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Effectiveness of 3D Pageflip Professional electronic module to prevent urolithiasis recurrent among urolithiasis patients

Eficacia del módulo electrónico 3D Pageflip Professional para prevenir la recurrencia de la urolitiasis en pacientes con urolitiasis

Riris Andriati[1a]*, Tukimin bin Sansuwito[2b], Kosheila Ramuni[3b], Bibi Florina Abdullah[4b]

SUMMARY

Introduction: *Non-communicable diseases are one of the targets of the Sustainable Development Goals (SDGs), including health problems related to urinary tract stones (urolithiasis). Urolithiasis has a high recurrence rate within 3-5 years after recovery from the disease. This study aimed to develop an Electronic Module (E-module) as a medium for preventing urolithiasis patients and assessed the effectiveness of this professional E-Module 3D pageflip media.*
Methods: *This type of research was research and development. The E-module development model in this study was carried out in 3 stages, namely define (preliminary study in the form of field studies and literature studies), design (designing the e-module), and development (feasibility test and effectiveness test 3D pageflip professional e-module). In the development stage, the subject of this research was taken using a purposive sampling technique, totaling 150 respondents with the criteria of patients with urolithiasis at the urology poly. To be able to measure the effectiveness of the E-module, the instrument used was a questionnaire using a Likert scale. The test was carried out using the Paired Sample T-test with a level of 5 %.*
Results: *Respondents were dominated by age in the range of 46-62 (55.3 %) and male (65.33 %). The E-module feasibility test was carried out with an assessment from the expert, which includes two aspects: the expert validation material, which showed a score of 94 (very good), and the media expert test, which scored 95.7 (highly feasible). Professional pageflip 3D e-module can improve knowledge (p-value = 0.0001), attitude (p-value = 0.0001), and behavior to prevent recurrence of urolithiasis (p-value = 0.0001).*
Conclusion: *This study showed that the professional pageflip 3D E-module can improve knowledge, attitude, and behaviour to prevent urolithiasis. The use of E-modules in providing information to the public provides an opportunity to understand better the concept of the material by studying the text because E-modules provide opportunities for people with urolithiasis to learn independently.*

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ORCID ID: 0000-0003-0798-4121[1]
ORCID ID: 0000-0001-7323-4308[2]
ORCID ID: 0000-0001-6473-3279[3]
ORCID ID: 0000-0002-9499-4426[4]

[a]Sekolah Tinggi Ilmu Kesehatan Widya Dharma Husada, Tangerang, Indonesia
[b]Lincoln University College of Malaysia, Number 2, Stadium Street, S7/15, 47301 Petaling Jaya, Selangor, Malaysia

*Corresponding Author: Riris Andriati
E-mail: ririsandriati@wdh.ac.id

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RESUMEN

Introducción: *Las enfermedades no transmisibles son una de las metas de los Objetivos de Desarrollo Sostenible (ODS), incluidos los problemas de salud*

relacionados con los cálculos en las vías urinarias (urolitiasis). La urolitiasis tiene una alta tasa de recurrencia dentro de los 3-5 años posteriores a la recuperación de la enfermedad. Este estudio tuvo como objetivo desarrollar un módulo electrónico (módulo E) como un medio para la prevención de pacientes con urolitiasis y evaluó la efectividad de este medio de cambio de página 3D E-Module profesional.

Métodos: *Este tipo de investigación fue investigación y desarrollo. El modelo de desarrollo del módulo electrónico en este estudio se llevó a cabo en 3 etapas, a saber, definición (estudio preliminar en forma de estudios de campo y estudios de literatura), diseño (diseño del módulo electrónico) y desarrollo (prueba de factibilidad y prueba de efectividad 3D pageflip módulo electrónico profesional). En la etapa de desarrollo, el tema de esta investigación fue tomado mediante una técnica de muestreo intencional, totalizando 150 encuestados con el criterio de pacientes con urolitiasis en el poli de urología. Para poder medir la eficacia del módulo E, el instrumento utilizado fue un cuestionario en escala tipo Likert. La prueba se llevó a cabo utilizando la prueba T de muestras pareadas con un nivel del 5 %.*

Resultados: *Los encuestados estuvieron dominados por la edad en el rango de 46-62 (55,3 %) y el sexo masculino (65,33 %). La prueba de viabilidad del módulo E se realizó con una valoración del experto, que incluye dos aspectos: el material de validación del experto, que arrojó una puntuación de 94 (Muy bueno), y la prueba del experto de medios, que obtuvo un puntaje de 95,7 (altamente factible). El módulo electrónico profesional pageflip 3D puede mejorar el conocimiento (valor p = 0,0001), la actitud (valor p = 0,0001) y el comportamiento para prevenir la recurrencia de la urolitiasis (valor p = 0,0001).*

Conclusión: *Este estudio demostró que el módulo E profesional pageflip 3D puede mejorar el conocimiento, la actitud y el comportamiento para prevenir la urolitiasis. El uso de módulos electrónicos para proporcionar información al público brinda la oportunidad de comprender mejor el concepto del material mediante el estudio del texto porque los módulos electrónicos brindan oportunidades para que las personas con urolitiasis aprendan de forma independiente.*

Palabras clave: *3D pageflip, módulo electrónico, ODS, urolitiasis.*

INTRODUCTION

Health issues in the SDGs are one of the important goals across people's life. Goal number 3 ensures a healthy life and promotes prosperity for all people of all ages (1). There are 38 SDGs targets in the health sector that need to be realized, one of which is non-communicable diseases (1). One of the non-communicable diseases is Urinary Tract Stones (Urolithiasis). Urolithiasis is a pathological condition due to the presence of hard masses such as stones that form along the urinary tract and can cause pain, bleeding, or infection in the urinary tract (2–4). Urinary stones are one of the biggest diseases in the field of urology that many people suffer from (5,6). The prevalence of urolithiasis has increased significantly in recent decades in most Asian countries, such as China (from 4 % to 9.0 %), South Korea (from 3.5 % to 11.5 %), Thailand (from 1.4 % to 16.9 %), Saudi Arabia (from 6.8.% to 19.1 %), Iran (from 5.7 % to 8.1.%) and Israel (from 1.2 % to 9.2 %) (1).

According to Zamzami in 2018, urolithiasis is the most common disease the Indonesian people suffer in the urology field (7). In Indonesia, the incidence of urinary tract stones is still unknown, but it is estimated that there are 170 000 cases per year, and the prevalence of the Indonesian population suffering from kidney stones is 0.6 % or 6 per 1 000 population. This shows that cases of urinary tract stones are still high. It is also estimated to increase rapidly every year. The prevalence of urolithiasis in Banten Province was reported to be as much as (0.4 %) (1). The number of urolithiasis sufferers from January to August 2020 was 985 (1). The prevalence of kidney stones increased with increasing age, highest in the 55-64-year age group (1.3 %), and decreased slightly in the 65-74 year age group (1.2 %) and 75 years (1.1 %). The prevalence was higher in men (0.8 %) than in women (0.4 %). The highest prevalence is in the population who have not attended school and have not graduated from elementary school (0.8 %) and are self-employed (0.8 %). The economic status is almost the same, from 131 quintiles of ownership to the lower middle-class index (0.6 %). The prevalence in rural areas is the same as in urban areas (0.6 %) (1).

One of the efforts made to improve the quality of knowledge about a disease is to be creative and innovative in providing educational counseling to increase understanding (8-10). The success of health education in the community depends on the learning component. Health education media is one component of the learning process.

Attractive media will provide confidence so that cognitive effects and psychomotor changes can be accelerated (11,12). Efforts can be made by conducting counseling and providing an effective learning module (13,14). Modules are written and arranged in such a way that the material delivered in teaching and learning activities is always directed to the objectives to be achieved, which have been clearly and specifically formulated. Modules can also be used as alternative learning media (15). A learning module is a small unit of teaching and learning program, which can be learned by students (self-instructional) or by themselves sendiri (1,16).

Computers are widely used as learning media. Computers are used to deliver lesson content and provide exercises (17). One computer-based learning media that can be used in teaching and learning activities is the E-module (Electronic Module). E-module is a module in an electronic format that is run by a computer (18,19). Electronic modules can display text, images, animations, and videos through electronic devices such as computers. Electronic modules can reduce the use of paper in the learning process. In addition, this electronic module is expected to be used as an alternative to efficient and effective interactive learning. The existence of E-modules is expected to be a new source of learning for the community, which is then expected to increase knowledge, attitudes, and behaviour. Based on this description, the researchers created a learning E-module that can be used by people with urolithiasis in hospital urology polyclinics.

METHODS

This research is Research and Development type. This study's E-module Development Model was carried out in 3 stages: Define, Design, and Development. The Define stage aims to determine and define the community's needs by analyzing the material's objectives and limitations for urotiliasis disease. In this stage, a preliminary study is carried out, which includes field studies and literature studies. At the field study stage, observations were made to analyze the condition of the people in Tangerang, Indonesia, and information materials used by the community to determine urotiliasis. Literature studies in the form of theoretical studies include the development of research theories, teaching materials in the form of E-modules, urolithiasis disease materials, and relevant previous research studies.

This design phase aims to design an E-module. Thus, a design form of an E-module is produced. At this stage, planning and preparation of the Professional 3D Pageflip E-module and concept understanding instruments and research instruments are carried out. As a result, a professional 3D pageflip e-module was developed based on urolithiasis disease material. At this stage, realize the planning results at the design stage. The Professional 3D Pageflip E-module design that has been conceptualized is then developed by going through the steps of the expert validation stage and the field implementation stage. In the development stage, the subject of this study was taken using a purposive sampling technique totaling 150 respondents, with the criteria of patients with urolithiasis at the Urology Poly. To measure the effectiveness of the E-module, the instrument used is a Likert scale questionnaire. The test was carried out using the Paired Sample T-test with a level of 5 %.

The instrument was used in the form of a questionnaire using a Likert scale. There are three types of data collection instruments in this development research, namely: (1) an instrument to analyze teaching materials used so far in the learning process, namely interview guidelines, and (2) an E-module instrument 3D Pageflip Professional, which is given to the public and a team of experts (media experts and material experts) and (3) a questionnaire instrument to determine the effectiveness of the 3D Pageflip Professional E-module. This study, to measure the effectiveness of the professional 3D Pageflip-based E-module, is compared with the results of the knowledge behaviour questionnaire and the sample attitude (pretest-posttest) taught using the professional 3D Pageflip E-module. The statistical test was carried out using the paired sample t-test with a level of 5 %.

This research has obtained ethical approval from the Health Research Ethics Commission, Faculty of Health Sciences, Universitas Islam Negeri Syarif Hidayatullah, Jakarta, with the number Un.01/F.10/KP.01.1/ KE.SP/08.08.081/2021.

RESULTS

Respondents of Characteristics

Table 1 showed respondents in this study were dominated by the age group between 46-62 years of 83 people (55.3 %) and male sex of 98 people (65.33 %).

Table 1

Characteristics of Respondents Based on The Demographic Profile (n = 150)

Demography variable	n	%
Age (year)		
18-30	11	1.36
31-45	56	37.3
46-62	83	55.3
Sex		
Male	98	65.33
Female	52	34.67
Total	150	100.00

Urolithiasis Disease Material Analysis

The results of this analysis can be used as a guide in developing indicators and determining the limits of e-module material. The public should understand the causes and procedures for preventing urolithiasis on urolithiasis. However, the lack of sources of information obtained by the public about urolithiasis disease so that people are indifferent to the dangers that will lurk if they have this disease. The 3D Pageflip Professional E-Module provides information regarding the concept of urolithiasis, its dangers, and ways to prevent it. This e-module will provide information electronically that can be accessed using a mobile phone.

Pageflip Professional 3D E-Module Prototype

The chemistry E-module developed is a professional pageflip 3D E-module where patients can understand the concept of urolithiasis disease. The pageflip professional 3D E-module is structured around the steps to prevent the recurrence of urolithiasis for survivors.

Design

At the design stage of the professionally developed 3D pageflip E-module, it begins with an "explanation" for each sub-chapter. For example, the explanation of urolithiasis disease in the e-module is intended to provide an understanding to the people of Tangerang city about Urolithiasis disease. The design of a professional 3D pageflip e-module on urolithiasis can be seen in Figures 1 and 2.

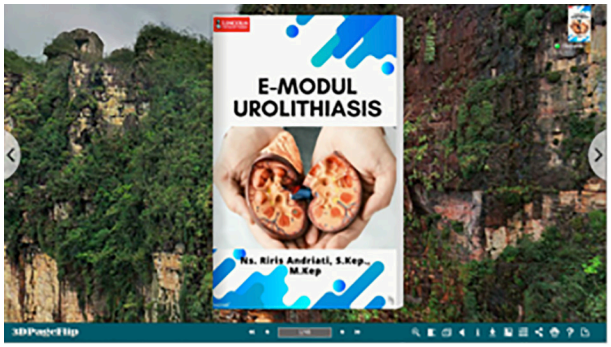

Figure 1. Urolithiasis E-Module Design View.

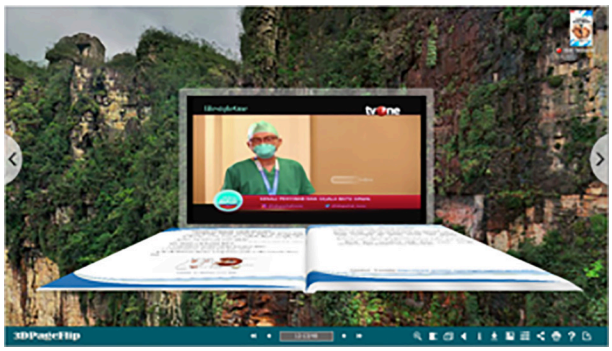

Figure 2. Video Display About Urolithiasis.

In the next stage of evaluation be able to see the public's understanding of the use of professional pageflip 3D E-modules. The formative test consists of 5 multiple-choice questions and is

equipped with an assessment so that people can measure their abilities related to urolithiasis. In other words, the formative test contained in the e-module is a requirement that must be met by people experiencing urolithiasis to find out whether people experiencing urolithiasis have mastered the material (Figure 3).

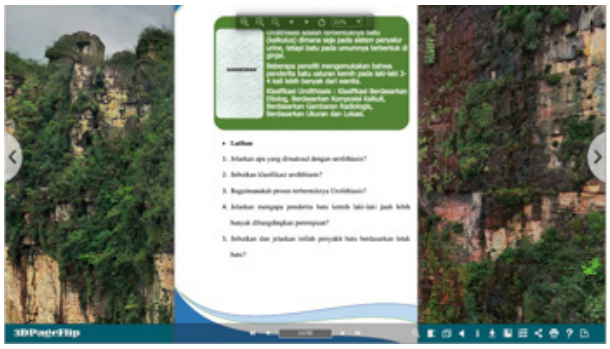

Figure 3. Formative Evaluation in Each Section of The E-Module.

Development

Pageflip professional 3D E-module Feasibility Test

Researchers undertook validation activities by asking several validator experts, namely an expert to assess the media and an expert to assess the material. Based on the data from the validation results and suggestions from the expert team, a revision was made to the page flip professional 3D E-module product. Validation is declared complete if the quality of the E-module product has been declared feasible by a team of experts.

Material Expert Validation

Material expert validation is carried out by filling out an assessment questionnaire sheet on each assessment aspect, which consists of 3 aspects. There are several statements from 10 statements filled out by material experts in each aspect. The material expert in this research is Dr. Edhi Hapsari Mulyoningtyas, Sp.U. Based on the results of the material expert feasibility test by dr. Edhi Hapsari Mulyoningtyas, Sp. U obtained several inputs; namely, the material needs to be deepened to provide holistic knowledge to the community regarding urolithiasis. The results of the material validation phase 1 obtained a score of 25, with a maximum score of 50, then the percentage = 25/50 *x* 100 % = 51,4 %. Based on these calculations, the presentation value of the media validation results is 50.0 %. With fewer categories (Sugiyono, 2012). So that some aspects need to be revised according to material experts.

The material expert test was carried out in stage 2 to see the feasibility of the developed e-module. The results of the second phase of material validation obtained a score of 47, with a maximum score of 50, then the percentage = 47/50 *x* 100 = 94,0 %, which means it is highly feasible.

Media Expert Test

In the next stage, the pageflip professional 3D E-Module tests the feasibility of media experts. In this section the media expert Dr. Dirgantara Wicaksono, M.Pd. The results of the media validation stage 1 obtained a score of 36, with a maximum score of 80, then the percentage = 36/70 x 100 % = 51.4 %. Based on these calculations, the presentation value of the media validation results is 51.4 %. With fewer categories (Sugiyono, 2012). So that some aspects need to be revised according to media experts, and some of the inputs given by media experts were the need to improve the E-module cover, which looks less sharp, and the quality of the displayed image is not good.

After several revisions, it was adjusted with input from media experts. The next step is the media expert validation test stage 2. The results of the second stage of media validation get a score of 67, with a maximum score of 70, then the percentage = 67/70 *x* 100 % = 95.7 %, which means it is highly feasible.

Test the Effectiveness of 3D Page Flip Professional through the Quantitative Stage

A difference test was conducted using the T-Test Paired to see the effectiveness of 3D Page Flip Professional. Before testing, it was necessary to test for normality. The normality

test was used to determine the knowledge, attitudes, and behaviour of preventing disease recurrence in the Tangerang City community using the professional 3D page flip E-module that was normally distributed. The normality test criteria were declared normal if the data had a significance > 0.05.

Table 2 shows that the data was normally distributed. Thus, the test of the difference between before and after the professional page flip 3D E-module used the Paired T-Test test. Table 3 shows the differences in knowledge, attitudes, and behaviour before and after exposure to the E-module.

Table 2

Normality Test of Knowledge, Attitude, and Behavior Before and After Using Page Flip Professional's 3D E-module

	Factors	p-value
Knowledge, Attitudes, and Behaviour Prevention of Recurrence of Urolithiasis Disease	Knowledge Pre-test	0.391
	Knowledge Post-test	0.613
	Attitude Pre-test	0.107
	Attitude Post-test	0.107
	Behaviour Pre-test	0.215
	Behavioural Post-test	0.391

Table 3

Differences in Knowledge, Attitudes, and Behavior of the Tangerang City Community Using Before and After the Professional 3D Page Flip E-Module

Variable		n	Mean	Min-Max	p-value
Knowledge	Pre Test	150	48.8	27 – 77	0.0001
	Post Test	150	69.64	52 - 80	
Attitudes	Pre Test	150	49.90	41 – 58	0.0001
	Post Test	150	74.90	66 - 83	
Behaviour	Pre Test	150	50.83	44 – 58	0.0001
	Post Test	150	75.83	69 - 83	

DISCUSSION

The feasibility trial of the Professional 3D Page Flip E-module used in the intervention with the assessment method from the expert showed a value of 'Excellent' in two aspects, namely expert validation material and expert test media. The final result of the assessment must have gone through several stages until it was finally declared worthy of being used as an educational medium for clients with urolithiasis. However, one of the assessment indicators is considered unfavorable. Improvements, such as the design display quality, the writing format, and the integration between the materials/activities, are needed. This is very important to consider in the educational element because interactive media (supported by attractive designs and displays) would help increase one's motivation to learn (20,21). The Centers for Disease Control and Prevention (2009) also strengthened by writing guidelines on how to deliver good education through the media should be able to adjust the size of writing that is comfortable for the target to read (22). In the context of this research, the client is expected to have a solid motivation to optimally utilize the E-modules provided so that their knowledge increases and their behaviour changes towards a healthier direction. To fulfil these achievements, the creation of standardized educational media is urgent and not to be ignored, especially if you

look at the clients in this study, which people in late adulthood dominate to the elderly who need comfort in reading with font sizes that should not be too small.

The knowledge level of clients in this study increased after being given intervention with Page Flip Professional 3D E-module media. This was in line with previous research, which showed that digital flipbooks could strengthen one's knowledge of the concepts presented (23). Another study also supported using E-modules, which impact increasing ability and even behaviour to solve a specific problem (24). Increased knowledge can be due to the brain's cognitive process, which tends to be easier to accept and understand information sourced from attractive visual displays. This indicates that increasing knowledge for clients in terms of health, especially the prevention of recurrence of urolithiasis, requires interactive and innovative media (not monotonous), especially the material presented is complex and closely related to daily life to modify lifestyle.

In addition to knowledge, the clients' attitudes in this study also proved to be more positive after being given the Page Flip Professional 3D E-module intervention. A changed attitude means that clients tend to be better able to make healthy life choices to prevent urolithiasis recurrence. This study was in line with Gustina and Wibowo in 2020 research which stated that digital flipbook media could affect the healthy attitude of teenagers (25). A healthy attitude begins with persuasive communication from the Professional 3D Page Flip E-module. The persuasive E-module is also supported by creative designs, attractive displays, and interactive word choices that have the potential to leave messages attached to the client's subconscious. If this happens, the client is unconsciously influenced to behave healthily, preventing the recurrence of urolithiasis.

Behavioural variables change after the client uses the Professional 3D Page Flip E-module. The behaviours referred to in this study were related to the actual application of activities to prevent the recurrence of urolithiasis, such as adequate fluid/hydration, physical activity, and proper diet consumption. This study was similar to a study from India, which stated that using flip books could change a person's behaviour to live a healthier life (26). The flipbook contains essential points of the messages to be conveyed and then packaged to be informative so that the process of cognition occurs more quickly. The knowledge inherent in the cognitive function then increases a person's self-awareness and guides them to act healthier. Another study by Maynastiti et al. in 2020 also explained that digital flipbooks could improve one's problem-solving skills (27). Problem-solving is also part of healthy behaviour closely related to preventing urolithiasis recurrence. An example of solving the problem in question is in the condition when the client can act to drink regularly according to fluid needs. On the other hand, the client also realizes that he did not care about hydration status in the past. This statement can indicate the importance of the Professional 3D Page Flip E-module, which acts as a medium to inspire/ initiate a person to behave healthier.

CONCLUSION

The Professional 3D Page Flip E-module has been assessed as feasible based on expert reviews to be used as an intervention medium to prevent urolithiasis recurrence. This E-module shows its effect on increasing knowledge and changing attitudes and behaviour towards being healthier in preventing urolithiasis recurrence. Therefore, it is highly recommended for nurses or health workers in hospital urology units apply this E-module as part of structured patient education. Further development is recommended to add online consultation features to maintain controlled healthy behaviour.

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