

Original Research

The Effectiveness of Leaflet and Video Educational Media Through WhatsApp Toward the Knowledge of Type 2 DM Patients



I Made Rai Mahardika^{1*} & Ni Made Ayu Sukma Widyandari¹

¹STIKES Panca Atma Jaya, Semarang, Indonesia

Article Info	Abstract
Article history: Received: 23 September 2022 Accepted: 29 January 2023	<p>Introduction: Knowledge of DM patients can be increased through the provision of education. There are various ways of providing education such as the type of media used and how the education is given. The aim of the study was to determine the effectiveness of leaflet and video educational media through WhatsApp application on the knowledge of Type 2 DM patients.</p> <p>Methods: The research design used was a quasi-experimental design using a pre-test and post-test with control group design. The number of samples consisted of 112 people who were divided into two groups, 56 people in the control group (leaflet) and 56 people in the intervention group (video). Sample was determined by purposive sampling. The level of knowledge was measured using a Diabetes Knowledge Questionnaire (DKQ24) which is reliable with a Cronbach's alpha value of 0.78. Independent variables are educational media in the form of leaflets and videos. The dependent variable is the level of knowledge of type 2 DM patients.</p> <p>Results: The results showed that health education provided with leaflets and videos via WhatsApp had an effect on increasing the knowledge of type 2 DM patients (p-value 0.000). The results of the Independent <i>t</i>-test showed that the mean value for leaflet media was 12.10 and the mean for video media was 13.28 with a p-value of 0.019.</p> <p>Conclusion: Providing health education using video media via WhatsApp is more effective in increasing knowledge in type 2 DM patients than using leaflet media via WhatsApp.</p>
Keywords: DM Type 2, educational media, leaflets, video, knowledge	

*Corresponding Author:

e-mail: raimhdk87@gmail.com



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INTRODUCTION

Diabetes Mellitus (DM) is a metabolic disease characterized by hyperglycemia that occurs due to abnormalities in insulin secretion, insulin action or both [1]. In 2017 there were 10.3 million people with diabetes in Indonesia and was ranked the sixth highest number of people with diabetes in the world [2]. Basic Health Research (Riskesdas) reports that the prevalence of diabetes in the adult population has increased very rapidly from 6.9% in 2013 to 8.5% in 2018. The high prevalence of diabetes in Indonesia can also be seen in the Province of Bali with a prevalence of diabetics in the 14th position out of 34 provinces in Indonesia [3]. The 2018 Bali Province Health Profile places diabetes in second place out of the top ten diagnoses for outpatient and inpatient non-communicable diseases [4]. The city of Denpasar itself recorded 14,353 diabetics in 2020 with the second highest number of 1,968 at the UPTD Puskesmas I Dinas Kesehatan Kecamatan Denpasar Barat with standard service recipients of 11.33% [5].

Diabetes is known as the silent killer because when the patient finds out that the disease has already occurred, complications have occurred [3]. Complications of diabetes can be prevented by controlling the 4 pillars of management, namely education, diet, physical activity, medication and compliance [6]. Education as one of the pillars of diabetes management aims to increase the knowledge of DM patients about the disease and correct treatment management [7]. However, the patient's knowledge about diabetes prevention and its complications is still very

minimal, because the patient assumes that the complications that occur are not the result of their diabetes [8].

The efforts to increase the knowledge of diabetes patients can be done by providing health education using appropriate educational media. Health education can be done in various ways or methods and media, including; visual media, audio media, audio visual media and multimedia. Health education media that are often used by health workers are leaflets and videos [9]. Leaflets are one of the most widely used media for health promotion. Leaflets proved to be effective in increasing the knowledge of diabetic patients [10]. However, along with the advancement of information technology today, video has been widely used as an educational medium [11]. Video is an audiovisual media that is used to convey health messages in the form of images and writing. Video as an educational medium is very effective in increasing the knowledge of type 2 DM patients [12].

Social media is starting to be used as a new medium to convey health information. Its effectiveness, which is able to reach thousands and even millions of targets in a short time, makes this media a necessity for every health worker [13]. The WhatsApp application is the most widely used in the world today because it can send chats without restrictions on characters, images, videos, sounds and GPS where the media is directly displayed and not in the form of a link. Education via WhatsApp is more effective, efficient, flexible and practical than education in the traditional way. WhatsApp has the potential to be used as a communication

medium, because it makes it easier for users to communicate with each other and interact without spending a lot of money on its use, because WhatsApp (WA) does not use credit, but uses internet data [14]. Research conducted by Nopryan Ekadinata and Doni Widyandana concluded that WhatsApp can be used as an effective educational medium as an educational program [15]. Based on the explanation above, the researcher is interested in knowing the effectiveness of leaflet and video educational media through WhatsApp application on the knowledge of type 2 DM patients at UPTD Puskesmas I Dinas Kesehatan Denpasar Barat.

METHODS

Study Setting & Participants

This study used a quasi-experimental design using a pre-test and post-test with a control group design. Sampling used purposive sampling technique. The population in this study were type 2 DM patients at UPTD Puskesmas 1 Dinas Kesehatan Denpasar Barat. The participants were asked to take part in a face-to-face interview, during which the details of the study were explained to them. After providing their informed consent, the participants were selected and divided into two groups: the control group, whose participants received health education by leaflet through WhatsApp; and the intervention group, whose participants received health education by video through WhatsApp for increasing their awareness about the disease. The ethical consent for this study was given by the Institute of Technology

& Health Bali (04.0446/KEPITEKES-BALI/VI/2022).

Variable

In this study, there were two independent variables namely leaflet educational media and video educational media that were distributed via WhatsApp. The dependent variable is the patient's knowledge of Type 2 DM.

Sampling, Inclusion & Exclusion Criteria

The population in this study were type 2 DM patients at UPTD Puskesmas 1 Dinas Kesehatan Denpasar Barat. The number of samples is calculated using the formula paired 2-group numerical comparative analysis.

$$n1 = n2 = \frac{(Z\alpha + Z\beta)^2 S^2}{(X1 - X2)^2}$$

The sample size for each group was 28. To avoid intervention impacts, the sample count was multiplied by 2 so that each group consisted of 56 respondents. The total number of samples in this study were 112 respondents. The number of respondents was divided into 2 groups, the control group (leaflet media) with a total of 56 respondents and the intervention group (video media) with a total of 56 respondents. Inclusion criteria: respondents aged 18 years, can read and write well, willing to be research subjects by signing informed consent, and having a WhatsApp application. Exclusion criteria: pediatric patients, having mental disorders.

Measurements Tools

The level of knowledge was measured by the Diabetes Knowledge Questionnaire (DKQ24) containing 24 questions developed by Star County which is a questionnaire developed from the DKQ60 with a Cronbach's alpha value of 0.78. The aspects assessed are basic information, glycemic control and prevention of complications. The answer choices are "yes", "no" and "don't know". Assessment is carried out based on the number of items actually answered by the subject, correct answers are given a value of 1 while wrong answers or don't know are given a value of 0. The level of knowledge is said to be high if the score is 17-24, medium is 10-16, and low is 0-9 [16].

Data Collection

Data collection using a Diabetes Knowledge Questionnaire (DKQ24). Both the control group and the intervention group were given a questionnaire as a pre-test. Then, the control group was given leaflet educational media, while the intervention group was given video educational media which was distributed to the group on WhatsApp application for each group. Each group was given the opportunity to understand the material presented through leaflet and video educational media. Three days later, a post-test was conducted using the same questionnaire.

Statistical Analysis

The data collected before and after intervention study were analyzed using the Statistical Package for Social Sciences (SPSS)

version 21. The study's findings were considered statistically significant if the probability (p) is less than 0.05 or $p < 0.05$. Normality test using Kolmogorov-Smirnov Test, data analysis using paired *t*-test to see the difference in the average score of knowledge before and after in each group then using the Independent *t*-test to see the difference in the average post-test score between the two groups.

RESULTS

A total 112 participated in the study, with 56 participants in the control group and the other 56 in the intervention group. The general and clinical characteristic of the participants are presented in the **Table 1**.

As shown in table 1, the majority of the participants (51.3%) were ages ranged from 46 to 65 years. Most of the subjects (54.5%) were female, with (51.8%) had educated of senior high school. Regarding to duration of diabetes, more than half (53,6%) participants were diagnosed less than 5 years.

The pre- and post- scores of both groups underwent paired comparison analysis using paired *t*-test to compare the change in diabetes knowledge, as shown in **Table 2**. These results indicate that there was a statistically significant change in knowledge of diabetes between the baseline and the end of the study in both control and intervention group.

Table 3 compared the change of knowledge between the control and the intervention group using the independent *t*-test. Levene's test results obtained 0.757, it can be interpreted that the data variance

between control and intervention group that was given health education is homogeneous. The findings show that when compared to the control group, the intervention group had a

significantly greater improvement in knowledge by showing a higher average value than the control group with a value of 13.28.

Table 1

General and clinical characteristic of the study groups

Characteristics		Number of participants n (%)
Age group (years)	25-45	16 (2.4)
	46-65	86 (51.3)
	> 65	10 (32.7)
Gender	Male	51 (45.5)
	Female	61 (54.5)
Last Education	Primary school	24 (21.4)
	Junior High School	10 (8.9)
	Senior High School	58 (51.8)
	University	20 (17.9)
Duration of diabetes (years)	< 5	60 (53.6)
	≥ 5	52 (46.4)

Table 2

Pre- and Post-Diabetes knowledge using paired t-test

Group	Outcomes measure	Mean ± SD	95% CI	p value
Control	Preknowledge	8.96 ± 2.64	2.20-4.08	< 0.001
	Postknowledge	12.10 ± 2.53		
Intervention	Preknowledge	8.48 ± 2.29	3.98-5.62	< 0.001
	Postknowledge	13.28 ± 2.71		

Table 3

Comparison of the shanges of knowledge between the control and intervention groups using independent t-test

Outcome measures	Group	Mean ± SD	Levene's Test	p value
Post knowledge level	Control	12.10 ± 2.70	2.20-4.08	< 0.001
	Intervention	13.28 ± 2.53		

DISCUSSION

Differences in Respondents' Knowledge Before and After Being Given Health Education with Leaflet Media Through the WhatsApp application

Based on the research conducted in the control group (leaflet), it shows that there is an increase in knowledge before and after health education is given by using leaflet media through the WhatsApp application, it can be seen that there is an increase in the value before and after health education is given from 8.96 to 12.10. Based on statistical analysis, there are significant differences before and after health education is given by using leaflet media through WhatsApp application ($p < 0.001$). So, it can be concluded that the educational leaflet provided through the WhatsApp application can improve the knowledge of Type 2 DM patients.

This research is in line with the results of research conducted by Hidayah, M., & Sopiyan, S. which states that leaflet media is effective for increasing knowledge. This can be seen from the difference in knowledge before and after nutrition education is given by using leaflet media in patients with Type 2 diabetes [10]. Research conducted by Vainy, T. P. also stated that the leaflet media is effective in increasing the knowledge of pediatric diarrhea self-medication in parents [17].

Leaflet is an information media that has been assembled into information that is concise and clear to make it easier for

everyone to understand the information therein. Leaflet is one of the print media used to convey health messages in the form of health information delivery through folded sheets of paper, where in the leaflet the information content can be in the form of sentences or images or combinations. The information contained in the leaflet should use grammar that is easy to understand for everyone [9]. In the era of digitalization, educational provision using leaflets can also be given online. Leaflet has the advantage of online distribution, namely it does not have a large download capacity so it does not require a lot of data packages because it is in the form of images. Another advantage is that because the leaflet is distributed digitally, after it is downloaded, respondents can see its contents easily and many times [18].

Differences in Respondents' Knowledge Before and After Being Given Health Education with Video Media Through the WhatsApp Application

Based on the results of the study, it shows that the provision of health education in the intervention group (video) through WhatsApp application shows an increase in knowledge before and after health education is given. Based on statistical tests, it can be concluded that there are significant differences before and after health education is given by using video media through WhatsApp application ($p < 0.001$).

This study is in line with the results of research conducted by Apriyani et al., (2021)

which stated that health promotion using video media through WhatsApp has an effect on increasing the knowledge of health cadres about surface infections [19]. Research conducted by Latif, A. I., & Tiala, N. H also showed similar results, it revealed an increase in the average value of knowledge before and after being given educational video actions through the WhatsApp groups [20].

Researchers assume that the increase in the average knowledge of patients with Type II diabetes after being given health education using video media via WhatsApp because the information presented is more interesting not only limited to images but also audio. Audio-visual media is a good medium to be used in the learning process, because it involves more senses [9].

Video is an audio-visual medium that is increasingly popular in the community. The message presented can be factual or fictitious which can be informative, educational, or instructional [19]. The advantages of video media are that it attracts the attention of the target, the target can obtain information from various sources, saves time and can be repeated at any time, and the audio volume can be adjusted when the presenter wants to explain some

The Effectiveness of Leaflet and Video Media via WhatsApp to Increase the Knowledge of Type II DM Patients

Based on research conducted, it shows that the provision of health education using leaflet and video media via WhatsApp significantly increased knowledge in patients with Type II

diabetes ($p < 0.05$). However, the results of the analysis show that the video media has a higher average value of the knowledge of patients with Type II diabetes than the leaflet media. This shows that the provision of health education using video media via WhatsApp is more effective in improving the knowledge of Type II diabetes patients than using leaflet media via WhatsApp ($p = 0,019$). As with previous research conducted on students, it was also stated that video media has the advantage of being able to convey the material clearly because it utilizes more than one sense, in this case, the senses of sight and hearing, where in the process of delivering the material, it should utilize more than one sense to make it easier to understand the material presented. In addition, video media is also able to show a variety of interesting and varied materials [21].

The results of this study are in line with research conducted by Latif, A. I., & Tiala, N. H. (2021) which states that providing education through videos on WhatsApp groups is more effective in increasing knowledge related to TB prevention compared to using leaflets or standard media [20]. Research conducted by Hasanuddin, S. H. (2018) also stated the results in line with this study where the average value of the video media group is greater than the picture story media group, this shows that video media is more effective than picture story media [22]. However, different results were conveyed in a study conducted by Apriyani, R. et al which stated that descriptively it could be seen that the increase in the video group was higher than that of the control group (leaflet), but

statistical analysis concluded that the difference was not significant [19]

Health education media plays an important role in increasing knowledge and information sources. With the modification of health education media, it will further increase the level of knowledge. In the context of education, lately, there have been many technology-based learning models introduced with various terms used, including learning methods by utilizing social media. There are many types of social media platforms that have developed to date and the most dominating and popular is WhatsApp which is widely used by most people in the world. WhatsApp has become a cross-platform communication in the world. WhatsApp combines various features such as group chats, video calls, voice calls and so on [23]. WhatsApp-based video is a new breakthrough and innovation in the field of electronic-based health education to keep up with the current times [24]. WhatsApp is not only part of the current trend, but has a high potential to support educational needs [25].

CONCLUSION

The provision of health education using leaflet and video media via WhatsApp can increase the knowledge of Type 2 DM patients. The use of video media via WhatsApp for health education in type 2 DM patients is proven to be more effective in increasing knowledge compared to using leaflet media via WhatsApp.

STRENGTH AND LIMITATION

Strength

This study used WhatsApp application, easily adapted in the digitalization era, information dissemination is easier, faster and more effective.

Limitations

Strict assistance was not carried out during the intervention, especially when sending the questionnaire via WhatsApp, so it is possible that the answers given were not from the respondent. In addition, there are elderly respondents who may not be very active and fluent in using the WhatsApp application. Some of the obstacles experienced by the elderly in using technology, especially WhatsApp, are interpersonal barriers, structural barriers and functional barriers so that the data may be biased.

Suggestions for Further Research

Making educational media with digital technology that is more interactive to facilitate the dissemination and understanding of information across all ages, for example, interactive multimedia, digital video and animation or game-based learning.

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CONFLICT OF INTEREST

In this research, there is no conflict of interest between any parties.

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