Jurnal Ilmiah Pengabdian Masyarakat Bidang Kesehatan
Volume 4, Issue 2, 112-121
e-ISSN: 2986-2698
https://ejournal.gomit.id/index.php/abdigermas
DOI: 10.58723/abdigermas.v4i2.735

Effectiveness of Animated Video-Based Education in Improving Diabetes Self-Management Among Patients with Type 2 Diabetes Mellitus in Pekanbaru, Indonesia

Carles*
Sekolah Tinggi Ilmu Kesehatan Tengku Maharatu, INDONESIA

Agrina Agrina
Universitas Riau, INDONESIA

Muhammad Irwan
Sekolah Tinggi Ilmu Kesehatan Tengku Maharatu, INDONESIA

Eliza Fitria
Sekolah Tinggi Ilmu Kesehatan Tengku Maharatu, INDONESIA

Betty Nia Rulen
Sekolah Tinggi Ilmu Kesehatan Tengku Maharatu, INDONESIA

Agung Sutriyawan
Universitas Bhakti Kencana, INDONESIA

Article Info

Article history:

Received: May 7, 2026
Revised: June 4, 2026
Accepted: June 15, 2026

Keywords:

Animated Video;
Blood Glucose Management Behavior;
Dietary Pattern;
Stress Management;
Type 2 Diabetes Mellitus.

Abstract

Background: Type 2 Diabetes Mellitus remains a major global health problem that requires effective self-management to prevent complications. Poor blood glucose management behavior, unhealthy dietary patterns, and inadequate stress management may worsen patients' conditions. Educational interventions using audiovisual media, such as animated videos, have the potential to improve patients' understanding and self-management behavior.
Aims: This study evaluated the effectiveness of animated video-based education in improving diabetes self-management among patients with Type 2 Diabetes Mellitus in Pekanbaru, Indonesia.
Methods: This study used a quasi-experimental design with intervention and control groups. A total of 200 participants were included, consisting of 100 participants in the intervention group and 100 participants in the control group. The intervention group received a 60-minute animated video-based education session, while the control group received no intervention. Data were collected before and after the intervention using questionnaires. Data were analyzed using paired t-tests, independent t-tests, and Cohen's d.
Results: The results showed significant improvements in the intervention group in blood glucose management behavior ($p<0.001$; Cohen's $d=2.741$), dietary patterns ($p<0.001$; Cohen's $d=3.506$), and stress management ($p<0.001$; Cohen's $d=3.420$). Independent t-test analysis also demonstrated significant differences in score changes between the intervention and control groups across all study variables ($p<0.001$), with very large effect sizes.
Conclusion: Animated video-based education was effective in improving blood glucose management behavior, dietary patterns, and stress management among patients with Type 2 Diabetes Mellitus.

To cite this article: Carles, C., Agrina , A., Irwan, M., Fitria, E., Rulen, B. N., & Sutriyawan, A. (2026). Effectiveness of Animated Video-Based Education in Improving Diabetes Self-Management Among Patients with Type 2 Diabetes Mellitus in Pekanbaru, Indonesia. *Jurnal Ilmiah Pengabdian Masyarakat Bidang Kesehatan (Abdigermas), 4(2)*, 112–121. https://doi.org/10.58723/abdigermas.v4i2.735

INTRODUCTION

Diabetes Mellitus (DM) continues to be a major public health concern because its complications can contribute to higher morbidity and mortality (Gupta et al., 2024; Hossain et al., 2024). DM is defined by persistent hyperglycemia associated with impaired insulin production, reduced insulin effectiveness, or a combination of both (Abel et al., 2024; Yadav et al., 2023). The World Health Organization (WHO) reported that more than 800 million adults worldwide were living with diabetes in 2022, with prevalence increasing from 7% in 1990 to 14% in 2022 (WHO, 2024). According to the International Diabetes Federation (IDF), the number of adults living with diabetes continues to increase globally and is projected to rise further by 2050 (IDF, 2025). In

*** Corresponding author:**
Carles, Sekolah Tinggi Ilmu Kesehatan Tengku Maharatu, INDONESIA. ✉carles.ulung1@gmail.com

Indonesia, T2DM remains one of the major non-communicable diseases, with increasing prevalence each year. Data from the 2023 Indonesian Health Survey reported a diabetes prevalence of 11.7% (Kemenkes RI, 2023). The increasing number of diabetes cases has also become a major challenge for healthcare services in various regions, including Pekanbaru City. In the community context, patients with T2DM often face practical challenges in implementing daily self-management behaviors, particularly in maintaining blood glucose management behavior, following appropriate dietary patterns, and managing psychological stress. These problems indicate the need for health education strategies that are not only informative but also easy to understand, attractive, and applicable to patients' daily lives.

T2DM care requires patients to maintain blood glucose control to reduce the risk of complications such as cardiovascular disease, stroke, kidney failure, and visual impairment (Kemenkes RI, 2023). Diabetes management depends not only on pharmacological therapy but also on adherence to dietary regulation, stress management, physical activity, and proper self-care behavior (Baraz et al., 2017; Hassan & Hatah, 2022). However, many patients still experience difficulties in understanding and implementing diabetes self-management, resulting in poor blood glucose management behavior (Aini et al., 2022; Ellahi et al., 2023). Animated video has increasingly been used as an educational medium in diabetes care because it can deliver health information through combined visual and auditory messages (Chang et al., 2021; Feeley et al., 2022). Compared with conventional verbal or text-based education, animated video may help simplify complex self-management concepts, increase patient attention, and improve understanding of key health messages (Almutairi et al., 2022; Alyami et al., 2022; Hoe et al., 2024). Recent systematic review evidence also indicates that video-based education can support diabetes knowledge and self-care practices (Hoe et al., 2024).

Diet and stress management also play important roles in diabetes care. Uncontrolled stress may worsen patients' conditions and affect blood glucose stability (Fadli et al., 2023; Virda et al., 2024). Effective diabetes education is therefore essential to support patients in understanding and implementing diabetes self-management behaviors in daily life. However, many patients with T2DM continue to experience difficulties in adhering to dietary recommendations, monitoring blood glucose, and managing psychological stress. Conventional educational approaches may not always be sufficient to maintain patient engagement and facilitate understanding of complex self-management information. Educational materials related to diabetes self-management often involve multiple behavioral recommendations that require sustained attention and comprehension. Therefore, educational approaches that combine visual and auditory information may help improve patient understanding and retention of key self-management messages. Animated video-based education offers an audiovisual learning approach that can present health information in a more attractive and understandable format. Previous studies have reported improvements in diabetes knowledge and self-care after audiovisual education. Nevertheless, evidence regarding the effectiveness of animated video-based education on multiple aspects of diabetes management, particularly blood glucose management behavior, dietary patterns, and stress management, remains limited. This study assessed animated video education for T2DM patients in Pekanbaru, Indonesia.

METHOD

This study was designed as a community-based health education intervention to support diabetes self-management among patients with T2DM in Pekanbaru City. The intervention was implemented in collaboration with local healthcare facilities, which assisted in identifying eligible participants, facilitating recruitment, and supporting the implementation of educational activities. The program consisted of several stages, including identification of participants' educational needs, preparation of animated video-based educational materials, recruitment of participants, implementation of health education sessions, and evaluation of behavioral outcomes.

The empowerment strategy focused on improving patients' ability to understand and independently apply diabetes self-management practices in daily life, particularly blood glucose management behavior, dietary regulation, and stress management. The animated video education was developed to cover several key topics related to T2DM, including an introduction to diabetes,

diabetes-related complications, blood glucose management behavior, dietary regulation, stress management, physical activity, and medication adherence. The educational content was prepared based on diabetes education materials and recommendations from the Indonesian Ministry of Health, PERKENI, and WHO. Although no formal expert validation was conducted, the content was reviewed by the research team and healthcare staff to ensure that the material was appropriate, understandable, and relevant to patients with T2DM. The video was delivered individually using participants' smartphones and had a total duration of 60 minutes. Participants in the intervention group watched the video during the educational session and were given access to review the material after the session. The control group did not receive the animated video intervention during the study period.

The study was carried out from October 2024 to April 2025 and included 200 participants, with 100 participants in each group. The number of participants was determined based on the feasibility of implementing the community-based intervention and the availability of eligible patients during the study period. Participants were recruited purposively and assigned to intervention and control groups using a non-random allocation method. Eligible participants were patients with Type 2 Diabetes Mellitus who agreed to participate. Patients with severe hearing or visual impairment were excluded because these conditions could interfere with their ability to receive animated video education. To minimize bias, both groups were assessed using the same eligibility criteria, instruments, and data collection procedures.

Data on blood glucose management behavior, dietary adherence, and stress management in T2DM patients were collected using questionnaires. The research team prepared the questionnaires in Bahasa Indonesia by referring to diabetes education materials and applicable guidelines. Three questionnaires were used in this study. The blood glucose management behavior questionnaire included 10 Likert-scale items. The dietary pattern and stress management questionnaires each included 10 Guttman-scale items. Higher scores indicated better blood glucose management behaviors, healthier dietary patterns, and better stress management.

Before data collection, the instruments were piloted with 30 respondents who had characteristics comparable to the study population. Item validity was examined using item-total correlation, with an r-table value of 0.361. All items across the three questionnaires were considered valid because their correlation coefficients exceeded 0.361. Reliability analysis indicated acceptable internal consistency, with Cronbach's alpha values of 0.886 for blood glucose management behavior, 0.902 for dietary pattern, and 0.881 for stress management.

After informed consent was obtained, data collection included pretest and posttest stages. Participants completed questionnaires before the intervention, and posttest assessments were conducted after the intervention. Data completeness was checked before analysis. All 200 participants completed both pretest and posttest assessments; therefore, no missing data were found in the final dataset. Baseline characteristics were compared between groups. Independent t-test, chi-square test, paired t-test, and Cohen's d were used for numerical variables, categorical variables, within-group changes, and effect size, respectively.

This study received ethical approval from the Health Research Ethics Committee of STIKes Tengku Maharatu, approval number 09/STIKes-T.MHRT/KEPK/X/2024, issued on 07 October 2024. All participants provided written informed consent before data collection.

RESULTS AND DISCUSSION

Results

This study was conducted in Pekanbaru City with a total sample of 200 respondents (Table 1). The mean age of the respondents was 40.49 ± 11.71 years. Most respondents were female, accounting for 119 respondents (59.5%). Based on educational level, the majority of respondents had completed senior high school education, comprising 87 respondents (43.5%). Based on occupation, most respondents were housewives, accounting for 58 respondents (29.0%). Baseline analysis showed comparable characteristics between groups for age ($p = 0.652$), sex ($p = 0.773$), education ($p = 0.323$), and occupation ($p = 0.153$).

Table 1. Characteristics of Respondents by Study Group

Characteristics	Intervention Group (n=100)	Control Group (n=100)	Total (n=200)	p-value
Age (Mean ± SD)	40.86 ± 10.78	40.11 ± 12.63	40.49 ± 11.71	0.652
Sex				
Male	39 (39.0%)	42 (42.0%)	81 (40.5%)	0.773
Female	61 (61.0%)	58 (58.0%)	119 (59.5%)	
Educational Level				
Elementary School	15 (15.0%)	7 (7.0%)	22 (11.0%)	
Junior High School	17 (17.0%)	19 (19.0%)	36 (18.0%)	0.323
Senior High School	43 (43.0%)	44 (44.0%)	87 (43.5%)	
Higher Education	25 (25.0%)	30 (30.0%)	55 (27.5%)	
Occupation				
Housewife	27 (27.0%)	31 (31.0%)	58 (29.0%)	
Self-employed	18 (18.0%)	16 (16.0%)	34 (17.0%)	
Private-sector Employee	8 (8.0%)	17 (17.0%)	25 (12.5%)	0.153
Laborer	13 (13.0%)	11 (11.0%)	24 (12.0%)	
Civil Servant	14 (14.0%)	5 (5.0%)	19 (9.5%)	
Unemployed	20 (20.0%)	20 (20.0%)	40 (20.0%)	

The mean changes in the intervention group were 7.69 points for blood glucose management behavior (95% CI: 7.13–8.25), 3.97 points for dietary patterns (95% CI: 3.75–4.19), and 3.65 points for stress management (95% CI: 3.44–3.86) (Table 2). Based on Cohen's effect size interpretation, the intervention produced large effects across all three outcomes.

Table 2. Comparison of Pretest and Posttest Scores in the Intervention and Control Groups

Variables	Pretest Mean ± SD	Posttest Mean ± SD	Mean Change (95% CI)	p-value	Cohen's d
Blood Glucose Management Behavior					
Intervention Group	25.48 ± 5.35	33.17 ± 5.39	7.69 (7.13–8.25)	<0.001	2.741
Control Group	24.76 ± 5.19	25.83 ± 5.90	1.07 (0.59–1.55)	<0.001	0.445
Dietary Pattern					
Intervention Group	3.20 ± 1.82	7.17 ± 1.81	3.97 (3.75–4.19)	<0.001	3.506
Control Group	4.18 ± 1.82	4.35 ± 2.18	0.17 (-0.17–0.51)	0.316	0.101
Stress Management					
Intervention Group	3.97 ± 2.19	7.62 ± 2.15	3.65 (3.44–3.86)	<0.001	3.420
Control Group	4.03 ± 1.86	4.07 ± 2.35	0.04 (-0.25–0.33)	0.783	0.028

The between-group mean differences were 6.62 points for blood glucose management behavior (95% CI: 5.89–7.35), 3.80 points for dietary patterns (95% CI: 3.40–4.20), and 3.61 points for stress management (95% CI: 3.26–3.96). The Cohen's d values ranged from 2.533 to 2.837 (Table 3), indicating large intervention effects according to Cohen's effect size categories.

Table 3. Differences in Changes of Blood Glucose Management Behavior, Dietary Pattern, and Stress Management Scores between the Intervention and Control Groups

Variables	Mean ± SD	Mean Difference	95% CI for Mean Difference	t	p-value	Cohen's d
Δ Blood Glucose Management Behavior						
Intervention Group	7.69 ± 2.806	6.62	5.89–7.35	17.914	<0.001	2.533
Control Group	1.07 ± 2.405					
Δ Dietary Pattern						
Intervention Group	3.97 ± 1.132	3.8	3.40–4.20	18.695	<0.001	2.644
Control Group	0.17 ± 1.688					
Δ Stress Management						
Intervention Group	3.65 ± 1.067	3.61	3.26–3.96	20.061	<0.001	2.837
Control Group	0.04 ± 1.449					

Figure 1 shows changes in blood glucose management behavior, dietary patterns, and stress management before and after the intervention. The intervention group showed greater changes than the control group after the intervention.

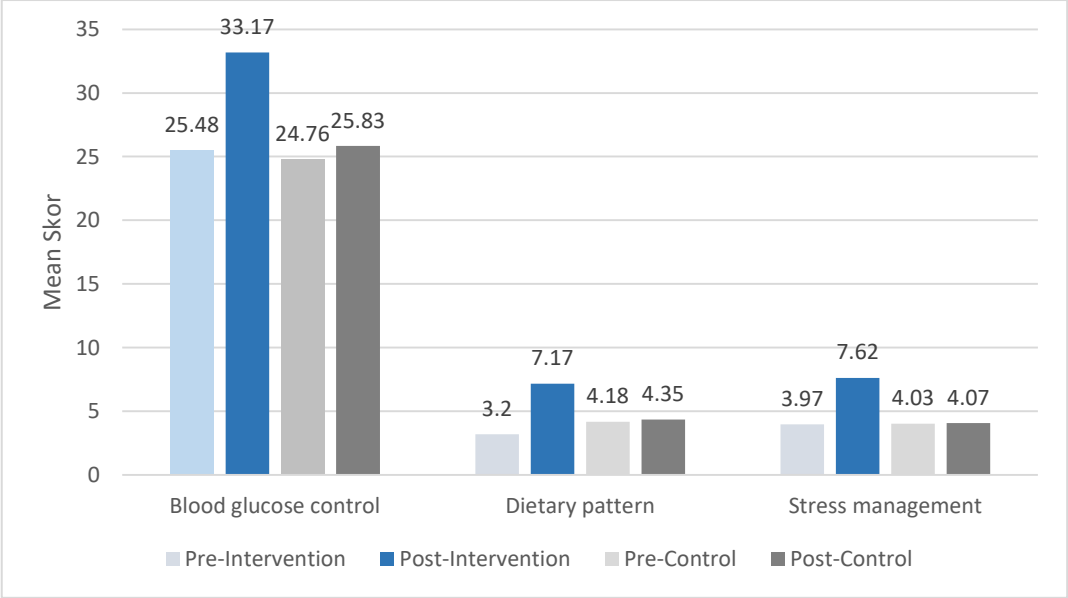

Figure 1. Changes in Mean Scores Before and After the Intervention in the Intervention and Control Groups

Discussion

Animated video education improved blood glucose management behavior, dietary patterns, and stress management (Carles et al., 2025; Deshpande et al., 2023). Score increases favored the intervention group. Audiovisual media can help improve understanding and self-management in diabetes care (Aida et al., 2020; Correia et al., 2022). These findings are supported by recent systematic review evidence showing that video-based diabetes education can improve patients' understanding and support diabetes self-management when appropriately designed and delivered (Hoe et al., 2024). These results are consistent with earlier DSME research (Ernawati et al., 2021; Marni et al., 2025). The improvement in blood glucose management behavior scores in the intervention group indicates that animated video education may enhance patients' awareness of diabetes self-management. Educational videos may improve diabetes management and blood glucose monitoring (Paes et al., 2022; Ratri et al., 2020). Video-based education may also increase patient attention and motivation (Pichayapinyo et al., 2024). These findings are supported by previous research indicating that self-management-based diabetes education positively affects diabetes control and quality of care (Tao et al., 2026).

The large effect sizes observed in this study suggest that animated videos functioned not only as information delivery tools but also as facilitators of patient engagement and comprehension. By combining visual and auditory elements, animated videos may simplify complex diabetes self-management concepts and make health messages easier to understand and remember. This may support better blood glucose control, diet, and stress management. From an audiovisual learning perspective, animated videos may influence behavior change by presenting health messages through both visual and auditory channels. This dual presentation can help patients pay attention to key information, understand abstract diabetes self-management concepts, and retain messages more effectively than verbal explanations alone. In this study, this mechanism may explain why participants were able to improve not only blood glucose management behavior but also dietary regulation and stress management after receiving the animated video education.

Regarding dietary patterns, the intervention group showed greater improvement than the control group. These findings suggest that animated video education may help patients better understand the importance of dietary regulation in diabetes management. One possible explanation

is that dietary recommendations for diabetes are often perceived as complex and difficult to implement in daily life. Concepts such as portion size, meal timing, and food selection may be challenging to understand when presented only through verbal explanations. Animated videos can provide visual demonstrations and practical examples that help patients translate dietary recommendations into everyday behaviors, thereby improving dietary adherence. Information related to food types, meal schedules, and sugar intake restrictions may be more easily understood through visual approaches compared to conventional educational methods (Goudet et al., 2019; İkizler et al., 2020). Video-based education may support healthy behavior changes in patients with chronic diseases (Aida et al., 2020). Dietary adherence is important in diabetes management (Najihah et al., 2021).

Stress management also improved in the intervention group. Stress is one of the factors that may affect blood glucose stability among patients with diabetes. Animated videos helped patients understand stress management in daily life (Patnaik et al., 2015; Ehasanbakhsh et al., 2020; Nooseisai et al., 2021). Stress management strategies are often difficult to adopt because patients may not clearly understand the relationship between psychological stress and diabetes outcomes. Through visual scenarios and practical demonstrations, animated videos may help patients recognize stress triggers and identify simple coping strategies that can be applied in daily life (Liu et al., 2024; Nguyen et al., 2023). This may explain the substantial improvement in stress management scores observed among participants in the intervention group. Animated videos may help patients apply healthy behaviors in daily life. Self-care education may improve diabetes management (Ervina et al., 2025). Animated video education showed strong effects on blood glucose management behavior, dietary patterns, and stress management. Audiovisual education may support diabetes management. Video-based education may improve patient involvement and self-care (Rollo et al., 2016; Zareban et al., 2014). Multimedia education may also improve diabetes knowledge and self-care (Tamiru et al., 2023).

Animated videos may be used in diabetes education programs. Animated videos are easy to understand and may increase patient engagement. Video-based DSME may improve diabetes knowledge and patient participation (Ervina et al., 2025). The impact of this educational program on the target community was reflected in the significant improvements in blood glucose management behavior, dietary patterns, and stress management among participants in the intervention group. These findings indicate that animated video-based education can support patients in understanding and applying diabetes self-management practices in their daily lives. In the community setting, this program may contribute to strengthening patients' capacity to manage their condition independently and may serve as a practical educational strategy for healthcare facilities in supporting patients with T2DM. Despite its significant findings, several limitations of this study should be acknowledged. First, the study was conducted in only one area, which may limit the generalizability of the findings. Second, the posttest assessment was conducted shortly after the intervention; therefore, the findings mainly reflect short-term improvements in participants' responses and behavioral scores. Sustainable behavior change cannot be confirmed without medium- or long-term follow-up evaluation. Third, the study variables were measured using self-report questionnaires, which may introduce subjective bias among respondents.

Implications

An educational intervention using animated videos has been shown to have a significant impact on improving self-management in patients with Type 2 Diabetes Mellitus (T2DM). The combination of visual and auditory elements has been shown to effectively simplify complex concepts of glucose management, diet, and stress management, making them easier for patients to understand and apply in their daily lives. At the community level, this smartphone-based method has become a practical educational strategy for healthcare facilities to improve patient independence.

Research Contribution

This study makes an important scientific contribution by providing empirical evidence on the effectiveness of audiovisual education that focuses on multiple target variables (blood glucose management, diet, and stress) simultaneously, a topic previously limited in scope. These findings

enrich the literature on community-based Diabetes Self-Management Education (DSME) in Indonesia, particularly in Pekanbaru.

Limitations

This study has several limitations, including its scope, which limited the generalizability of the results. Furthermore, the posttest evaluation only measured short-term behavioral changes without long-term follow-up. The use of a self-report questionnaire also has the potential to introduce subjective bias among respondents.

Suggestions

Healthcare facilities are advised to integrate this animated video into routine diabetes education programs. Future researchers are encouraged to use a longitudinal design with long-term evaluation and direct measurement of clinical parameters (such as HbA1c or blood glucose levels) to assess the sustainability of this intervention's impact.

CONCLUSION

Animated video education was proven to be effective in improving blood glucose management behavior, dietary patterns, and stress management among patients with Type 2 Diabetes Mellitus. The intervention group showed greater improvements than the control group, with large effect sizes across all outcomes. Animated videos may be used as a useful educational tool for supporting T2DM care in healthcare settings. Future research should use longitudinal designs to assess the sustainability of these behavioral improvements and their potential impact on clinical outcomes.

ACKNOWLEDGMENT

The authors thank STIKes Tengku Maharatu for supporting this study.

AUTHOR CONTRIBUTION STATEMENT

AA and MI contributed to conceptualization and methodology. AS and BNR handled data curation and formal analysis. AS, EF, and BNR conducted investigation and data collection. AS and CC prepared the original draft. AA, MI, EF, and BNR contributed to review and editing. AA and MI supervised the study. All authors reviewed and approved the final manuscript. The authors declare no conflict of interest.

AI DISCLOSURE STATEMENT

The authors declare that no artificial intelligence (AI) tools or services were used in the preparation, research, writing, editing, or revision of this manuscript.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

REFERENCES

Abel, E. D., Gloyn, A. L., Evans-Molina, C., Joseph, J. J., Misra, S., Pajvani, U. B., Simcox, J., Susztak, K., & Drucker, D. J. (2024). Diabetes mellitus Progress and opportunities in the evolving epidemic. *Cell*, *187*(15), 3789–3820. https://doi.org/10.1016/j.cell.2024.06.029

Aida, A., Svensson, T., Svensson, A. K., Urushiyama, H., Okushin, K., Oguri, G., Kubota, N., Koike, K., Nangaku, M., Kadowaki, T., Yamauchi, T., & Chung, U.-I. (2020). Using mHealth to Provide Mobile App Users With Visualization of Health Checkup Data and Educational Videos on Lifestyle-Related Diseases: Methodological Framework for Content Development. *JMIR MHealth and UHealth*, *8*(10), e20982. https://doi.org/10.2196/20982

Aini, N., Sustriawan, B., Wahyuningsih, N., & Mela, E. (2022). Blood Sugar, Haemoglobin and Malondialdehyde Levels in Diabetic White Rats Fed a Diet of Corn Flour Cookies. *Foods*, *11*(12), 1819. https://doi.org/10.3390/foods11121819

Almutairi, J. S., Almigbal, T. H., Alruhaim, H. Y., Mujammami, M. H., AlMogbel, T. A., Alshahrani, A. M., Al Zahrani, A. M., Batais, M. A., & Shaik, S. A. (2022). Self-awareness of HbA1c and its association with glycemic control among patients with type 2 diabetes. *Saudi Medical Journal*, *43*(3), 291–300. https://doi.org/10.15537/smj.2022.43.3.20210536

Alyami, M., Serlachius, A., Law, M., Murphy, R., Almigbal, T. H., Lyndon, M., Batais, M. A., Algaw, R. K., & Broadbent, E. (2022). Utility and Acceptability of a Brief Type 2 Diabetes Visual Animation: Mixed Methods Feasibility Study. *JMIR Formative Research*, *6*(8), e35079. https://doi.org/10.2196/35079

Baraz, S., Zarea, K., & Shahbazian, H. B. (2017). Impact of the self-care education program on quality of life in patients with type II diabetes. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*, *11*, S1065–S1068. https://doi.org/10.1016/j.dsx.2017.07.043

Carles, C., Girsang, E., & Nasution, A. N. (2025). Self Awareness Behaviour Model in Controlling Blood Sugar Levels in Type 2 Diabetes Mellitus Patients Based on Animated Video Media. *Journal of Carcinogenesis*. https://doi.org/10.64149/j.carcinog.24.4s.134-143

Chang, C., Hwang, G., & Gau, M. (2021). Promoting students' learning achievement and self-efficacy: A mobile chatbot approach for nursing training. *British Journal of Educational Technology*, *53*(1), 171–188. https://doi.org/10.1111/bjet.13158

Correia, J. C., Waqas, A., Huat, T. S., Gariani, K., Jornayvaz, F. R., Golay, A., & Pataky, Z. (2022). Effectiveness of Therapeutic Patient Education Interventions in Obesity and Diabetes: A Systematic Review and Meta-Analysis of Randomized Controlled Trials. *Nutrients*, *14*(18), 3807. https://doi.org/10.3390/nu14183807

Deshpande, N., Wu, M., Kelly, C., Woodrick, N., Werner, D. A., Volerman, A., & Press, V. G. (2023). Video-Based Educational Interventions for Patients With Chronic Illnesses: Systematic Review. *Journal of Medical Internet Research*, *25*. https://doi.org/10.2196/41092

Ehasanbakhsh, H., Mirzaei, A., Bakhtiyari, S., Zavare, M. S. A., & Jalilian, M. (2020). The Effect of Stress Management Program on Perceived Stress in Patients with Type 2 Diabetes: A Randomized Controlled Trial. *Current Diabetes Reviews*, *17*(7). https://doi.org/10.2174/1573399817666201228162950

Ellahi, B., Dikmen, D., Seyhan-Erdoğan, B., Karabulut, O. F., Aitken, A., Agbozo, F., & Zotor, F. B. (2023). Prevalence, Risk Factors, And Self-Awareness For Hypertension And Diabetes: Rural–Urban And Male–Female Dimensions From A Cross-Sectional Study in Ghana. *International Journal of Diabetes in Developing Countries*, *43*(5), 694–708. https://doi.org/10.1007/s13410-022-01141-9

Ernawati, U., Wihastuti, T. A., & Utami, Y. W. (2021). Effectiveness of Diabetes Self-Management Education (Dsme) in Type 2 Diabetes Mellitus (T2Dm) Patients: Systematic Literature Review. *Journal of Public Health Research*, *10*(2). https://doi.org/10.4081/jphr.2021.2240

Ervina, Yanti Harahap, Abdul Muhith, Akas Yekti Pulih Asih, & Siti Nur Hasina. (2025). The Effect of Video-Based Diabetes Self-Management Education (DSME) Telenursing on Level of Knowledge in Diabetes Mellitus Patients. *Journal Of Nursing Practice*, *9*(1), 107–116. https://doi.org/10.30994/jnp.v9i1.652

Fadli, F., Uly, N., Safruddin, S., Darmawan, S., & Batupadang, M. (2023). Analysis of Self-Regulation Model To Improvement Of Self-Care Capability In Type 2 Diabetes Mellitus Patients. *Multidisciplinary Science Journal*, *6*(6), 2024082. https://doi.org/10.31893/multiscience.2024082

Feeley, T. H., Keller, M., & Kayler, L. K. (2022). Using Animated Videos to Increase Patient Knowledge: A Meta-Analytic Review. *Health Education & Behavior*, *50*(2), 240–249. https://doi.org/10.1177/10901981221116791

Gupta, A. K., Shemer, A., Economopoulos, V., & Talukder, M. (2024). Diabetic Foot and Fungal Infections: Etiology and Management from a Dermatologic Perspective. *Journal of Fungi*, *10*(8), 577. https://doi.org/10.3390/jof10080577

Goudet, S., Bogin, B., Madise, N., & Griffiths, P. (2019). Nutritional Interventions For Preventing Stunting In Children (Birth To 59 Months) Living In Urban Slums In Low- And Middle-Income

Countries (LMIC). *Cochrane Database of Systematic Reviews*, *2019*(10). https://doi.org/10.1002/14651858.cd011695.pub2

Hassan, F., & Hatah, E. (2022). An Analytical Exploration of Various Non-Pharmacological Approaches Utilized in Managing Diabetes Among Patients in Malaysia. *International Journal of Social and Psychological Aspects of Healthcare*, *2*(1), 27–37. https://doi.org/10.51847/jmkuhoebqx

Hoe, C. Y. W., Ahmad, B., & Watterson, J. (2024). The use of videos for diabetes patient education: A systematic review. *Diabetes/Metabolism Research and Reviews*, *40*(2). https://doi.org/10.1002/dmrr.3722

Hossain, Md. J., Al-Mamun, Md., & Islam, Md. R. (2024). Diabetes mellitus, the fastest growing global public health concern: Early detection should be focused. *Health Science Reports*, *7*(3). https://doi.org/10.1002/hsr2.2004

IDF. (2025). Diabetes Atlas 11th edition 2025. *International Diabetes Federation*. https://idf.org/about-diabetes/diabetes-facts-figures/

İkizler, T. A., Burrowes, J. D., Byham-Gray, L., Campbell, K. L., Carrero, J. J., Chan, W., Fouque, D., Friedman, A. N., Ghaddar, S., Goldstein-Fuchs, D. J., Kaysen, G. A., Kopple, J. D., Teta, D., Wang, A. Y., & Cuppari, L. (2020). KDOQI Clinical Practice Guideline for Nutrition in CKD: 2020 Update. *American Journal of Kidney Diseases*, *76*(3). https://doi.org/10.1053/j.ajkd.2020.05.006

Kemenkes RI. (2023). Survei Kesehatan Indonesia (SKI) 2023. *Kementerian Kesehatan Republik Indonesia*. https://www.badankebijakan.kemkes.go.id/hasil-ski-2023/

Liu, W., Wang, Q., Zheng, D., Mei, J., Lu, J., Chen, G., Wang, W., & Ding, F. (2024). The Effects of a Complex Interactive Multimodal Intervention on Personalized Stress Management Among Health Care Workers in China: Nonrandomized Controlled Study. *Journal of Medical Internet Research*, *26*. https://doi.org/10.2196/45422

Marni, L., Armaita, A., Yoselina, P., & Anggita, K. D. (2025). Pengaruh Diabetes Self Management Education (DSME) Terhadap Peningkatan Pengetahuan pada Penderita Diabetes Melitus Tipe 2 di Wilayah Kerja Puskesmas Pariaman Kota Pariaman Tahun 2022. *Jurnal Kesehatan Komunitas (Journal of Community Health)*, *11*(1), 74–80. https://doi.org/10.25311/keskom.Vol11.Iss1.2076

Najihah, R. A., Indriyawati, N., & Hartoyo, M. (2021). Development of Audio Visual Health Education Media About Self Management in Patients Type II Diabetes Mellitus. *JENDELA NURSING JOURNAL*, *5*(1), 23–30. https://doi.org/10.31983/jnj.v5i1.6893

Nguyen, T. T., Pu, C., Waits, A., Tran, T. D., Ngo, T. H., Huynh, Q. T. V., & Huang, S.-L. (2023). Transforming Stress Program On Medical Students' Stress Mindset And Coping Strategies: A Quasi-Experimental Study. *BMC Medical Education*, *23*(1), 587. https://doi.org/10.1186/s12909-023-04559-9

Nooseisai, M., Viwattanakulvanid, P., Kumar, R., Viriyautsahakul, N., Baloch, G. M., & Somrongthong, R. (2021). Effects of Diabetes Self-Management Education Program On Lowering Blood Glucose Level, Stress, And Quality Of Life Among Females With Type 2 Diabetes Mellitus in Thailand. *Primary Health Care Research & Development*, *22*. https://doi.org/10.1017/s1463423621000505

Paes, R. G., Mantovani, M. de F., Costa, M. C., Pereira, A. C. L., Kalinke, L. P., & Moreira, R. C. (2022). Effects of Educational Intervention On Health Literacy And Knowledge About Diabetes: A Quasi-Experimental Study. *Escola Anna Nery*, *26*. https://doi.org/10.1590/2177-9465-ean-2021-0313en

Patnaik, L., Joshi, A., & Sahu, T. (2015). Mobile Phone-Based Education And Counseling To Reduce Stress Among Patients With Diabetes Mellitus Attending A Tertiary Care Hospital of India. *International Journal of Preventive Medicine*, *6*(1), 37. https://doi.org/10.4103/2008-7802.156267

Pichayapinyo, P., Sompopcharoen, M., Thiangtham, W., Sillabutra, J., Meekaew, P., Bureerat, B., & Somboonkaew, A. (2024). Perceptions Of The 2D Short Animated Videos For Literacy Against Chronic Diseases Among Adults With Diabetes And/Or Hypertension: A Qualitative Study In Primary Care Clinics. *BMC Primary Care*, *25*(1), 374. https://doi.org/10.1186/s12875-024-02621-z

Ratri, D. M. N., Hamidah, K. F., Puspitasari, A. D., & Farid, M. (2020). Video-Based Health Education to Support Insulin Therapy in Diabetes Mellitus Patients. *Journal of Public Health Research*, *9*(2). https://doi.org/10.4081/jphr.2020.1849

Rollo, M. E., Aguiar, E. J., Williams, R. L., Wynne, K., Kriss, M., Callister, R., & Collins, C. E. (2016). Health Technologies To Support Nutrition And Physical Activity Behaviors In Diabetes Self-Management. *Diabetes, Metabolic Syndrome and Obesity: Targets and Therapy*, *Volume 9*, 381–390. https://doi.org/10.2147/DMSO.S95247

Tamiru, S., Dugassa, M., Amsalu, B., Bidira, K., Bacha, L., & Tsegaye, D. (2023). Effects Of Nurse-Led Diabetes Self-Management Education On Self-Care Knowledge And Self-Care Behavior Among Adult Patients With Type 2 Diabetes Mellitus Attending Diabetes Follow Up Clinic: A Quasi-Experimental Study Design. *International Journal of Africa Nursing Sciences*, *18*, 100548. https://doi.org/10.1016/j.ijans.2023.100548

Tao, Y., Zhang, R., Zhao, Y., Li, S., Guo, H., Huang, Y., & Fang, C. (2026). Quality And Reliability Of Type 1 Diabetes Mellitus–Related Short Videos On Bilibili And Tiktok: A Cross-Sectional Assessment Study. *Digital Health*, *12*. https://doi.org/10.1177/20552076261444042

Virda, N. A., Ari Kurniyanti, M., & Dwi Sulaksono, A. (2024). Effectiveness of Animation Video about Diabetes Mellitus Self-Care Management on The Level of Knowledge among Elderly. *Health and Technology Journal (HTechJ)*, *2*(5), 487–491. https://doi.org/10.53713/htechj.v2i5.262

WHO. (2024). Urgent Action Needed As Global Diabetes Cases Increase Four-Fold Over Past Decades. *World Health Organization*. https://www.who.int/news/item/13-11-2024-urgent-action-needed-as-global-diabetes-cases-increase-four-fold-over-past-decades

Yadav, U., Kumar, N., & Sarvottam, K. (2023). Role of Obesity Related Inflammation In Pathogenesis Of Peripheral Artery Disease In Patients Of Type 2 Diabetes Mellitus. *Journal of Diabetes & Metabolic Disorders*, *22*(1), 175–188. https://doi.org/10.1007/s40200-023-01221-5

Zareban, I., Niknami, S., Hidarnia, A., Rakhshani, F., Shamsi, M., & Karimy, M. (2014). Effective Intervention of Self-Care on Glycaemia Control in Patients With Type 2 Diabetes. *Iranian Red Crescent Medical Journal*, *16*(12). https://doi.org/10.5812/ircmj.8311