the form of an e-book about DVT on understanding DVT prevention.

Based on the results of the paired t-test, it is known that there is an effect of using the e-Education application containing DVT material in the form of e-leaflets on the understanding of DVT prevention in the control group with the posttest score higher than the pretest and there is an effect of using the e-Education application in the form of an e-book about DVT on an understanding of DVT prevention in the experimental group with a posttest score higher than the pretest. Thus, it can be concluded that the hypothesis in this study which states that the effect of electronic education with e-Education applications can increase understanding of DVT prevention can be accepted by the results of empirical research.

The Difference in Understanding of DVT Prevention between E-Education Applications Contains DVT Material in the form of E-Leaflets and the form of E-Books

The analysis used to determine the differences in understanding of DVT prevention between the e-Education application containing DVT material in the form of e-leaflets and the form of e-books used the independent t-test, which is presented in the following table:

Table. 7
Test Results Independent T-Test

Variable	Group	Average	p
Understanding of	Control	21.06	0.000
Posttest DVT prevention	Experiment	23.30	

The results of the Independent t-test test obtained a significant value of 0.000 ($p < 0.05$) based on these results because the p-Value < 0.05 then H_0 was rejected and H_1 was accepted, which means that there is a significant effect on electronic education with the e-Education application in improving nurses' understanding of DVT prevention.

DISCUSSION

The Effect of Providing Electronic Education with the E-Education E-Leaflet Application on the Prevention of DVT in Hospital Nurses

The results of the research that have been obtained are known that in the control group, the majority of respondents have a working period of 1-5 years, which is as much as 70.6% and since the last 3 years for cases of DVT in the Mars ward of Dr. this DVT case. . This is thought to be the cause of the average pre-test score in the majority control group getting low.

The results showed that there were differences in the value of nurses' understanding of DVT prevention before and after using the e-Education application containing DVT material in the form of e-leaflets. Although the material in the e-Leaflet is shorter, it can affect nurses' understanding of DVT material, this can be seen from the Mean value in the control group which increased from 19.12 to 21.06 and the t-count value was 3.25, and a significant value of 0.007.

Are principles of using health promotion media, including the more sensations that are used to receive health news and information from the media, the better or clearer the understanding of the message received will be. Information about DVT will be captured by

the respondent's five senses of sight and hearing to form a new knowledge about the effector response of the sensing process to a stimulus or message regarding DVT material.

The results of this study support previous research conducted by Khasanah (2021) the results of his research state that there is an effect of health education with the smart link application on the level of first aid knowledge of SMAN 1 Godean students.

The Effect of Providing Electronic Education with the Application of E-Education E-Books on the Prevention of DVT in Hospital Nurses

Based on the results of the study, shows that there is an effect of using an e-book application about DVT on understanding DVT prevention. The results obtained that the level of understanding in the Experimental group before being given electronic education with the application education *e-book* the average value of the pretest was 20.22 and after being given electronic education with the e-Education e-book application, the post-test increased to 23.30. The results of this study are in line with research conducted by Saraswati et al., (2020) which states that the Aneminfo android application can be an alternative media for the government and health workers in providing education about iron deficiency anemia to increase adolescent knowledge and prevent anemia.

There are other purposes of using health promotion media, namely to facilitate the delivery of information, reduce misperceptions, clarify information, facilitate understanding, reduce verbalises communication, provide an overview of objects that can be captured by the eye, and facilitate communication. Electronic books or e-books are book publications that are available in digital form, which consist of images, text, or even both, and can be opened and read through the screen of a smartphone, computer, or several other electronic devices.

Differences in the Understanding of DVT Prevention between the Use of E-Education E-Leaflet Applications and E-Education E-Book Applications

Based on the results of the research conducted, there was an increase in the average value in the experimental group and control group, but the increase in the average value in the experimental group increased more than in the control group, this happened because the experimental group was treated in the form of an e-book while the group was treated with e-books. control was given treatment in the form of e-Leaflet. The difference between the material in the form of an e-Book and an e-leaflet is that in an e-Book the material is presented in full and is equipped with pictures and videos, while in an e-leaflet the material is presented briefly. From the results of the independent sample t-test, it was concluded that there was a significant effect of education with the e_Education application on nurses' understanding of DVT.

Provision of health education information and communication is an important strategy in controlling DVT. Health education information and communication require media. The development of technology through mobile media creates various innovations in all fields, for example in the field of health education which is marked by the emergence of the Android-based Electronic concept. So that learning is developed by utilizing Android-based electronic media where the characteristics of this device can allow patients and families to easily access education to increase understanding of preventing DVT (Relawati et al., 2018).

The use of media with innovations in the form of applications has its charm as a medium for providing healthy material (Mutasar et al, 2020). The use of control e-Education containing DVT material in the form of e-leaflets and experimental e-Education containing DVT material in the form of e-books both affect increasing understanding of DVT prevention. However, the use of experimental e-Education containing DVT material in the form of e-books has a higher impact than control e-Education containing DVT material in the form of e-leaflets. This is because e-books have more interesting materials and pictures and are equipped with videos so that they provide their charm. This is by the opinion which states that the more senses used to receive messages and health information from a media, the higher or clearer the understanding of the message received (Wati et al, 2022).

The right and appropriate health information media are very effective in increasing individual knowledge and understanding in the field of health promotion. Educational media with electronic-based applications are effective as health promotion media. This is also supported by research from Mutasar et al., (2020) the results of the study are there is an increase in the score or category of knowledge to be better than before the extension experiment was carried out with the android application. The results of the analysis of the journals used as literature in this study indicate that there is an influence between electronic media based on android mobile on increasing knowledge. Knowledge and understanding that increases in a person can help that person take a better attitude so that they have better behavioral actions. Understanding is an activity to formulate the meaning of messages in spoken, written, or graphic form. Cognitive processes in the understanding category include interpreting, imitating, classifying, inferring, guessing, comparing, and explaining (Ruwaida, 2019). After the nurse learns the DVT material through the e-Education application, it is hoped that it can be applied in their duties in treating patients when they find patients with cases of DVT.

CONCLUSION

The use of e-Education applications containing DVT material in the form of e-leaflets has a significant effect on nurses' understanding of DVT prevention. The use of the e-Education application containing DVT material in the form of an e-book has a significant effect on nurses' understanding of DVT prevention. There is a significant difference in the understanding of DVT prevention between the use of e-Education e-leaflet applications and e-Education e-book applications.

SUGGESTIONS

Based on some of the progress achieved and the conclusions of this study, several suggestions that need to be conveyed are for health workers, it is recommended to use the e-Education e-book application for other materials besides understanding DVT prevention. For hospitals or units, this application of DVT prevention can be used in the treatment room in need, namely the operating room, internal medicine room, and ICU. Future researchers should increase the number of research samples so that the results can be generalized, not only in certain hospitals but also with a combined number of samples from several other hospitals taken at random.

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