

# Educational Curriculum for Diabetes Mellitus (DM) Patients at the Public Health Center in Salatiga City, Central Java Province

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**Abstract.** The efficacy of diabetes mellitus (DM) therapy is not only contingent on the pharmacological agents but also significantly influenced by the depth of patient comprehension regarding therapeutic management. Therefore, designed educational interventions pertinent to individual requirements must be administered, including the intricacies of DM therapy management. This qualitative study was carried out in January - February 2023 at 6 Public Health Center in Salatiga City. The investigative method employed was semi-structured interviews, conducted with a cohort of DM patients between the ages of 55 to 65 years, who possessed proficient communicative skills in the Indonesian language, and voluntarily answered each question. Meanwhile, individuals concurrently engaged in healthcare vocations were excluded and the interview process was documented in the form of an audio recording. The results showed that patients still need education regarding proper diet for diabetics including the type, amount, and schedule. Guidance relating to appropriate physical activities catering to DM patients, in conjunction with the discernment of medication indications, potential side effects, storage requisites, and administration protocols, emerged as critical topics. This study stated that DM patients need educational curriculum related to diet/nutrition, physical activity, medicines, and DM complications.

**Keywords:** diabetes mellitus, education, curriculum, outcomes, Indonesia

## 1 Background

International Diabetes Federation (IDF) [1] in 2017 placed Indonesia as the 7th country out of the top 10 with the largest diabetes mellitus (DM) population in the world. However, there has been a \*n increase in 2021 IDF placing Indonesia as the 5th country with the largest population in the world [2]. DM patients based on the results of Basic Health Research (RISKESDAS) in 2013 amounted to 6.9% and increased to 8.5% in 2018. The disease is a prominent health problem related to the increased cost of therapy. The Health Social Security Administering Body (BPJS) claims that the amount of funds disbursed continues to increase annually. In 2018, 2019, and 2022, the amount increased to Rp. 6.5 trillion, Rp. 7.1 trillion, and Rp. 7.5 trillion, respectively [3].

DM patients need to carry out secondary prevention through behavioral changes such as physical activity, changes in diet, and medication adherence. Behavior change requires understanding, persistence, and education in self-management to optimize health outcomes [4–7]. Randomized controlled trials and national observational studies show that education in DM management results in cost-effective [8, 9], clinical outcome [10–13], and quality of life [14–16].

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Education is the basis of treatment for DM patients to achieve controlled results [17].

The American diabetes association (ADA) formulated a self-management education curriculum in the National Standards for Diabetes Self-Management Education and Support. The content includes a description of the process of developing DM disease and its treatment options, regulation of nutrition and physical activity into lifestyle, safe and effective use of medicines, monitoring, and interpretation of blood sugar levels and other parameters for self-decision making, detection, prevention, and treatment of acute and chronic complications, psychosocial development strategies, and Health Promotion and attitude change [17]. Education programs must be specific to certain populations, such as the type of DM and ethnic, social, language, cognitive, literacy, and cultural factors [18]. Based on this background, this study explores the need for educational programs and curriculum for patients in Public Health Center in Salatiga City.

## 2 Materials and Methods

### 2.1 Study Design

This study used a qualitative design and semi-structured interviews were conducted to identify the forms of educational media and curriculum needed by

DM patients. A total of 10 respondents were DM patients participating in PROLANIS at Public Health Center in Salatiga City and the officer who conducted the interviews was Anita Kumala Hati. The interview process was documented in the form of an audio recording. The study was approved by the Ethics Committee of the Faculty of Medicine, Nursing and Public Health, Universitas Gadjah Mada, with number KE-FK-1595-EC-2022.

## 2.2 Study Sample

Respondents were obtained through the snowball sampling method [19]. The purpose of this study was explained and the willingness to participate was also reported. Inclusion criteria were DM patients participating in PROLANIS at the Public Health Center in Salatiga City aged over 18 years to 65 years, can communicate well with the Indonesian language, and voluntarily answered each question in the interview. Meanwhile, the exclusion criteria were DM patients who work as health workers and the recruitment of respondents continued until thematic saturation was reached.

## 2.3 Interview Guide

Respondents willing to take part filled out a consent form and received an explanation of the purpose and stages of this study. The following related questions were given:

1. What educational media do DM patients like and why?
2. How is the educational curriculum needed by DM patients?

## 2.4 Data Collection

In semi-structured interviews, respondents were encouraged to express issues related to questions through open-ended questions [20].

## 2.5 Data Analysis

Thematic analysis was conducted to obtain qualitative data [21]. Thematic analysis was applied to various theoretical approaches, but the underlying assumptions of recent studies were towards a postpositivist paradigm, including systematic efforts, direct interpretation, and transparency of data [22]. During the analysis, the themes guide the questions and are used to sort the data. The data obtained were coded deductively, to produce the initial code using the theoretical framework and objectives as a starting point. Furthermore, an inductive approach was used to code interesting additional features of the data that formed subthemes. The reconsideration of the theme involved a comprehensive review of the dataset. The main theme was refined and elaborated on through a process of identifying the various elements. The analysis was summarized in five distinct stages, namely transcription, initial coding, generating themes,

reviewing themes, and defining themes [21]. Furthermore, the COREQ checklist was used in data analysis to report this study [20].

## 3 Result and Discussion

This study involved 10 DM patients participating in PROLANIS at the Public Health Center in Salatiga City. There were 8 females and 2 males aged between 57 to 65 years. The average length of time required to interview 1 respondent was 14 minutes.

### 3.1 Educational Media

The results of opinion exploration showed 2 themes regarding the selection of educational media. A total of 7 out of 10 respondents preferred educational media in the form of videos due to the following reasons:

“It is a bit difficult for old eyes to read.”

(Respondent 1)

“Video will make us more able to understand the meaning of education because there are audio and visual.”

(Respondent 6)

Respondents prefer educational media in the form of videos due to decreased ability to read, hence, movement and sound can be interpreted. It was also easier to understand educational curriculum by seeing the visual movement. Meanwhile, 3 respondents selected reading texts as educational media for the following reasons:

“I prefer reading scripts because videos on a cellphone are easily shifted and lost, I do not understand technology.”

(Respondent 4)

“I like to read because my eyes are still clear to read.”

(Respondent 10)

Respondents select education in text media because videos shared through smartphones are easily lost due to weak digital literacy. This study shows that DM patients prefer education given in video form due to several advantages of transferring information in the form of changing attitudes, increasing knowledge, or improving control of disease conditions. Video interventions have proven potential to promote and empower patients with chronic conditions [23, 24], as well as optimize self-management in adolescents with Type 1 DM [25]. The concepts have the potential to empower, transfer information and provide positive changes to adolescents with chronic conditions to carry out self-management routines [26, 27]. The perception and willingness to comply with therapy have increased with the existence of Intervention education-based videos [28]. The addition of a video-based lifestyle education program to conventional therapy is effective in increasing the promotion of glycemic control in DM patients. According to Gupta, almost 40% of

respondents experienced a 1% decrease in HbA1c, where a simple technology-based educational program consisting of four videos were added to the routine treatment of DM patients [29]. The study conducted by Ratri, (2020) proved that type 2 DM patients at the Airlangga University Hospital in Surabaya who received educational video interventions on insulin therapy reported a significant increase in knowledge. Furthermore, there is an improvement in patient attitudes toward the practice of using insulin injections independently and managing DM conditions [30]. Leong, (2022) conducted interventions in DM patients using an educational program of 51 videos through social media consisting of 10 videos each on the definition of DM and daily care, as well as 6, 21, and 4 videos on nutritional care, DM medicine, and quizzes, respectively. This study was conducted for 3 months and proved to be effective in increasing the knowledge, attitudes, and self-care activities of DM patients [31]. Educational programs through video can overcome problems related to the low health literacy and answer the challenges of traditional face-to-face education [32]. A systematic literature study based on 28 studies with a total of 12,703 subjects concluded that video interventions were very effective for modifying health behavior depending on the target behavior to be influenced. The modeling also facilitated the learning of new behaviors as an important consideration in future video interventions [27]. Abrar (2020) suggested developing educational videos using a trans-cultural approach to traditional language in overcoming communication barriers in the knowledge transfer process. Educational videos in traditional languages increased patient knowledge of disease management [33]. Another analysis to determine the effectiveness of video compared to text as a medium of health education in chronic disease patients by comparing 4 treatment groups, group 1 - text (4000 characters), group 2 - video clip (5 minutes), group 3 - text followed by video, and group 4 - video followed by text, proved that the video followed by text intervention was more effective than the others [34].

### 3.2 Educational Curriculum

This study obtained 5 thematic educational curriculum needed by respondents, namely DM treatment management, diet, physical activity, drug use, and complications. The initial theme pertained to the management of DM therapy and a significant proportion of respondents require education concerning the therapy management. This necessity arose due to their perception of unwavering adherence to medication, contrasted against the backdrop of consistently elevated blood sugar levels. Furthermore, respondents exhibited limited awareness of the factors contributing to fluctuating blood sugar levels, lack knowledge regarding strategies to mitigate hyperglycemia, and expressed a fervent aspiration for complete recuperation.

“I have taken the medicine 3 times, in the morning before eating glimepiride, after eating metformin, then metformin in the evening?”

(Respondent 2)

“What I want to know is, how can I fully recover from DM and hypertension?”

(Respondent 6)

The first material in the National Diabetes Self-Management Education and Support (DSME) Standard Curriculum is to describe DM, which includes an explanation of the disease process and its treatment options [17]. The second theme is related to DM medications, where 4 out of 10 respondents need education regarding their use, such as dosage and how to store drugs, drug names, and indications, rules for use, and medication adherence.

“I do not know the uses of the drug (pointing to candesartan).”

(Respondent 5)

“I do not know the name of the drug, but what I know is, this is a blood pressure and sugar medicine. I just think of the little blue ones.”

(Respondent 10)

DM patients with good adherence give positive results on treatment and reduce mortality [35–37]. Compliance with taking medication is influenced by the level of knowledge of the disease. Patients with a low level of knowledge will also have reduced adherence to taking medication [15, 38–40]. Educational curriculum on DM medications can include the importance of adhering to hypoglycemic medication, the correct technique for using independent insulin [41–43], explaining the indications, rules for use, and side effects of drugs [41, 43], as well as the right time and frequency of taking the medication [44]. The third theme is related to physical activity, where 2 out of 10 respondents state that education is needed regarding the physical activity suitable for DM patients and the time or sports schedule.

“What type of exercise is suitable for DM patients.”

(Respondent 3)

“Exercising how much time every day.”

(Respondent 8)

Cardiorespiratory physical activity with moderate or high intensity has been shown to reduce cardiovascular events and mortality [45–47], improve fitness in type 1 and Type 2 DM [48], and slow the development of peripheral neuropathy [49]. The recommended physical activity for DM patients is aerobic exercise and resistance. A total of 150 minutes per week of aerobic exercise is needed with at least two sessions per week of resistance training. Recommended types of aerobic exercise include walking, cycling, moderate brisk walking, jogging, basketball, and swimming. The fourth theme is related to a healthy diet, where 7 out of 10 respondents state that education on diet for DM patients is still needed, including the type, amount, and schedule.

“Concerning food, yes, the menu and the amount, say white rice weighing 2.5 ounces, how many scoops or spoons.”

(Respondent 1)

“Good and bad foods eaten by DM patients.”

(Respondent 5)

“DM patients need to know that you cannot eat too much sweet and fried foods with sachet drinks.”

(Respondent 8)

Nutrition intake education can increase knowledge, attitudes, and healthy eating patterns proven to improve DM disease control [50]. Educational curriculum related to healthy eating patterns delivered through role-playing, group discussions, watching a short video, and listening to a lecture has been shown to significantly improve HbA1c control, blood glucose levels, lipid profiles, BMI, as well as blood pressure both systolic and diastolic [41]. Dietary education has been shown to improve the control of clinical parameters in patients [42, 44, 51, 52]. Healthy diet education in the Bukhsh study (2018) which includes meal planning, Eating tips for weight loss for obese/overweight patients, and types of healthy and unhealthy foods for T2DM sufferers are proven to significantly reduce HbA1c [42]. Ukrainian patient education makes guidelines for healthy eating including a meal plan calculated for calories, as well as foods to be consumed and avoided [53]. The fifth theme is related to DM disease, where 6 out of 10 respondents state that DM patients should be educated on the complications.

“Do not know about the complications yet, it seems important to know.”

(Respondent 2)

“Want to know about complications to prevent than cure.”

(Respondent 3)

“You should know the complications for early treatment and prevention.”

(Respondent 8)

According to Bukhsh (2018), educational curriculum pertaining to DM plays a crucial role in imparting to patients the knowledge needed to mitigate the risks associated with DM-related complications. Identification and prevention of common complications such as hypoglycemia, diabetic foot ulcer, diabetic retinopathy, Cardiovascular issues, and diabetic nephropathy, are crucial [42]. Educational curriculum related to cardiovascular complications may include quitting smoking, maintaining blood pressure within the normal range, and controlling cholesterol and triglycerides within the normal range [54]. Diabetic foot complications can be prevented by regular checking and daily foot care. In the event of discovering any instances of compromised skin integrity such as abrasions, ulcers, blisters, regions displaying heightened warmth or reddening, and the formation of calluses, it is recommended to promptly seek consultation with a healthcare professional [54].

Previous studies also showed some of the need for a comprehensive educational curriculum covering a variety of materials. Sanaeinazab (2021) provided an educational curriculum with content including etiologic descriptions and risk factors related to DM, available treatments and their effectiveness, lifestyle modifications with healthy eating patterns and exercise, skills to measure blood sugar with a glucometer, complications of DM and how to assess and control these complications, and control to prevent anxiety, stress, or depression. The study proved to significantly improve HbA1c control, blood glucose levels, lipid profiles, BMI, and systolic and diastolic blood pressure [55]. Sabo (2021) conducted an analysis with educational curriculum for DM patients on the material covering the disease process and treatment, nutritional management, exercise, medication, blood glucose monitoring, acute complications, chronic complications, mental health, and goal setting. A significant decrease in HbA1c and blood pressure in patients compared to the control group was reported [56]. The results of a systematic literature review showed that 4 out of 5 educational curriculum succeeded in improving the quality of life [57]. Educational curriculum on DM and its complications, physical activity, self-care and behavioral self-efficacy, healthy food nutrition, medication adherence, and self-monitoring of blood glucose levels with an intervention period of 3 months is proven to improve quality of life, level of knowledge, and confidence in therapy [58].

## 4 Conclusion

In conclusion, video-based education was preferred by DM patients compared to text-based. This study recommended an educational curriculum suitable for DM patients including management of therapy, healthy eating patterns, physical activity, medicines, and complications of the disease.

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