



Online education model on coffee addiction on the prevention of diabetes mellitus

Model edukasi online pada pecandu kopi terhadap pencegahan diabetes mellitus

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Abstract

Diabetes Mellitus (DM) starts with unhealthy changes in life behavior. Unhealthy patterns and lifestyles are considered fun without regard to the negative impacts that can last a long time. This study aimed to identify the influence of online education factors on coffee addicts on DM prevention. Quantitative research using a quasi-experimental design. The sample was 450 people. The research was conducted in 6 districts, namely Aceh Besar, Banda Aceh, West Aceh, South Aceh, Lhokseumawe and East Aceh, from August 1, 2021, to October 30, 2021. The sampling technique used was the Multistage sampling method—sample calculation using SEM standards. The independent variables are online education and Shari'a video, while the dependent variable is DM prevention. Data collection using a questionnaire in the form of a Likert scale (1-5). Demographic data analysis used SPSS, while data analysis to test the influence between variables using Structural Equation Modeling (SEM). The results showed that online education through Shari'a videos could improve DM prevention. The variables tested in the development of the model, namely, online education and syar'i videos, affect DM prevention. The SEM test results obtained the GFI (Goodness of Fit Index) value at an alpha value $\leq 0,05$. In conclusion, online education can be used as a medium to educate coffee addicts because it supports DM prevention.

Keywords: Blood glucose, complications, prevention, shari'a video

Abstrak

Diabetes Mellitus (DM) berawal dari perubahan perilaku hidup yang tidak sehat. Pola dan gaya hidup yang tidak sehat dianggap menyenangkan dan tanpa memperhatikan dampak negatifnya yang dapat berlangsung secara lama. Tujuan Penelitian ini untuk mengidentifikasi pengaruh faktor edukasi online pada pecandu kopi terhadap pencegahan DM. Penelitian kuantitatif menggunakan desain quasi eksperimen. Sampel sebanyak 450 orang. Penelitian telah dilakukan di 6 Kabupaten yaitu Aceh Besar, Banda Aceh, Aceh Barat, Aceh Selatan, Lhokseumawe dan Aceh Timur, sejak 1 Agustus 2021 sampai 30 Oktober 2021. Teknik pengambilan sampel menggunakan metode *Multistage sampling*. Perhitungan sampel menggunakan standar SEM. Variabel independen adalah edukasi online dan video syar'i, sedangkan variabel dependen adalah pencegahan DM. Pengumpulan data menggunakan kuesioner berbentuk skala likert (1-5). Analisa data demografi menggunakan SPSS, sedangkan untuk analisa data untuk menguji pengaruh antar variabel menggunakan *Structural Equation Modelling* (SEM). Hasil penelitian menunjukkan, edukasi online melalui video Syar'i dapat meningkatkan pencegahan DM. Variabel yang diuji dalam pengembangan model yaitu, edukasi online dan video syar'i, berpengaruh terhadap pencegahan DM. Hasil uji SEM diperoleh nilai GFI (*Goodness of Fit Index*) pada nilai alfa $\leq 0,05$. Kesimpulan, edukasi online dapat digunakan sebagai media untuk memberikan edukasi pada pecandu kopi, karena mendukung pencegahan DM.

Kata Kunci: Kadar gula darah, komplikasi, pencegahan, video syar'i

Introduction

Along with the times, human activities cannot be limited to achieving their life goals. One habit that escapes human control is consuming unhealthy food during activities (Clark et al., 2020). Fast food, high in sugar, and lack of fiber trigger the incidence of prolonged hyperglycemia and the risk of DM (Al Rahmad, 2021). Unhealthy patterns and lifestyles are considered fun and provide temporary solutions without paying attention to the impact in the future (Jezewska-Zychowicz et al., 2018; Plaza-Díaz et al., 2020).

Diabetes Mellitus (DM) begins because of changes in unhealthy life behavior. Data states that 451 million people aged 18-99 years living at risk of diabetes, and the age group 20-79 years suffering from diabetes worldwide reaches 2.045 and 629 people (Fidan et al., 2020). Increased blood sugar levels cause DM to be above average in the body.

The increasing morbidity and mortality in the world are caused by an unhealthy lifestyle, one of which is coffee addiction. Addiction addicts not only consume coffee but also consume uncontrolled sugar. As a result, DM is the leading cause of blindness, heart disease, stroke, kidney failure, and leg amputation. A healthy lifestyle can prevent 80% of DM (Kemenkes RI, 2018). Diabetes Mellitus used to strike at the age of 40 years and over. Now, it has attacked the younger age group. Another figure states that Indonesia is the second country in Southeast Asia that causes deaths from DM after Sri Lanka (WHO, 2022).

The high incidence of DM in Indonesia puts the risk of increasing cases of other non-communicable diseases (NCDs), such as hypertension and stroke. The community does not realize this incident because of their unhealthy lifestyle. Approximately 55% of the burden of NCDs generally arises from DM. It is supported by service management that has not touched every level of society below, the education is not evenly distributed, and the education methods are not suitable. DM complications are increasing, such as premature death and decreased quality of life (Lopez et al., 2014).

Currently, DM cases are higher than infectious diseases in developing countries, one of which is Indonesia. National Health Survey in 2018 stated that Diabetes Mellitus increased

from 6,9% to 8,5%. DM disease causes health problems such as; becoming less productive, dependent on others, being disabled due to injury, and even endangering death. Another impact is the burden on the government and society for the cost of routine care and health checks (Kemenkes RI, 2020). This cost is believed to be higher than the cost of online education.

Public education online can use social media packaged in the form of videos. Education for coffee addicts (routine coffee drinkers more than three times per day) can be done using videos and sent online. Nurses can carry out this education as a health service team through a network in the village. Online education, with videos, is one way to increase public awareness to prevent increasing DM cases (Kemenkes RI, 2018). The development of society with technology, especially online education, can be delivered with a healthy culture and lifestyle. Behavioral deviations in excessive coffee and sugar consumption are the primary targets for changing a better lifestyle (Bols et al., 2015). The use of video as a form of education and teaching method is equivalent to or more effective than traditional face-to-face teaching (Forbes et al., 2016).

Nurses in providing services can use art. Role-playing in videos while providing education is one of the educational innovations. However, other techniques with patience, perseverance, smile, and sincerity are tricks that are believed to be effective in public service. Educational activities are the primary goal of solving health problems in the community. Nurses can design innovative online education to manage coffee addicts using video to change their behavior to a healthier one (Halimatussakdiah et al., 2018). This education is believed to accelerate programs to overcome health problems in coffee drinkers and prevent more severe DM complications. People who have not been exposed to the impact of coffee, sugar, and unhealthy foods, need this information to overcome health problems. If given education, coffee drinkers with diabetes complications are believed to improve psychological cognition and hypertension and strengthen blood pressure and blood sugar control (Li et al., 2022).

Coffee addicts in Aceh are easy to find in coffee shops. Aceh, dubbed the land of a thousand coffee shops, supports this phenomenon. The content of coffee does not directly trigger the

onset of DM, but because it is drunk with uncontrolled sugar, it will cause an increase in blood sugar levels, called hyperglycemia. If this situation lasts for a long time, it will be at risk of causing Type 2 DM, Hypertension, and Stroke. This condition requires the attention of health workers and the government to socialize on the effects of drinking excessive coffee and sugar on health. The community needs this information to increase awareness of a healthy lifestyle (Ricci et al., 2017).

Nurses, one of the health care teams whose role is as an advocate and counselors to patients, feel the need to provide professional, effective, and efficient services. Otherwise, the growth of coffee shops will cause DM disease in coffee drinkers or the community. Online video education is one solution that needs support. It is easy for coffee addicts to play videos on their cell phones. This education is believed to reduce the incidence of DM and improve the quality of health services in Aceh. Based on the above research and problems, the study aims to measure the influence of online education factors on DM prevention in coffee addicts.

Method

This study aims to look at the online education model for the prevention of DM in coffee addicts in Aceh. This type of research is quantitative and uses a cross-sectional approach. The research locations were conducted in 6 districts, namely Aceh Besar, Banda Aceh, West Aceh, South Aceh, Lhokseumawe, and East Aceh, August 1 – October 30, 2021. The location was determined randomly from 23 districts, and only six were selected.

The population of this study was all coffee drinkers in 6 districts/cities in Aceh, namely: Aceh Besar Banda Aceh, Sigli, Lhokseumawe, Tapak Tuan, and Meulaboh. The sample in this study was 450 people. A sample calculation is calculated based on the SEM equation. The sampling technique in this study was carried out using the Multistage sampling method. The inclusion criteria for selecting respondents were: age 25-50 years, visiting coffee shops > three times/week and drinking coffee 2-3 times/day, no complications due to DM: 1) not disabled, 2) not challenging to talk, 3) no gangrene injuries and 4) willing to be a respondent. Who are not included in the inclusion criteria are not used as respondents.

Data was collected using a questionnaire designed to test the online education variables, the nature of education, and the prevention of DM. The questionnaire was designed on a Likert scale (1-5). The questionnaires were distributed to coffee drinkers, filled out in front of the researcher, and collected afterward. The questionnaire was tested for reliability on 50 coffee addicts in 2021. The results of the validity and reliability test used the product-moment correlation. The questionnaire was designed by researchers using reference sources related to these variables. The online education variable (X) was adopted from (Lopez et al., 2014; RI Kemenkes, 2018). At the same time, the video syar'i variable (Y) variable was adopted from (Blair et al., 2021; Salina et al., 2012; Statton et al., 2016). Likewise, the DM prevention variable (Z) was adopted from several related references (Bols et al., 2015; Kim, 2015; Nguyen et al., 2016).

Table 1. Research variables

Variables	Information	Dimension
X	Online Education	1. Convenience 2. Video Material 3. Community Support
Y	Syar'i video	1. Internet/WIFI 2. LCD/Mobile Phone 3. Video Display
Z	DM Prevention	1. Blood Sugar Levels Control 2. Keep Cholesterol 3. Control Blood Pressure

Education is given to coffee drinkers by sending educational videos via WhatsApp App or links on Youtube. Who are not included in the inclusion criteria are not used as respondents. Data collection was carried out after coffee addicts watched videos about education containing the effects of coffee and the impact of excessive sugar on the body, especially DM. In addition, the video is linked to religious education about healthy eating patterns in Islam and the Sunnah of the Prophet about eating and drinking well.

Demographic data analysis using SPSS, while to test the effect between variables or sub-variables is tested with the Analysis of Moment Structure (AMOS) software 22. The SEM analysis

model is used because this equation model is a set of statistical techniques that allows the simultaneous testing of a relatively complex series of relationships (Burns & Grove, 2005). Before conducting the research, the researcher obtained a research permit from the Aceh Provincial Political and National Unity Agency and the city district where the research was carried out and an ethical test from the Health Polytechnic of Aceh, Ministry of Health.

Results and Discussion

Demographic Characteristic

In Table 2, it can be seen that most coffee drinkers are aged 25 years (42,7%). The largest group in the marital status category was unmarried (48,9%). Meanwhile, in the sex group, the dominant coffee drinkers were male (65,8 %). The education level of most coffee drinkers is in the high school category (42,2%). An essential aspect of health check-up behavior was that coffee drinkers checked their health if there were only complaints (82,0%).

Table 2. Demographic characteristic (n= 450)

Characteristic Subject	n	%
Ages		
25 years old	192	42,7
25-45 years old	171	38,0
> 45 years old	87	19,3
Marital status		
Single	220	48,9
Married	217	48,2
Widow/Widower	87	2,9
Gender		
Male	296	65,8
Female	154	34,2
Level of education		
Junior high school	33	7,3
Senior High School	190	42,2
Diploma/ Bachelor	206	45,8
Master	21	4,7
Health check-ups at the health center/ doctor		
Every year routine	47	10,4
If there is a complaint	369	82,0
Never check	34	7,6
Current complaint		
DM	15	3,3
Hypertension	20	4,4

Stroke history	14	3,1
No complaints	401	89,1
Monthly income (IDR):		
< 1.350.000	171	38,0
1.350.000-2.999.999	140	31,1
3.000.000-3.999.999	79	17,6
4.000.000-4.999.999	36	8,0
5.000.000-5.999.999	24	5,3

The results of other urgent demographic data are that coffee drinkers are in a DM condition (3,3%), hypertension (4,4%), and a history of strain (3,1%). From an economic point of view, coffee drinkers are mainly in the low economic category with income < IDR 1.350.000 (38,0%).

Confirmatory Factor

The latent construct in this study consisted of two exogenous latent variables, namely Online Education and Syari'a video. In comparison, the one endogenous latent variables are DM prevention. At the same time, the dimensions observed in exogenous and endogenous latent variables were 23 dimensions. This research also makes a path diagram, as shown below.

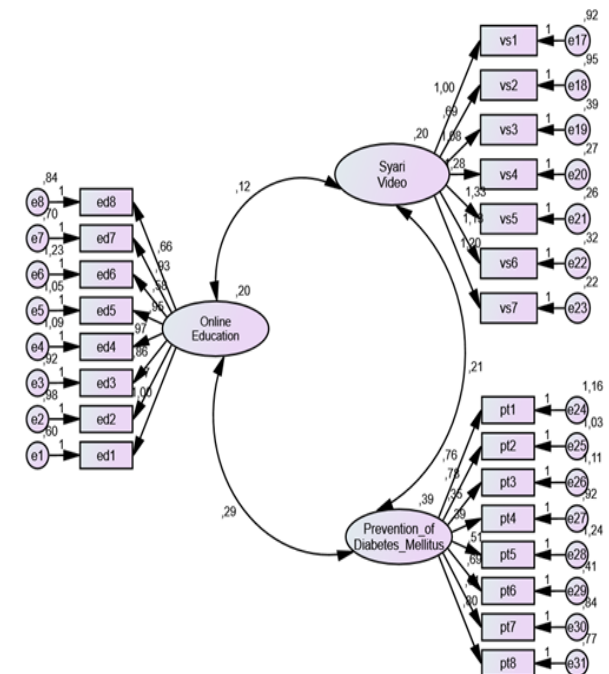


Figure 1. Confirmatory analysis

In Figure 1, it can be explained that the Online Education variable has an indirect effect through Syari'a Video on DM prevention. SEM test results (Table 4) obtained Chi-square GFI (Goodness of Fit Index), AGFI (Adjusted Goodness

Fit of Index), CFI (Comparative Fit Index), TLI (Tucker Lewis Index), CMIN/DF, and RMSEA (Root Mean Square Error of Approximation). The research variables are shown in figure 1. The indicators (a, b, c) tested for their relationship in this model are presented in Table 3.

Table 3. Variables and indicators

Variables	Indicators
Online Education	a1. Nurse doing counseling with video
	a2. Counseling using video is easier to understand
	a3. Fact-based counseling
	a4. Interesting syar'i video
	a5. Syar'i videos are useful for preventing DM
	a6. People are happy with the videos played by religious figures.
	a7. The message can be understood well
	a8. The community is willing to share videos in the village
Syar'i Video	b1. Strong signal internet
	b2. Wifi is provided in the Village
	b3. Videos are on each cellphone
	b4. Videos can be accessed easily
	b5. The public can access syar'i videos via cellphones
	b6. Materials can be accessed by computer
	b7. Video plays in a crowd
Prevention of DM	c1. Blood sugar levels when <150 mg%/dl in a healthy body
	c2. I don't feel any DM
	c3. Every time you drink coffee, you use more than 3 tablespoons of sugar
	c4. My blood pressure is higher than normal
	c5. Every time I have a complaint, I check it at the Puskesmas
	c6. DM videos make me more careful about drinking coffee
	c7. Coffee has no direct relationship with cholesterol
	c8. The food in the coffee shop is a lot of coconut milk and oily

Confirmatory Factor Analysis of Research Variables (SEM)

This study uses data analysis with Structural Equation Modeling (SEM). The research model consists of 23 dimensions or indicators.

The SEM test's first step is to test the dimensions with Confirmatory Factor Analysis. The test results show a causal relationship between the hypothesized variables. The results also show that the model used is acceptable, with a significance level of 0,082, which means it is an excellent structural equation. The GFI, CFI, CMIN/DF, and RMSEA measurement indices are also in a reasonable range.

Table 4. Criteria Goodness of Fit measurement models

Goodness-of-Fit Index	Cut off Value	Analysis Results	Model Evaluation
Degree of Freedom (DF)	Positive (+)	Positive (+)	Good
χ^2 (Chi-Square)	Expected small	1316,397	Good
Significant Probability	$\geq 0,05$	0,000	Good
CMIN/DF	$\leq 2,00$	1,826	Good
GFI	$\geq 0,90$	0,980	Good
AGFI	$\geq 0,90$	0,933	Good
PGFI	$\geq 0,90$	0,944	Good
NFI	$\geq 0,90$	0,940	Good
TLI	$\geq 0,90$	0,938	Good
CFI	$\geq 0,90$	0,983	Good
PNFI	0,60 - 0,90	0,987	Good
RMSEA	0,05 - 0,08	0,083	Good

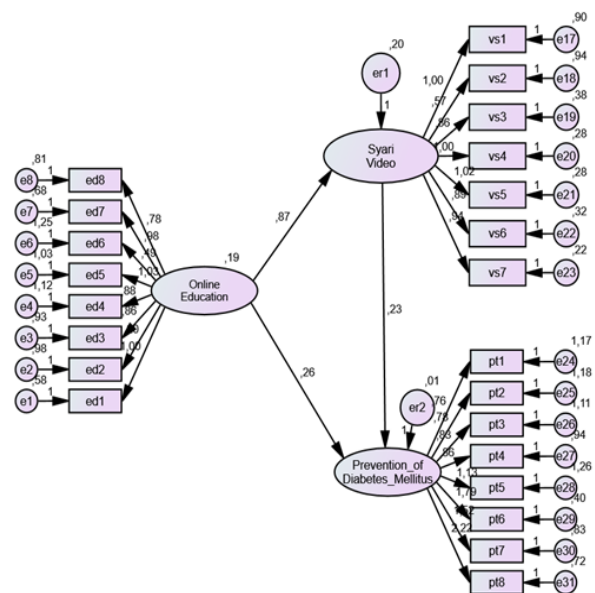


Figure 2. Full models analysis

The results of this test indicate that the model used is statistically acceptable ($p=0,000$). In addition, the proposed model uses a structural equation model, and the results are promising. The measurement index Goodness of Fit Index (GFI), Comparative Fit Index (CFI), The Minimum Sample Discrepancy Function (CMIN/DF), and The Root Mean Square Error of Approximation (RMSEA) are in the range of expected values.

In this discussion, the results of hypothesis testing will be explained as proposed in the previous chapter. Hypothesis testing in this study was carried out based on the Critical Ratio (CR) value of a causal relationship from the results of SEM processing, as shown in the table below.

Table 4. Regression weight structural equational model

Endogen		Exogen	Estimate	CR	p
Syar'i Video	<--	Online Education	0,867	5,351	0,000
Prevention of DM	<--	Online Education	0,264	4,910	0,000
Prevention of DM	<--	Syar'i Video	0,228	2,057	0,040

Testing the effect on other variables can be seen from the critical ratio (CR) value greater than 1,97. Furthermore, the probability value is less than 0,05. Both values obtained in the table meet the requirements for acceptance of the hypothesis. For example, the online education variable using syar'i video ($p= 0,000$ and $CR= 5,351$) is estimated to give results of 86,7%.

The Effect of Online Education on the Use of Syar'i Video

Drinking coffee is considered only a sharing and fun activity because routines and hobbies accompany it. Coffee addicts do not think they are used to behaviors detrimental to their health, time, and opportunity to do more beneficial activities than drinking coffee. So far, coffee addicts only satisfy their feelings without paying attention to the effects of coffee and sugar on their bodies, so this education becomes valuable for them.

Similar research shows that video use in education and social issues has significantly increased public awareness (Gaffney & White, 2018). No different from previous research (Salina et al., 2012), explaining that those who had watched the video and read about the teaching techniques increased the average score to 6,19. Education with video and more participants liked ($p < 0,05$).

Online education using video is an art of conveying information to the public. Community-based art can encourage coffee addicts to cultivate healthy personalities and creativity and help them prepare a healthy and broad-minded lifestyle to prevent DM (Cho et al., 2019; Kim, 2015). Ideally, educational and learning media design principles guide material development, implementation, and program quality improvement (Ghavami et al., 2021).

Video media used for education need good preparation about the objectives, the material to be included, and the actors should be known to the public. Making videos for education to the lay

group or the middle to lower economic target group must be easier to understand the grammar used. The language suitable for public understanding makes it easier for people to understand the messages contained in the video. The dominant coffee drinkers have lower secondary education levels and low incomes.

The Effect of online Education on DM Prevention

In the second variable test, the p-value is 0,000. It indicates that Online Education activities are among the best programs to prevent DM in coffee addicts. If Online Education is carried out, it can increase DM prevention by 26,4%.

The community has been waiting for the test results on the online Education variable on DM. It proved to be a good test result. The influencing factor is that coffee addicts do not think that they are tested with questions from a questionnaire about drinking coffee that they have been doing. They do not know that the habit of drinking coffee is harmful to their health even though the daily sugar requirement does not exceed the health requirements, namely 36 grams (9 teaspoons) for adult men, 24 grams (6 teaspoons) for adult women, and less than 24 grams (6 teaspoons) for children aged 2 to 18. year (Angeles-Agdeppa et al., 2020).

Another study found that drinking coffee was associated with an increase in blood pressure and cited the caffeine in coffee as a factor in increasing blood pressure (Bidel et al., 2006). A prospective study found that coffee intake may increase the risk of hypertension, although until now, this has been considered controversial. Genetic factors contribute to the variability of coffee's effects on cardiovascular health (Amra, 2018). Specific genetic polymorphisms associated with caffeine metabolism raise the risk of cardiovascular disease among coffee drinkers. In another study conducted by (Lukic et al., 2020), drinking coffee > 6 cups of filtered coffee/day filtered and instant coffee was found to increase the risk of death from cancer (HR 0,20; 95% CI: 0,08-0,56).

The findings of other studies say that drinking coffee is associated with the risk of DM. Moreover, drinking coffee and a mixture of sugar that is not controlled will increase complications of DM, hypertension, and stroke. Drinking coffee for those who have experienced

addiction requires a more substantial effort from cat health officials to provide education on healthy lifestyles. The education carried out by nurses for coffee addicts requires continuous time, needs support, and government policies to control DM.

The Effect of the Syar'i Video on DM Prevention

The test results for the video syar'i variable on DM prevention showed a p-value of 0,040. In contrast, the third test statistically explained that the syar'i video was good for DM prevention. The results of this study provide meaning, if the video is used in the education of coffee addicts, it can increase the prevention of DM by 22,8%. It indicates that the use of syar'i video can be one of the media and programs carried out by nurses in providing education in health services for the prevention of DM in coffee drinkers.

The idea of using videos. The video is based on several research results, which provide the advantage of reaching the wider community simultaneously. The video can be modified according to the expected role of the target population. Some health workers think about how they can educate groups of coffee drinkers. According to Islamic law, education can support a healthy lifestyle, diet, and life management (Halimatussakdiah et al., 2020). DM disease control and prevention can be done by implementing effective interventions through practical education (Allende-Vigo, 2015; Nguyen et al., 2016). Prevention of NCDs, it is necessary to develop an intervention program to reduce the number of NCDs in the community with accessible education (Kufe et al., 2016).

Education by using videos for coffee drinkers needs to be done continuously. The information conveyed is easy to digest and easily understood by the public. Videos for DM prevention can be done in all age groups, considering that coffee drinkers are carried out in groups even though it is higher in the reproductive age group. Shared videos can increase public interest in changing the perception of coffee drinkers for DM prevention. In general, the strategies presented in the Syar'i videos are supported by inspiring figures in the community, such as Alim Ulama. Given that DM results from behavior, it is necessary to have fun, exciting and easy education in everyday life.

Conclusions

The findings of this study with the variables Online Education, Video Syar'I, and DM prevention are methods that nurses can prepare to educate coffee drinkers.

Video education is one way to use educational technology that can be delivered via Smartphones or other media in coffee shops (or places that people often visit daily). This education is one way to limit the rate of DM incidence in Aceh.

The research model conducted by researchers is one way of developing the prevention of DM and more severe complications in coffee addicts. This method is a continuous effort to socialize the material to the community. Nurses who educate the public can use more media and be played repeatedly for tourism, especially for preventing long and continuous DM.

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