

The Impact of Health Education Through Audio-Visual Media on Increasing Knowledge of Type 2 Diabetes Prevention Among Students

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ABSTRACT

Background: Type II Diabetes Mellitus continues to rise globally, especially among adolescents, who often lack awareness of the risks associated with this disease due to insufficient information.

Objective: This study aims to evaluate the impact of health education using audio-visual media on increasing knowledge of Type II Diabetes Mellitus prevention among 11th-grade students at SMA Negeri 23 Makassar.

Methods: The research used a pre-experimental design with a one-group pre-test and post-test approach. A total of 138 respondents were randomly selected from a population of 212 students. Data were collected using a questionnaire and analyzed using the Wilcoxon Signed Rank Test.

Results: The study found a significant improvement in the knowledge of Type II Diabetes Mellitus prevention after receiving health education through audio-visual media, with a p value of 0.000.

Conclusion: Health education through audio-visual media significantly enhances the knowledge level regarding the prevention of Type II Diabetes Mellitus among 11th-grade students at SMA Negeri 23 Makassar.

Keywords: Audio visual, adolescents, health education, knowledge, Type II Diabetes Mellitus

INTRODUCTION

Audio-visual technology has been used for several years but was traditionally limited to health education videos played on video players and TVs (Harcourt, 2024). Nowadays, many people prefer watching videos on their mobile phones. Engaging and educational content about diabetes can be very helpful and easily understood by a broad audience, and over time, the intensity of learning can affect individuals' knowledge and understanding (Rasyida & Susanti, 2022; Sulfikar & Rajab, 2024).

Diabetes Mellitus is a metabolic disease characterized by hyperglycemia due to impaired insulin secretion or function, and it is one of the leading causes of death (Kristelina, Zainal, & Fajriansi, 2023). Type II Diabetes Mellitus is marked by high blood sugar levels and disturbances in the metabolism of carbohydrates, fats, and proteins due to insufficient insulin secretion. According to the World Health Organization (WHO), as of May 2020, there were 422 million people worldwide living with Diabetes Mellitus (Pratiwi, Izhar, & Syukri, 2022). A systematic review from 25 countries estimated 41,600 new cases of Type II Diabetes Mellitus among adolescents globally in 2021. Indonesia is listed as the country with the highest prevalence, with 133 cases. Data from the Ministry of Health shows that the prevalence in children aged ≥ 15 years increased by 8.5%, and in children aged ≥ 15 years, it reached 10.9% (Syaipuddin, Yasir Haskas, 2023). In 2021, diabetes caused 6.7 million deaths, equivalent to one death every 5 seconds (Mustika, Suarnianti, 2024). The prevalence of Type II Diabetes Mellitus in South Sulawesi has also risen, from 1.6% in 2013 to 1.8% in 2018 (Syarfaini et al., 2023). Surveillance data from the non-communicable disease units in Makassar's Puskesmas Layang and Puskesmas Antara recorded the highest number of adolescent diabetes patients, with prevalences of 18% and 16%,

respectively, out of the total adolescent diabetes patients in Makassar (Annisa Amalia Yahya, 2024).

Effective health education requires media or teaching aids, and one of the most effective tools is audio-visual media. Audio-visual media combines sound and moving images. The advantage of audio-visual media is that it engages multiple senses, such as sight and hearing, and the information conveyed can be absorbed by 75% to 87%, while 13% to 25% is absorbed through other senses (Wirastri, 2023).

The lack of understanding among adolescents about Diabetes Mellitus and its management, as noted by Yusrawati Hasibuan and Yulina Dwi Hastuty (2022), indicates that the information provided is not fully understood. This is due to a lack of awareness about the risks and prevention of diabetes. A solution to improve adolescents' interest and learning engagement through health education is the use of audio-visual media. This tool can convey information in a more engaging and easily understood way, especially for adolescents who are more responsive to videos. The goal of this solution is to enhance knowledge and build awareness among adolescents about the importance of maintaining a healthy lifestyle, such as a balanced diet and physical activity, to reduce the risk of Type II Diabetes Mellitus. According to a study by Rizka Aulivia, Indra Dewi (2021), audio-visual media has a positive impact on increasing knowledge about the prevention of Type II Diabetes Mellitus among adolescents at SMK Darussalam Makassar.

Based on preliminary data obtained from SMA Negeri 23 Makassar, the number of students in Class XI MIPA 2, 3, and 4 and Class XI IPS 1, 2, and 3 is 212 students, consisting of 93 male students and 119 female students. Interviews conducted with several students at SMA Negeri 23 Makassar revealed that some of them did not know what Type II Diabetes Mellitus is or how to prevent it.

Based on this, the researcher is interested in conducting a study on the Effect of Health Education Through Audio-Visual Media on Improving Knowledge About the Prevention of Type II Diabetes Mellitus Among 11th Grade Students at SMA Negeri 23 Makassar.

METHODS

This study uses a quantitative method with a one-group pre-test and post-test design, applying a pre-experimental approach. The aim of this research is to determine the effect of health education through audio-visual media on improving the knowledge of 11th-grade students at SMA Negeri 23 Makassar regarding the prevention of Type II Diabetes Mellitus. The study was conducted on January 6, 2025, and involved 138 respondents from a total population of 212 students. The instrument used in this study was a questionnaire on students' knowledge of Type II Diabetes Mellitus prevention, consisting of 21 questions. The data processing technique in this study included editing, coding, and tabulation, using SPSS software. The results were analyzed with $\rho < \alpha$ (0.05). The data analysis was performed using univariate and bivariate analysis, with the Wilcoxon Signed Rank Test being applied. This study has passed the ethical review with the approval number 266/STIKES-NH/KEPK/XII/2024, issued on December 21, 2024, by the Nani Hasanuddin Health College Ethics Committee.

RESULT

Respondent Characteristics

Table 1 Respondent's Gender Characteristics at SMA Negeri 23 Makassar

Gender	Frequency (n)	Percentage (%)
Male	38	27.5
Female	100	72.5
Total	138	100.0

Based on Table 1, the study results show that the majority of respondents were female, with 100 respondents (72.5%), while 38 respondents (27.5%) were male. Thus, it can be concluded that the majority of respondents in this study were female.

Table 2 Respondent's Age Characteristics at SMA Negeri 23 Makassar

Age	Frequency (n)	Percentage (%)
16 years	50	36.2
17 years	88	63.8
Total	138	100.0

Based on Table 2, the study shows that the majority of respondents were 17 years old, with 88 respondents (63.8%), while 50 respondents (36.2%) were 16 years old. It can be concluded that the majority of respondents in this study were in the 17-year age group.

Table 3 Family History Characteristics of Respondents at SMA Negeri 23 Makassar

Family History	Frequency (n)	Percentage (%)
Yes	26	18.8
No	112	81.2
Total	138	100.0

Based on Table 3, the study results show that 26 respondents (18.8%) had a family history of Type 2 Diabetes Mellitus, while 112 respondents (81.2%) did not have a family history of this disease. Therefore, it can be concluded that the majority of respondents in this study did not have a family history of Type 2 Diabetes Mellitus.

Table 4 Family Relationship Characteristics of Respondents at SMA Negeri 23 Makassar

Family Relationship	Frequency (n)	Percentage (%)
None	112	81.2
Father	14	10.1
Mother	12	8.7
Total	138	100.0

Based on Table 4, the study results show that the majority of respondents, 112 respondents (81.2%), did not have a family member with Type 2 Diabetes Mellitus. Meanwhile, 14 respondents (10.1%) had a father with Type 2 Diabetes Mellitus, and 12 respondents (8.7%) had a mother with the disease. Therefore, it can be concluded that most respondents in this study did not have a family member with Type 2 Diabetes Mellitus.

Univariate Analysis

Table 5 Univariate Analysis Pre-Test Questionnaire on Students' Knowledge of Type II Diabetes Mellitus Prevention

Pre-Test	Frequency (n)	Percentage (%)
Good	5	3.6
Average	112	81.2
Poor	21	15.2
Total	138	100.0

Based on Table 5, the study results show the distribution of the frequency of knowledge on the prevention of Type II Diabetes Mellitus during the pre-test. Out of 138 respondents, 5 respondents (3.6%) had good knowledge, 112 respondents (81.2%) had average knowledge, and 21 respondents (15.2%) had poor knowledge.

Table 6 Univariate Analysis Post-Test Questionnaire on Students' Knowledge of Type II Diabetes Mellitus Prevention

Post-Test	Frequency (n)	Percentage (%)
Good	132	95.7
Average	5	3.6
Poor	1	0.7
Total	138	100.0

Based on Table 6, the study results show the distribution of knowledge levels on Type II Diabetes Mellitus prevention during the post-test. Out of 138 respondents, 132 respondents (95.7%) had good

knowledge, 5 respondents (3.6%) had average knowledge, and 1 respondent (0.7%) had poor knowledge.

Bivariate Analysis

Table 7 *Bivariate Analysis of the Effect of Health Education Through Audio-Visual Media on Increasing Knowledge of Type II Diabetes Mellitus Prevention Among 11th-Grade Students at SMA Negeri 23 Makassar*

Variable	Median (Minimum-Maximum)	ρ Value
Knowledge before the education	10 (5-16)	0.000
Knowledge after the education	19 (7-21)	

Based on **Table 7**, it shows a significant increase in knowledge about the prevention of Type II Diabetes Mellitus after health education using audio-visual methods. Before the education, the median knowledge score was 10, with a range of 5 to 16. After the education, the median score increased to 19, with a range of 7 to 21. The Wilcoxon Signed Rank Test showed a ρ value of 0.000, which is less than α (0.05), thus rejecting the null hypothesis (Ho). The score of -10.211 obtained using SPSS 26.00 for Windows (Wilcoxon Test) indicates that the audio-visual educational media significantly improved the knowledge of students at SMA Negeri 23 Makassar. This means that providing education using audio-visual media significantly increased students' knowledge about the prevention of Type II Diabetes Mellitus.

DISCUSSION

Respondent Characteristics

Gender

Based on the study results, the majority of the respondents in the 11th-grade class at SMA Negeri 23 Makassar were female. Females tend to be more concerned about health and more proactive in seeking information regarding disease prevention compared to males, who generally show lower health awareness. This finding is consistent with research by Wulan et al. (2024), which stated that the majority of respondents with good preventive behaviors for complications were female due to their higher awareness and initiative in maintaining health.

Age

Based on the results, the majority of the respondents in the 11th-grade class at SMA Negeri 23 Makassar were 17 years old. Students at this age are in a vulnerable phase, as they begin to have the freedom to explore different types of foods that seem appealing. During this period, they are also more likely to follow food trends and take advantage of food delivery services, such as GoFood. As a result, their eating habits may become unregulated, which could increase the risk of developing diseases such as Type II Diabetes Mellitus.

Family History

Based on the study results, the majority of respondents in the 11th-grade class at SMA Negeri

23 Makassar did not have a family history of Type II Diabetes Mellitus, with 112 respondents in total. Family history is one of the major risk factors for the development of Type II Diabetes Mellitus because the disease is closely related to genetic factors. Students with a family history of Type II Diabetes Mellitus are at a higher risk of developing the disease compared to those without such a history. These findings are consistent with research by Nuraisyah et al. (2021), which stated that individuals with a family history of Type II Diabetes Mellitus have a 3.78 times higher risk of experiencing abnormal blood sugar levels.

Family Relationship

Based on the study results, the majority of the respondents in the 11th-grade class at SMA Negeri 23 Makassar did not have any family members with Type II Diabetes Mellitus, with 112 respondents. However, 14 respondents had a father with Type II Diabetes Mellitus, and 12 respondents had a mother with the same condition. Students with a family history, either from their father or mother, are at a higher risk of developing Type II Diabetes Mellitus due to genetic factors. These findings align with the research by Irwan et al. (2021), which stated that the risk of developing Diabetes Mellitus increases by 3.4 times if the mother has the disease and 3 times if the father has the condition.

Univariate Analysis

Based on the results of measuring the knowledge level on the prevention of Type II Diabetes Mellitus in 11th-grade students at SMA Negeri 23 Makassar, the pre-test results showed 5 respondents in the "good" category. After health education intervention through audio-visual media, the post-test results showed 132 respondents in the "good" category. The analysis of the master table revealed that 106 respondents moved from the "average" to the "good" category, 17 respondents moved from the "poor" to the "good" category, and 9 respondents remained in the "good" category. Therefore, the final result showed 132 respondents with "good" knowledge, demonstrating that health education through audio-visual media was effective in improving the students' knowledge of preventing Type II Diabetes Mellitus.

Based on the results of measuring the knowledge level on the prevention of Type II Diabetes Mellitus, the pre-test showed that 112 respondents were in the "average" category. After the intervention, 5 respondents remained in the "average" category, with 2 respondents moving from "poor" to "average," and 3 respondents staying in the "average" category. Therefore, 5 respondents with "average" knowledge experienced a decline after the health education intervention through audio-visual media.

According to the researcher's assumptions, the pre-test results showed 21 respondents in the "poor" category. After receiving health education through audio-visual media, 1 respondent remained in the "poor" category, indicating a decline after the intervention.

Bivariate Analysis

The analysis using the Wilcoxon Signed Rank Test showed a significant increase in the students' knowledge about the prevention of Type II Diabetes Mellitus after the intervention using audio-visual

methods. Before the intervention, the median knowledge score of the respondents was 10, with a range from 5 to 16, while after the intervention, the median score increased to 19, with a range from 7 to 21. The Wilcoxon Signed Rank Test showed a p value of 0.000, which is less than $\alpha = 0.05$, rejecting the null hypothesis (H_0) and accepting the alternative hypothesis (H_a).

These findings are consistent with research by Juniartati & Zaini (2025) in the study titled "The Effect of Health Education Through Audio-Visual Media on Stroke Prevention in Diabetes Mellitus Patients," which showed that audio-visual-based health education significantly increased the knowledge and attitudes of Diabetes Mellitus patients regarding stroke prevention. The Wilcoxon Signed Rank Test results in that study showed a p -value of 0.012 ($p < 0.05$), with the average knowledge score of the intervention group increasing from 67.06% before the education to 89.41% after the intervention. This study also showed that video media was more effective than leaflets in enhancing patient understanding of stroke prevention.

According to the researcher's assumptions, the alternative hypothesis is accepted, and the null hypothesis is rejected, meaning that there is a significant effect of health education through audio-visual media on improving knowledge about the prevention of Type II Diabetes Mellitus among 11th-grade students at SMA Negeri 23 Makassar. This finding suggests that the use of audio-visual media in school health education can be an effective strategy to increase students' awareness and understanding of disease prevention. Therefore, this approach could be considered as a more interactive learning method in health education programs at the secondary school level.

CONCLUSION

Based on the results of the study conducted on the effect of health education through audio-visual media on improving knowledge about the prevention of Type II Diabetes Mellitus among 11th-grade students at SMA Negeri 23 Makassar, it can be concluded that there is an effect of providing health education through audio-visual media on the level of knowledge regarding the prevention of Type II Diabetes Mellitus among 11th-grade students at SMA Negeri 23 Makassar.

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