

Audiovisual Health Education and Short-Term Changes in Dietary Knowledge Among Patients with Type 2 Diabetes Mellitus

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ABSTRACT

Type 2 diabetes mellitus is a chronic condition which is becoming more common worldwide. One of the most efficient ways of treating this disease is via diet modification. However, poor awareness of diabetes food management may limit optimum glycemic control. The research aims to assess the short-term effects of audiovisual health education on dietary knowledge in individuals with type 2 diabetes mellitus. This quantitative research used a pre-experimental design. The design that was used in this study was a one-group pretest-posttest design. There were 74 individuals with type 2 diabetes mellitus at Pelambuan Community Health Center, Banjarmasin identified by unintentional sampling. The data were acquired by utilizing a previously validated, valid and reliable food knowledge questionnaire and analyzed by using Wilcoxon Signed Rank Test. Most of the respondents (62; 83.78%) had inadequate nutritional knowledge with an average score of 35.32 before intervention. After the audiovisual health education, all the respondents (100%) had high knowledge of nutrition, with the mean score improving to 88.83. Wilcoxon Signed Rank Test showed statistically significant difference between pretest and posttest scores ($p < 0.001$). These results indicated that there was a short-term increase in dietary knowledge after audiovisual health education to type 2 diabetes mellitus patients at Pelambuan Community Health Center, Banjarmasin.

Keywords: audiovisual, community health center, dietary knowledge, health education, type 2 diabetes mellitus

INTRODUCTION

Type 2 diabetes mellitus (T2DM) is a chronic metabolic condition characterized by hyperglycemia due to decreased insulin production, insulin resistance, or both (Banday et al., 2020). It has become one of the fastest rising worldwide public health issues. The International Diabetes Federation (2025) estimated that roughly 589 million individuals aged between 20 and 79 years had diabetes in 2024, representing 11.1% of the world's population in this age group, and this figure is anticipated to climb to 852.5 million by 2050. Chronic hyperglycemia is linked to an elevated risk of microvascular and macrovascular consequences, resulting in increased morbidity, mortality, and healthcare expenses (Mohammed et al., 2025). Recent data suggests that chronic inflammation, metabolic dysfunction, insulin resistance and increasing pancreatic β -cell dysfunction are implicated in the development and progression of type 2

diabetes mellitus (Vybhavi et al., 2025). The prevalence of diabetes among people ≥ 15 years old in Indonesia grew from 2.0% in 2018 to 2.2% in 2023, making the nation one of the highest in the world in terms of the number of diabetes cases (Wahyuni et al., 2025). The Pelambuan Community Health Center had the most instances of T2DM, with 369 patients in Banjarmasin in 2024 (Vera et al., 2025).

A pilot assessment on 10 patients with T2DM at the Pelambuan Community Health Center showed that 80% never got nutritional instruction and 70% did not comprehend the appropriate meal plan and portion size. These results suggest a lack of understanding on the part of patients about crucial areas of nutritional control. Dietary management is one of the cornerstones of T2DM therapy and it is important for maintenance of glycemic control and for prevention of disease-related complications. According to the American Diabetes Association (2024), diabetes education is an important part of managing diabetes. Dietary planning according to the principles of quantity, schedule and food type (3J) is very significant for blood glucose management (Gong & Lai, 2025). However, lack of awareness on dietary management typically leads in poor adherence which may raise the risk of problems (Andriani & Handayani, 2024). Shabbir et al. (2024) found that the most prevalent obstacle to dietary adherence among individuals with type 2 diabetes mellitus was lack of awareness about dietary guidelines. Similarly, Abose et al. (2024) observed that patients who had inadequate diabetes awareness were 2.88 times more likely to be non-adherent to the suggested diet. Therefore, it is necessary to implement effective educational programs to improve health literacy to help patients in controlling their condition (Nadia et al., 2025). The use of techniques of health education depending on the characteristics of patients may increase understanding, attachment and active involvement in the learning process (Maneri et al., 2022).

Audiovisual media are increasingly employed in health education because it combines visual and aural information so that the educational messages are simpler to learn and retain Qodir et al. (2024). Various research have shown positive effects of audiovisual education on health knowledge and learning outcomes among diverse groups of people (Amaliya et al., 2024). Video-based education has been shown to increase dietary adherence and diabetes management in T2DM patients Ropikoh et al. (2024), and audiovisual education has been demonstrated to be more effective than written media in enhancing patients' knowledge and attitudes (Juniartati et al., 2025). However, no research has examined the change in dietary knowledge of T2DM patients after audiovisual health education in primary healthcare settings.

Preliminary assessment of 10 patients with T2DM at Pelambuan Community Health Center showed that 80% of patients did not have prior dietary instruction and had little awareness of diabetic dietary management. In addition, 70% did not comprehend the suggested meal plan and portion size, and only 60% knew the items that should be limited and the repercussions of poor dietary adherence. These data suggest that people with T2DM have a poor awareness of nutrition and the need for appropriate educational intervention.

Previous studies have investigated the audiovisual education of knowledge of diabetes, but there is limited evidence on the application of audiovisual education of dietary knowledge, especially the 3J principles (amount, schedule, and type of food) among patients with type 2 diabetes mellitus in primary healthcare settings. In this light, the current research was conducted on patients with type 2 diabetes mellitus at the Pelambuan Community Health Center, Banjarmasin, to analyze short-term changes in dietary knowledge after audiovisual health education. Therefore, this research intended to observe the short-term changes of dietary knowledge after audiovisual health education among the patients with type 2 diabetes mellitus at Pelambuan Community Health Center, Banjarmasin.

METHODS

A pre-experimental one-group pretest–posttest design was used in this study's quantitative methodology. The research was carried out at the Pelambuan Community Health Center, Banjarmasin, Indonesia, from March to April 2026. The study population consisted of 304 patients with type 2 diabetes mellitus. After excluding 10 patients who participated in the preliminary study, the eligible population was 294 patients. 25% of the eligible population was chosen, yielding a sample of 74 people, in accordance with Arikunto (2013) recommendation to choose 20–25% of populations bigger than 100. An unintentional sampling strategy was used to recruit respondents. This non-probability sampling method may restrict the results' applicability to patients with comparable features and induce selection bias. Patients with type 2 diabetes mellitus between the ages of 20 and 59 who were willing to engage and had good communication skills were eligible to enroll. Patients with cognitive impairment, severe illness, hearing or visual impairment that prevented participation in the audiovisual intervention, or incomplete questionnaire data were excluded from the study. Data collection was done by utilizing a nutritional knowledge questionnaire derived from Selan (2025), which consisted of 15 questions true or untrue, with a score of 0 to 15. Each correct answer was scored 1 and each incorrect answer 0, with higher scores indicating better dietary knowledge. Knowledge levels

were categorized as poor (<56%), moderate (56–75%), and good (76–100%). The questionnaire had been previously tested for validity and reliability by Selan (2025). Item validity was assessed using Point Biserial correlation with 30 respondents, yielding correlation coefficients of 0.3785–0.6352, exceeding the critical value ($r = 0.361$). Reliability was assessed using the Kuder–Richardson 20 (KR-20), with a coefficient of 0.815, indicating good internal consistency.

Participants completed the questionnaire before the intervention (pretest), followed by one session of audiovisual health education lasting approximately 5 minutes, using an animated video developed by the researcher in Indonesian and delivered individually to each participant using a laptop. The video presented the educational material in animated form with text. The educational content was developed based on supporting references on type 2 diabetes dietary management, including Gong dan Lai (2025), Rahmala et al. (2022), and Suardi (2022), covering the definition and objectives of diabetes dietary management, the 3J principles (amount, schedule, and type of food), recommended and restricted foods, portion and calorie management, and regular meal schedules. The video was reviewed and approved by the research supervisors and examiners before implementation and was registered as a copyrighted work entitled *Video Animasi Diet Diabetes Melitus* (Copyright Registration No. 001255385). Immediately following the video, participants filled in the same questionnaire as a posttest to measure any change in nutritional knowledge.

All participants provided written informed permission, and the Health Research Ethics Committee, Institute for Research and Community Service, Universitas Sari Mulia, granted ethical approval with ethical approval number 161/KEP-UNISM/III/2026. Respondents' characteristics and dietary knowledge were summarized using descriptive statistics, and since the data were not normally distributed, differences between pretest and posttest scores were examined using the Wilcoxon Signed Rank Test at a significance threshold of $p < 0.05$. The sample size was determined using the population-based approach described by Arikunto (2013) and was not based on an a priori calculation of expected effect size, statistical power, or anticipated pretest–posttest differences; this represents a methodological limitation of the study.

RESULTS

Univariate Analysis

The characteristics of the respondents and the distribution of dietary knowledge before to and during the audiovisual health education intervention were described using univariate analysis.

Table 1. Characteristics of the Respondents

Characteristics	Frequency (f)	Percentage (%)
Age		
40–49 years	21	28.38
50–59 years	53	71.62
Total	74	100.00
Education Level		
Did not complete elementary school	10	13.51
Junior high school	29	39.19
Senior high school	35	47.30
Total	74	100.00
Duration of Type 2 Diabetes Mellitus		
≤ 2 years	42	56.76
3–4 years	25	33.78
≥ 5 years	7	9.46
Total	74	100.00

Table 1 shows that most respondents were aged 50–59 years (71.62%), had completed senior high school (47.30%), and had been diagnosed with type 2 diabetes mellitus for ≤ 2 years (56.76%).

Table 2. Distribution of Dietary Knowledge Among Patients with Type 2 Diabetes Mellitus

Knowledge Level	Frequency (f)	Percentage (%)
Pretest		
Poor	62	83.78
Moderate	12	16.22
Total	74	100.00
Posttest		
Good	74	100.00
Total	74	100.00

Table 2 indicates that before the intervention, most respondents had poor dietary knowledge (83.78%). Following the audiovisual health education intervention, all respondents (100%) demonstrated good dietary knowledge.

Bivariate Analysis

The Wilcoxon Test was used in the bivariate analysis to compare the dietary knowledge of individuals with type 2 diabetes mellitus before and after the audiovisual health education intervention.

Table 3. Comparison of Dietary Knowledge Scores

Dietary knowledge score	Pretest	Posttest	Z	p-value	Effect size (r)
Median (Q1–Q3)	40.00 (13.33–46.67)	93.33 (80.00–93.33)	–7.522	<0.001	0.87

Dietary knowledge ratings before and after the audiovisual health education intervention are compared in Table 3. Prior to the intervention, the median dietary knowledge score was 40.00 (Q1–Q3: 13.33–46.67); after the intervention, it was 93.33 (Q1–Q3: 80.00–93.33). The Wilcoxon Test revealed a substantial effect size ($r = 0.87$) and a statistically significant difference between pretest and posttest scores ($Z = -7.522$, $p < 0.001$).

Table 4. Changes in Dietary Knowledge Before and After Audiovisual Health Education

Dietary Knowledge	Before Intervention		After Intervention	
	f	%	f	%
Poor	62	83.78	0	0.00
Moderate	12	16.22	0	0.00
Good	0	0.00	74	100.00
Total	74	100.00	74	100.00

Table 4 shows changes in respondents' dietary knowledge before and after the audiovisual health education intervention. Before the intervention, most respondents had poor dietary knowledge (83.78%), while 16.22% had moderate knowledge. After the intervention, all respondents (100.00%) demonstrated good dietary knowledge.

DISCUSSION

Dietary Knowledge Before the Audiovisual Health Education Intervention

The current investigation revealed that individuals with type 2 diabetes mellitus had poor dietary awareness before obtaining the audiovisual health education. The respondents had basic information on the required food sources but less knowledge on the calorie needs, portion management, meal timing, fat consumption and meal planning for each person. Findings indicate that knowledge of healthy food choices alone may not be enough for diabetic dietary control. Dewi et al. (2023) found that dietary knowledge was associated with dietary habits in patients with type 2 diabetes mellitus, whereas Dewi et al. (2025) stressed the need for broad

nutritional knowledge to help in making dietary choices and quality of life. Soleman et al. (2023) also reported a relationship between patients' knowledge and medication adherence. Therefore, formal instruction should include both the basics of food choices and the more sophisticated issues of dietary control.

Insufficient information about nutrition may also be associated with demographic and clinical factors of the responders. The majority of responders were aged 50 to 59 years and had been diagnosed with type 2 diabetes mellitus for no more than 2 years, indicating that some patients may still be adjusting to suggested dietary and lifestyle changes. Patients' awareness of diabetes care may also be influenced by prior health information, educational background, and health literacy (Wang et al., 2024). Results such as these emphasize the importance of structured education on meal timing, portion sizes, energy demands and healthy food choices.

Dietary Knowledge After the Audiovisual Health Education Intervention

The results of this research showed that the dietary knowledge of individuals with type 2 Diabetes Mellitus improved after receiving audiovisual health education. Respondents demonstrated more knowledge on food choices, quantity management, calorie planning, and meal timing. These results are in line with prior research that has shown improvement in diabetes-related knowledge after audiovisual or video-based instruction. Audiovisual health education has been reported to positively influence knowledge and attitudes also reported positive findings of the use of audiovisual or video-based education for diabetes-related knowledge and dietary management (Juniartati et al., 2025; Pella et al., 2025; Puspita et al., 2025; Ropikoh et al., 2024).

One responder answered erroneously one questionnaire item about the appropriate amount of dietary fat intake, although great progress was seen. This implies that ideas with numbers, percentages and nutritional calculations could need more explanation than actual dietary suggestions. As to Harianja et al. (2024), the diabetic dietary education should focus on food choices, calorie needs, energy balance, and personalized dietary planning. Audiovisual media may also aid comprehension by integrating visual information with spoken information. Mayer's Cognitive Theory of Multimedia Learning suggests that using complementing verbal and visual information might aid in facilitating the processing and organizing of new knowledge.

Audiovisual health education and short-term change in dietary knowledge of patients with type 2 diabetes mellitus

Results demonstrated a significant immediate increase in food knowledge after the audiovisual health education session. However, because the study used a one-group pretest–posttest design without a control group, the observed improvement cannot be attributed exclusively to the intervention. The immediate posttest using the same questionnaire may also have contributed to the observed increase through testing and recall effects.

Audiovisual media may facilitate the understanding of complex dietary concepts by combining verbal and visual information. According to Mayer’s Cognitive Theory of Multimedia Learning, complementary verbal and visual information can support the processing and organization of new information. Previous studies also reported improvements in diabetes-related knowledge following audiovisual or video-based education. These findings support the potential use of audiovisual media as an educational approach in diabetes care (Juniartati et al., 2025; Puspita et al., 2025; Ropikoh et al., 2024).

Improved dietary knowledge may provide an important foundation for diabetes self-management. Harianja et al. (2024) emphasized the importance of dietary knowledge in diabetes self-management, while Sofie dan Sefrina (2022) reported that nutrition education may contribute to improvements in dietary patterns when accompanied by practical guidance. However, the present study measured knowledge only and did not assess dietary adherence, self-management behavior, or glycemic outcomes. Therefore, audiovisual health education may complement diabetes education in primary healthcare, while further controlled studies with longer follow-up are needed to determine whether improvements in knowledge are sustained and translate into changes in dietary behavior.

CONCLUSION

Following a single audiovisual health education session, individuals with type 2 diabetes mellitus at the Pelambuan Community Health Center in Banjarmasin showed a substantial short-term increase in dietary knowledge. The majority of respondents had inadequate dietary awareness before to the intervention, but all respondents had a high degree of dietary knowledge after audiovisual health education. Results show a considerable improvement in nutritional knowledge after the intervention. The one-group pretest-posttest paradigm without a control group, however, does not provide clear findings about causal efficacy. These results

suggest the promise of audiovisual media as a complementary method to diabetic dietary education in primary healthcare settings. Future research should include more rigorous study designs including controlled or randomized trials, bigger sample numbers, longer follow-up periods, and the assessment of dietary adherence and glycemic control among individuals with type 2 diabetes mellitus.

LIMITATION

The current research has certain limitations that should be taken into consideration when evaluating the results. First, the research design was a one-group pretest–posttest design without a control group, which limited the ability to ascribe the observed change in dietary knowledge only to the audiovisual health education intervention. In addition, the use of accidental sampling might have generated selection bias and reduced the capacity to generalize the results to patients with comparable features. Other external influences such as information gained from healthcare professionals, family members, social media or the internet during the research period may have also impacted respondents' knowledge, thereby impacting on the internal validity of results. Furthermore, the sample size was calculated on a population-based method and not on an a priori calculation on the estimated effect size and statistical power, which should be taken into account when interpreting the results.

Second, the posttest was administered immediately after the intervention, which did not allow us to evaluate the long-term retention of information and if the improvement was maintained over time. Testing and recollection effects may possibly have contributed to the rise in scores seen since the same questionnaire was utilized for the pretest and posttest. Moreover, individual characteristics such as educational background, past experience with diabetes care, learning preferences and health literacy were not explored in detail, although these aspects may have impacted participants' reactions to the educational intervention. Future studies should employ controlled study designs with larger sample sizes, longer follow-up periods, and additional outcome measures (e.g., dietary adherence and glycemic control) to provide stronger evidence on the short-term and long-term effects of audiovisual health education.

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