E-Module: Dengue Hemorrhagic Fever toward Knowledge and Learning Motivation among Nursing Students

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Abstract

Introduction: Innovation media to support the learning process among nursing students should be concerned. The aim of the study was to evaluate the effectiveness of the e-module dengue hemorrhagic fever toward knowledge and motivation among nursing students.
Methods: A pre-experimental study design was undertaken from September to October 2021. We recruited 45 bachelor nursing students in the third year at Universitas Padjadjaran, Bandung, Indonesia. Data were collected using a knowledge questionnaire that was developed by researchers and motivation using Students Motivation towards Science Learning questionnaire. E-Module: Dengue Hemorrhagic Fever was implemented for seven days. Finally, the data were analyzed using Wilcoxon signed rank test and dependent paired t-test with level of significance $p<0.05$.
Results: We found that e-module was a promising intervention as learning media to increase the knowledge ($p=0.02$) and motivation ($p=0.002$).
Conclusion: E-Module as learning media can be a promising intervention to increase the knowledge and learning motivation among nursing students. It can be suggested to universities to consider E-Module to support the learning process.

Keywords

e-module; knowledge; motivation; nursing; students

INTRODUCTION

Dengue fever (DHF) is an infection caused by the dengue virus, transmitted through female mosquitoes of Aedes aegypti and Aedes albopictus (World Health Organization, 2021). The prevalence of DHF in Indonesia has always been a public health issue (Kementerian Kesehatan RI, 2016). Lack of knowledge about vector prevention is one of the factors that cause the prevalence of DHF. Based on Fakhriadi et al. (2015), insufficient knowledge is a higher risk. Other studies also state that learning is significantly related to attitudes and behavior in eradicating mosquito nests (Sukayuni et al., 2021).

Students as agents of change have an essential role in people's lives which can apply in health education to prevent DHF. Students need sufficient knowledge in distributing this information to the public. Jain et al. (2014) reported the DHF knowledge among nursing students was relatively low. In addition, according Cetin-Dindar (2016), the increase

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in knowledge is influenced by learning motivation. For this reason, increasing student understanding needs to be improved with more exciting and applicable learning methods.

The learning process in nursing should use the most efficient learning method to become professionals and maximize their learning (Moule, 2011). Developing efficient, innovative, and applicable learning media is needed to encourage students to optimize and utilize the learning process. The availability of learning media that follows technological developments can increase learning motivation (Darmaji et al., 2019). Learning motivation is influenced by intrinsic and extrinsic factors, such as physical condition, intelligence, emotional state, health status, learning environment, learning style, facilities and infrastructure, time, and parents (Nyman and Sumpter, 2019). Good learning motivation is due to interest in learning and curiosity so that students carry out activities to achieve their goals in learning accompanied by increased knowledge (Harefa and Silalahi, 2020).

Electronic media (e-modules) as easy-to-access learning media have different benefits and characteristics. Based on the benefits, e-modules can make the learning process more enjoyable, interactive, accessible anytime and anywhere, and improve the quality of learning (Perdana et al., 2017). The development of e-modules as a medium to motivate and increase nursing student knowledge is considered more effective than conventional learning, such as face-to-face learning in class (Riniasih et al., 2018). Previous research has revealed that most of the learning systems used by nursing students in Indonesia are textbooks and lectures (Hadi et al., 2017; Mishra et al., 2017; Merlin and Vanchapo, 2020). The development of e-modules that are presented with a visual display that supports material content, detailed learning concepts, and standard nursing procedures in a single unit is needed so that the learning system is structured systematically and as primary reading material for nursing students. This study aimed to evaluate the effectiveness of using the DHF e-module in increasing nursing students' knowledge and learning motivation.

MATERIALS AND METHODS

Study Design

This study was conducted with a pre-experimental design with one pre-and posttest group. This design was used to show the dependent variable's effect better with limited resources (Allen, 2017).

Population, Samples, and Sampling

The research was conducted online from September to October 2021. The population in this study was third-level nursing students, Universitas Padjadjaran, Bandung, Indonesia, with as many as 155 people. Purposive sampling was used to recruit respondents. The inclusion criteria used were undergraduate nursing students who had completed the Pediatric Nursing and Medical-Surgical Nursing courses, voluntarily participated in the research, and had internet access. Meanwhile, the exclusion criteria are students who take academic leave and cannot follow the research process until it is finished.

The sample calculation used a Windows G*Power 3.1.9.7 (Heinrich-Heine-Universität Düsseldorf) to get a minimum sample by 0.5 effect size, 5% probability error, and 0.9 for 1-β probability error. Then, the result was 44 people for the minimum sample size. To anticipate the dropout rate, the researchers added 10% of the total minimum sample size so that the required sample was 49 people.

Instruments

The DHF e-module has been created by expert lecturers and reviewed beforehand regarding the validity of its contents. This e-module contains the definition, epidemiology, etiology, signs and symptoms, complications, diagnostic examinations, and nursing care for DHF.

A questionnaire developed by the researcher measured the knowledge variable. This questionnaire contains 15 questions using multiple-choice answers that contain indicators of the basic concepts of DHF, procedures for providing parenteral nutrition, and nursing care for DHF. This questionnaire has been tested for validity and reliability on 30 trial respondents whose final results were not included in the data analysis. The validity test results with correlation Pearson product-moment obtained 14 valid items, and one invalid item was excluded. Meanwhile, the

reliability test results with Cronbach alpha obtained 0.652 on 14 items. If it is correct, scoring on the answer is given one point, while zero otherwise.

The measurement of learning motivation used the Students Motivation towards Science Learning (SMTSL) instrument developed by Tuan et al. (2005). This questionnaire consists of 35 questions using a Likert scale with self-confidence, active learning strategies, learning values, performance, learning outcomes, and learning environment. The answers to this questionnaire consist of five categories, namely strongly agree is given a score of 5, agree is given a score of 4, doubtful is given a score of 3, disagree was assigned a score of 2 and strongly disagree was given a score of 1. The validity test results correlate with Pearson product-moment 35 valid items and reliability with a Cronbach alpha of 0.967 (Riniasih et al., 2018).

Table 1. Demographic Data Characteristics (n = 45)

Characteristics	n	%
Gender		
Male	4	8.9
Female	41	91.9
Age		
19	7	15.6
20	32	71.1
21	6	13.3
Campus area		
Jatinangor	28	62.2
Pangandaran	17	37.8
Residence		
Rural	20	44.4
Urban	25	55.6
Family history of DHF		
Yes	15	33.3
No	30	66.7
Personal medical history of DHF		
Yes	10	22.2
No	35	77.8

Table 2. Effect of E-module on Knowledge and Motivation of Nursing Undergraduate Students (n = 45)

Variable		Minimum	Maximum	Mean	SD	*p*-value
Knowledge	Pretest	28.7	78.57	53.25	13.8	0.02*
	Posttest	21.43	78.57	58.77	13.5	
Learning motivation	Pretest	60	92	71.5	6.55	0.002**
	Posttest	60	90.86	74.46	7.79	

*Wilcoxon signed rank test

**Dependent paired t-test

Procedure

The data collection process took place online for seven days in October. The researcher used informed consent to ask for the respondent's agreement on the first day. After agreeing, they had to do a knowledge pretest for 20 minutes and SMTLS for 10 minutes. Then, respondents were given an e-module access link where they could study the contents of the module for three days in the range of periods. Respondents were asked to fill out a logbook daily during research procedures. At the end, the e-module access link was closed, and respondents needed to fill out a knowledge posttest for 20 minutes and SMTSL for 10 minutes. During the data collection process, the researcher was responsible for conducting follow-up on respondents who did not follow the procedure according to the activity procedures for questioning.

Data Analysis

Data analysis used univariate and bivariate. Univariate analysis was used in the form of frequency and percentage distributions to describe the characteristics of the sample. In contrast, bivariate analysis with different tests was used to determine differences in each variable's pretest and posttest scores. The normality test was carried out as a prerequisite test to choose the data distribution using the Kolmogorov-Smirnov. After the prerequisite test was carried out, it was found that the knowledge variable data were not normally distributed, so that the Wilcoxon signed rank test was used. Meanwhile, the data on the learning motivation variable were normally distributed so that the dependent t-test was used. Data analysis was performed using the SPSS version 25 application for Windows with a significance of $p<0.05$.

Ethical Clearance

This research has received ethical approval from the Ethics Committee of the Health Commission of Universitas Padjadjaran, Indonesia (Ref 731/UN6.KEP/EC/2021). Respondents need to provide a written consent form without coercion to participate. Respondents can quit the research and it will not affect their academic field. Then, the researcher maintains the privacy of the respondents during the data collection process. This research does not have the potential to harm the respondents, either physically or mentally.

RESULTS

A total of 45 students participated in the study. Demographic data are presented in Table 1. The majority of respondents are female (91.9%), and 71.1% are 20 years old. Most were from the Jatinangor campus (62.2%), and more than half lived in urban areas (55.6%). Based on experience related to DHF, it can be seen that 66.7% of nuclear families have no history of DHF, and 77.8% have no record of DHF.

Based on Table 2, it can be seen that there is an increase in the mean pretest-posttest value on the knowledge variable (53.25 - 58.77). The p-value indicates a significant difference between the pretest and posttest values ($p = 0.02$). Meanwhile, the learning motivation variable increased the mean pretest-posttest (71.50 - 74.46). Then, the p-value showed a significant difference between the pretest and posttest groups ($p = 0.002$).

DISCUSSIONS

In the era of digitalization, the development of technology-based learning media demands teachers to provide a learning environment that can improve learning outcomes (Fadieny and Fauzi, 2021). Learning media with e-modules is an independent learning media that is systematically presented electronically (Saputra and Razak, 2020). The display of e-modules that provide attractiveness to students combined with the learning process can improve optimal learning outcomes (Istuningsih et al., 2018).

Learning activities with e-modules are suggested to improve nursing student competence (Deschênes et al., 2019). The advantage of the e-module is flexible for both teachers and students and provides consistent content for all students so that they get homogeneous content, and this helps increase student retention with attractive visual designs that can strengthen a realistic experience for students (Shah and Stefaniak, 2018). However,

the obstacles to implementing e-modules are inadequate internet access and incompatible devices.

E-module on knowledge

The findings indicated an increasing posttest score supported by a significant difference between the pretest and posttest on knowledge. The results of this study are in line with a quasi-experimental study which showed a significant difference in knowledge after e-module administration (Sitorus et al., 2019). The review previously reported an increase in posttest scores for students who used e-modules in different health disciplines (Shah and Stefaniak, 2018).

The research findings show that the use of e-modules can increase knowledge. This is because the independent learning process with the help of DHF e-modules is systematic and explicit so that undergraduate nursing students can quickly learn the content of the material, repeat their learning, and make study time effective as desired. This is supported by related research that education with e-module media can increase knowledge because the content is systematically arranged to be easy to understand and actively involved in learning itself (Sugiani et al., 2019; Logan et al., 2021). With e-modules, students can repeat sections to make them more transparent and provide independent learning opportunities for students (Aloush and Qadire, 2017). So, the achievement of the learning process is more optimal because of the increase in knowledge. Meanwhile, consistent material content coupled with clear and accessible material content continuously can trigger student retention so that learning outcomes increase.

E-module on learning motivation

The findings in this study indicate an increase in posttest scores and a significant difference between pretest and posttest on learning motivation. The result of this study is in line with a quasi-experimental study that showed a rise in posttest scores after using e-modules (Asrial et al., 2019). Previous research has also stated that e-modules effectively increase learning motivation and improve learning outcomes (Putri et al., 2020).

The findings of this study indicate that e-modules can increase learning motivation. E-modules are presented in the high-quality graphic resolution that can be accessed via computers/laptops and smartphones, which can increase learning motivation during the learning process. The visual display that supports the material content and the use of technology creates curiosity so that students explore the contents of the e-module. This causes an increase in interest in learning. The use of electronic media makes the learning experience fun and not monotonous. Thus it improves students' skills in using technology to become an additional advantage due to the implementation of e-modules. Previous research stated that students were enthusiastic and actively involved during the learning process with e-modules so that the use of e-modules could be a stimulus in learning (Setiarini et al., 2016). Other research also states that the delivery of learning with electronic media increases student interest through the learning experience (Ghenghesh et al., 2013), and e-modules provide an experience of learning activities to reflect and apply the learning content (Robb, 2016). The increase in learning motivation can make students interested in the content of the e-module material so that students will learn the material.

Strengths and limitations

This study has advantages, namely the appropriate research design questions to focus on measuring the effects of the dependent variable and an attractive and interactive e-module design. This study also has limitations, namely, the research sample is still limited, and the sample selection is not random.

CONCLUSION

The use of learning media that follows technological developments can stimulate students in increasing knowledge and learning motivation. E-modules as learning media can be a promising new approach in increasing undergraduate nursing students' knowledge and learning motivation. It can be a suggestion for universities to consider e-modules as supporting media in the learning process.

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Conflict of Interest

The authors declare that there is no conflict of interest in this study.

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