

Development and Feasibility of an Animated Video for Nutrition Education Delivered via WhatsApp to Hemodialysis Patients

Nabila Amartya Yuana¹, Eti Poncorini Pamungkasari^{2*}, Sri Mulyani³

¹ Department of Nutrition Science, Post Graduate School, Sebelas Maret University, Surakarta, Indonesia

² Department of Public Health, Faculty of Medicine, Sebelas Maret University, Surakarta, Indonesia

³ Department of Anesthesiology Nursing, Vocational School, Sebelas Maret University, Surakarta, Indonesia

Corresponding Author Email: etiponco@staff.uns.ac.id

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ABSTRACT

Dietary management is very important for patients with chronic renal failure. Dietary management is very important for patients with chronic renal failure. The problem that often occurs in patients with chronic renal failure is malnutrition, especially protein energy malnutrition. This study aims to analyze the acceptability of video through WhatsApp broadcasts as a medium for nutritional education for hemodialysis patients. This type of research uses the Research and Development method with the ADDIE model (Analyze, Design, Development, Implementation, Evaluation). The ADDIE model is structured with a systematic description of activities so that it fits the needs and characteristics required. The media feasibility assessment was carried out by assessing the validity of the animated video by three expert validators, namely material experts, media experts and linguists. The results of the media feasibility test by the expert team averaged 3.52 with a very valid category with minor revisions. Then a small group test was conducted consisting of 8 hemodialysis patients with purposive sampling with inclusion and exclusion criteria. The results of the small group test assessment were 95.91% in the category of very feasible and did not need revision. Based on the results of this analysis, the development of animated video media through whatsapp broadcasts can be given to hemodialysis patients as a medium for nutrition education and approved by a team of experts.

Key Messages:

- Development of animated video media through WhatsApp broadcasts is feasible as an educational media for hemodialysis patients.
- Development of educational media via WhatsApp is feasibility for hemodialysis patients

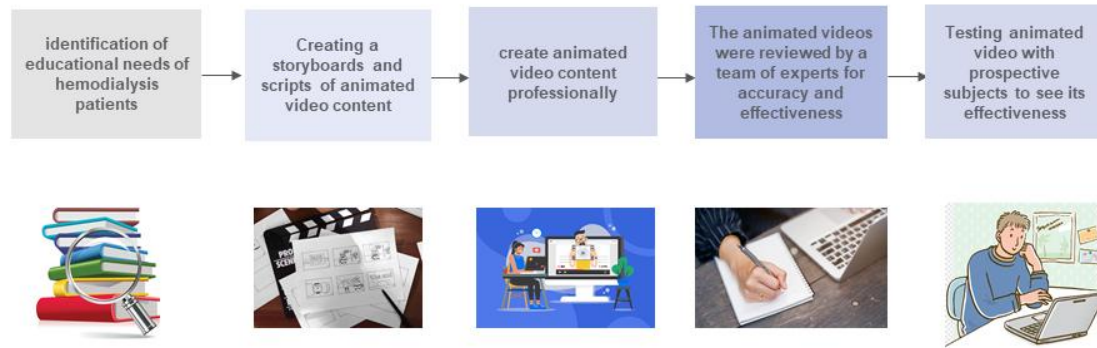
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GRAPHICAL ABSTRACT

Development of Animated Video Via WhatsApp for Nutrition Education: Feasibility and Effectiveness Study on Hemodialysis Patients



INTRODUCTION

The prevalence of chronic renal failure (CKD) according to World Health Organization is about 1/10 of the world's population or an estimated 5 to 10 million patient deaths each year. The number of cases of death by chronic kidney failure disease in 2021 is more than 843.6 million cases of kidney failure in the world (1). More than 2 million people in the world are treated with dialysis or a kidney transplant and only about 10% actually experience the treatment (2). The prevalence of chronic kidney disease in Riau Province is 17,258 or 0.26% of the total population, Riau Province has the fourth highest number of chronic kidney failure cases (3).

Dietary management is very important for patients with chronic renal failure. Problem that often occur in patients with chronic renal failure is malnutrition, especially protein-energy malnutrition (4). This is due to the effects of hemodialysis therapy, which causes gastrointestinal problems, such as nausea and vomiting. As a result, the patient loses more nutrients. Many factors influence non-compliance of hemodialysis patients, according to research conducted by Triyono et al. (2020) factors of non-adherence of patients include age, education, occupation, gender, knowledge, compliance and family support (4)

Based on the results of research conducted by Nurchayati (2021), The nutritional status of hemodialysis patients at Arifin Achmad Hospital Pekanbaru was 70.8% of whom had deficient nutritional status (5). Nutritional status is associated with the level of knowledge and compliance of hemodialysis patients (6). Providing education to chronic renal failure patients with hemodialysis can increase dietary awareness for patients who are undergoing hemodialysis with many kinds of educational methods have been carried out in CKD patients with hemodialysis, including booklets, leaflets, digital applications, and education with lecture methods (7). Study by Aisah et al. (8) stated health education using animated video significantly increased the knowledge of adolescent girls about anemia prevention, as evidenced by the results of the first measurement, and their knowledge persisted for 4 weeks after the intervention. The use of animated educational videos significantly increases knowledge and reduces barriers to prevention (9). Knowledge is a very important factor in the formation of new behavior. It starts with an understanding of certain materials or objects. One of the efforts to increase knowledge is by providing education or consultation activities related to nutrition, especially nutrition-related knowledge. Education cannot be separated from the media, because through the media information can be easily communicated and understood. The media used can clarify information, avoid misunderstandings, and help understanding (10). Understanding the material can be aided by the provision of health education. Health education using video makes participants more responsive to understanding compared to other media because videos brings together visuals and audio (11). Educational methods using power point, lectures and booklets are examples of conventional educational methods, such education has a limited reach. Research that explicitly develops nutrition education through the use of videos via whatsapp broadcasts is limited.

The development of information technology at this time facilitates communication between each

other flexibly. One of the most popular social networking applications (Mobile Messaging Apps) is WhatsApp Messenger. WhatsApp is a versatile instant messaging platform that enables its users to transmit diverse forms of communication, such as text, voice, and video messages. Furthermore, it offers the functionality of audio and visual communication (12). Research by Akmalia (2018), Proving that nutrition education for hemodialysis patients through mobile health via WhatsApp can affect the knowledge and dietary compliance of hemodialysis patients (13). WhatsApp remains one of the easily accessible mobile phone messaging applications in Nigeria due to its broad usage among educators, community health workers, and students (14). By utilizing the sophistication of technology such as Canva Pro and Capcut Pro can create an educational media product, namely animated videos that will make it visually appealing and easy to accept. Therefore, this study aims to analyze the acceptability of video media through WhatsApp broadcasts as a nutritional education media for hemodialysis patients.

Based on these problems, researchers want to know the acceptability test of nutrition education using video through WhatsApp broadcasts for hemodialysis patients to overcome malnutrition in hemodialysis patients.

METHODS

This research uses the Research and Development method with the ADDIE (Analysis, Design, Development, Implementation, Evaluation) approach model. The ADDIE model is structured with a systematic description of activities so that it fits the needs and characteristics required. ADDIE is Analysis, Design, Development, Implementation, and Evaluation. How to collect data by using a questionnaire or the form of a validation sheet from experts, and a feasibility questionnaire for respondents with three assessment components. three points are about material, content, and appearance. The validation using a Likert scale. The type of data presented is in the form of qualitative and quantitative data about the quality of learning media, and then analyzed descriptively, with qualitative and quantitative descriptions [15]. This research was conducted in January-February 2025. Followed by this study to test the feasibility of educational media education for hemodialysis patients who have knowledge of technological developments and are able to use WhatsApp. The subjects of this study were hemodialysis patients at Arifin Achmad Hospital, Pekanbaru City. The data sampling technique used was purposive sampling due to sampling with inclusion and exclusion criteria. The sample amounted to 8 patients with inclusion criteria, namely the age range of 18-35 years and are chronic kidney patients with hemodialysis at RSUD Arifin Achmad Pekanbaru who have undergone hemodialysis 2 x / week and use the WhatsApp application. The majority of internet and social media users aged 18-35 years old who are more understanding of technological developments so that it is easier to assess information related to technological developments (15).

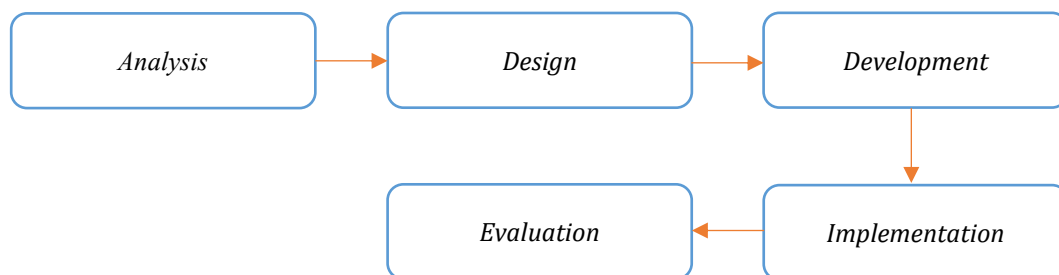


Figure 1. Model ADDIE

Analysis

At the analysis stage: a) Analysis of the needs of hemodialysis patients regarding nutritional knowledge for hemodialysis patients; b) Discussion with health workers and patients, c) Identify media and nutrition education that has been provided

Design

At this stage to develop the results of the patient needs analysis by designing educational media, compiling materials and selecting media. The results of the analysis and information collected will be used to prepare materials and design nutritional education videos. The content of nutrition education for

hemodialysis patients includes the nutritional needs of hemodialysis patients, good food ingredients and food ingredients that should be avoided, examples of good daily cooking menus for hemodialysis patients.

Development

At this process, educational video media will be developed with the concept of animation. The development of animated videos starts from coloring, animating and voice over. The video is made into 4 videos and the duration of the video presentation ranges from 30 seconds to 2 minutes. Videos longer than 2 minutes will bored.

Implementation

At this point, the media that has been made in accordance with the concept will then be tested for validity by three expert validators there is material experts, media experts and language experts. Assessment by experts to validate in the form of educational video content, the purpose of the video, the appearance of animation, text, sound background and video duration. Validation by experts aims to make the developed media obtain an assessment so that it is of good quality in terms of material aspects and the appearance of educational videos (16). Validation also includes input or suggestions so that the results are more optimal.

The validator conducts a media assessment by checking the form column provided then the results will be analyzed. The assessment guidelines given to the validator are using a Likert scale with a score of 0 = invalid, 1 = less valid, 2 = quite valid, 3 = valid, 4 = very valid (16). The scores that have been given will be calculated using the following formula:

$$R = \frac{\sum_{j=1}^m x}{m}$$

Description:

R = Validity of e-module media

x = Average research results of the validity of the j item

m = Many item

The results of the media validation assessment by the expert team will then be interpreted into several categories as follows (16):

Table 1. Interpretation of Validation Score

Qualification	Interpretation
$R > 3,20$	Very Valid
$2,40 < R \leq 3,20$	Valid
$1,60 < R \leq 2,40$	Moderately Valid
$0,08 < R \leq 1,60$	Less Valid
$R \leq 0,08$	Not Valid

Evaluation

At this stage, the researcher conducts an evaluation, aiming to improve or refine the product that has been developed.

CODE OF HEALTH ETHICS

This study uses primary data and has submitted approval to the Riau Provincial Government and Arifin Achmad Hospital, Pekanbaru City, and has been approved by the Health Research Ethics Committee (KEPK) of Dr. Moewardi Surakarta Hospital with number: 30/I/HREC/2025 issued on January 09, 2025.

RESULTS

The results of this study produced animated videos that were sent via WhatsApp Broadcast to provide nutritional education to hemodialysis patients. The following are the results of media development with the ADDIE method:

Analysis

To analyze the needs of patients for nutrition education, a preliminary study was conducted on hemodialysis patients at Arifin Achmad Hospital, Pekanbaru City. From the results of the preliminary study conducted by researchers, the lack of patient compliance with the hemodialysis diet is due to the lack of

patient understanding of the education that has been given and the average patient has forgotten the previous education. According to health workers in the hemodialysis room, it is necessary to add nutritional education material to patients so that there is new information related to nutritional education for hemodialysis patients. So that researchers really want to develop animated videos through WhatsApp broadcasts as a medium for nutritional education for hemodialysis patients.

Design

The design stage in designing this educational media has been adapted to the needs of hemodialysis patients, namely the need for nutritional education media with videos. The video was produced as many as 4 videos and lasted 30 seconds to 2 minutes. This is to avoid patient boredom when viewing educational video (17). Feasibility Test of Interactive Learning Media in Server Administration Subjects. Video content includes information on daily intake needs, food ingredients that are good and bad for consumption and also examples of good daily menus for hemodialysis patients. The first video is a 2-minute overview of nutrition education, including the nutritional needs of hemodialysis patients, foods that are good to consume and foods that should be avoided, and how to prepare and process good food. The second video on nutritional needs for hemodialysis patients is 30 seconds long. The third video is about good food ingredients and food ingredients that should be avoided by hemodialysis patients and how to process good food with a duration of 30 seconds. The fourth video is an example of a food menu that can be consumed by hemodialysis patients with a duration of 42 seconds.

Development

The educational video that has been made is then carried out in a media validation test conducted by a validator consisting of one material expert, one media expert, and one linguist. Criteria in determining expert validators, namely experienced, and experts in their fields.

Table 2. Results of Validation by Expert Validation

Expert Team	Value	Description
Material Expert	3,91	Very Valid
Media Expert	3,32	Very Valid
Language Expert	3,33	Very Valid
Total	3,52	Very Valid

The overall results of the validation of nutrition education video media by a team of validators obtained an average result of 3.52 with a very valid video media category to be given to hemodialysis patients. In addition to the assessment in quantitative form, comments and suggestions on each video are also given qualitatively which will be used as evaluation material.

The next stage is product testing in small groups. The feasibility test of video media was also carried out to a small group of 8 hemodialysis patients conducted in the hemodialysis room of RSUD Arifin Achmad Pekanbaru. The video media trial conducted on hemodialysis patients aims to get suggestions and criticisms by patients as subjects to be in accordance with what is desired. Data collection in the small group trial used an assessment form with a Likert scale from 0 to 4, namely 0 = very invalid, 1 = invalid, 2 = sufficient, 3 = valid, 4 = very valid. Overall validation of nutrition education video media by a team of validators obtained an average result of 3.52 with a very valid video media category to be given to hemodialysis patients. In addition to the assessment in quantitative form, comments and suggestions on each video are also given qualitatively, which will be used as evaluation material

Table 3. Results of Media Feasibility Test in Small Group

Respondent	Total Score	Maximum Score	%
P1	103	104	99,03%
P2	99	104	95,15%
P3	100	104	96,15%
P4	97	104	93,26%

P5	102	104	98,07%
P6	95	104	91,34%
P7	102	104	98,07%
P8	100	104	96,15%
Total	798	832	95,91%

Table 4. Score Minimum and Maximum

Mean (min-max)	Std. Deviation
96,30% (93,26-99,00%)	2,046

Based on the results of the small group trial in Table 3. Obtained an average assessment of 95.91% with a minimal score in Table 4. The range score minimum is 93,26%, maximum score 99% and the standard deviation is 2.046. This presents a very feasible category, so animated video media via WhatsApp as a nutritional education media for hemodialysis patients is feasible to be given to research subjects.

Evaluation

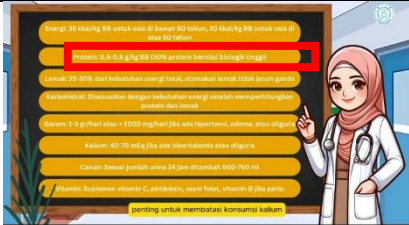
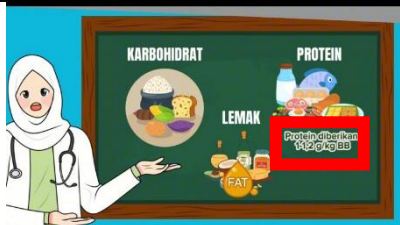
Based on the results of the assessment by a team of expert validators related to the video, video revisions were made according to comments and suggestions by expert validators.

Table 5. Results of Comments and Suggestions on Animated Video

Team Expert	Comments	Suggestions
Material Expert	- Based on the nutritional management consensus in patients with CKD stage V on Hemodialysis, protein needs as much as 1.2 g / kgBB / day - Lack of information about the sample menu for a day for hemodialysis patients	- Improve the protein needs of hemodialysis patients - Add a sample day menu for hemodialysis patients
Media Expert	None	None
Language Expert	- The pronunciation of the word "hemodialysis" must be the same, in the initial video it is different from other videos - The writing of "Foods that are good to consume" and "the following foods for hemodialysis patients" should be clarified	- Consistency in the use of the phrase "Hemodialysis" according to the KBBI - Change to "foods that are good for hemodialysis people or foods commonly consumed by hemodialysis patients"

Table 5 contains comments and suggestions on the video, including justifying the material, improving the writing, and adding material. Based on table 6. It can be seen the results of revisions or improvements based on comments and suggestions from the expert team.

Table 6. Revision of expert comments

Revision	Before Revision	After Revision
Based on the nutritional management consensus in CKD stage V patients on Hemodialysis, protein needs as much as 1.2 g/kgBB/day.		

Revision	Before Revision	After Revision
It would be better to present a sample menu that can be prepared / served by the family / patient companion at home.		
The pronunciation of the word "hemodialysis" must be the same, in the initial video it was mentioned using the word "hemodialysis" so it must be consistent		
The writing of "Foods that are good to consume" and "the following foods consumed by hemodialysis patients" should be clarified into "foods that are good to consume by hemodialysis people or foods commonly consumed by hemodialysis patients".		

DISCUSSION

This study used media animated video with audio visuals provided via Whatsapp broadcast. Based on the results in Table 2. Stating that the validator team has been assessed the validity of the video with a value of 3.52 in accordance with the category declared very valid with several revisions. The results of the media validation test by material experts is 3.91 higher than the media experts and linguists, with validation scores of 3.32 and 3.33. this is because media experts need more interesting video concepts and acceleration adjustments to letters, numbers and symbols. The linguists need to use sentences that are in accordance with the KBBI so that they can be more easily interpreted by respondents. Revisions of video include replacing the protein needs of hemodialysis patients, providing examples of menus for the hemodialysis diet, generalizing the entire hemodialysis sentence in the video and added good food sentences for hemodialysis patients in the video. after making revisions according to the experts' comments, educational videos can be given to small groups to conduct educational video trials via Whatsapp. The results of the feasibility trial in small groups were also declared very feasible to be used as nutritional education media for hemodialysis patients with a percentage of 95.91%. this is also the influence of the revision of the video according to the comments of the experts so that the video given to the patient already has good quality as evidenced by the results of the media feasibility test by a small group of hemodialysis patients stating very feasible. This is supported by previous research which states that the use of video media and posters via WhatsApp can increase the knowledge of hemodialysis patients, which means that animated video media can make hemodialysis patients easier to understand the information provided(13).

Video is an audio-visual media that can present images and sound simultaneously. Knowledge possessed by a person is received through the five senses. According to expert research, the essential thing

to transmit understanding into the brain is the sense of sight. About 75% - 87% of human knowledge is obtained through the sense of sight, 13% through the sense of hearing, and 12% through other senses. Along with the rapid development of technology, the creation and use of audio-visual media is no longer expensive. Both in rural and urban areas, audio-visual facilities are easily accessible. Therefore, education or education using audio visual media needs to be developed, one of which is in the health sector, by providing counseling to the community, and focusing on increasing knowledge (18). Video is also referred to as an attractive, effective, and efficient medium that makes it easier for someone to understand the information provided. Research by Azzahra (2024), on two sample groups, namely the intervention group and the control group, where the intervention group was given education using video, while the control group was given education using power point (visual media) (19). The results showed that the intervention group that was given the video showed higher knowledge and attitude scores compared to the control group that used power point.

The media used can clarify information, avoid misperceptions, and also facilitate understanding. Health promotion media is a means of health promotion, so that targets can understand health information, and help determine healthy living behavior based on the information conveyed (10). Health counseling media is an extension tool which will be used by extension workers in delivering education. Each tool has different strengths in helping a person's perception or thinking style (10). One type of media that can be used in health counseling or education is video. Video is a type of audio-visual media that depicts moving objects with natural or appropriate sound. As a medium, video can provide more real information, can be received equally, and can be repeated, or stopped as needed, which is very suitable for explaining processes. Videos contain content to provide information, explain concepts, describe processes, teach skills, and also act as a medium that influences knowledge and attitudes. (20).

WhatsApp makes it very easy for us to send messages in the form of videos, images and text (21). Many current health education models use the WhatsApp application as an educational medium. In the research of Nurhasanah, Petrika and Sopiandi (2022), the WhatsApp application was used to send education to type 2 Diabetes Mellitus patients (21). The WhatsApp application as a means of providing education is very useful and helps in the process of communicating, giving and receiving information (22). Limitations in this study require further research how the effectiveness of media in evaluation of nutrition education to hemodialysis patients using media that have been verified of feasibility. Number of subjects needs to be added so the results test of the media feasibility are more valid and can describe the assessment of all hemodialysis patients.

CONCLUSION

Animated video through whatsapp broadcast as media education obtained a score of 3.52 with a very feasible category and obtained a presentation of 95.91% in a small group trial (n = 8 hemodialysis patients). Based on results, animated video can show feasibility as an media education for hemodialysis patients. The limitations of this study require the continued research to see the results of providing nutrition education interventions with animated video via whatsapp in hemodialysis patients. Research can be carried out with quasi-experimental methods and divided into control and intervention groups with more samples. then pre-test and post-test measurements of intervention are carried out, so that they can see the effectiveness of the media in measuring both knowledge and compliance of hemodialysis patients.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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