



The Effect of Educational Video on the Implementation of a Healthy Lifestyle for the Prevention of Gestational Diabetes in Pregnant Women

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Abstrak:

Background, Gestational Diabetes Mellitus (GDM) is an increasingly common pregnancy complication associated with macrosomia, preeclampsia, and later type 2 diabetes, and healthy lifestyle modification is its primary prevention strategy, yet uptake among pregnant women remains low due to limited practical educational media.

Aim, This study aimed to analyze the effect of educational videos on the implementation of a healthy lifestyle for the prevention of gestational diabetes among pregnant women in the working area of the Lhokseumawe City Community Health Center

Methods, A quantitative quasi-experimental study with a non-equivalent control group design was conducted on 64 pregnant women (32 intervention, 32 control), selected through purposive sampling; data were collected with a modified questionnaire before and two weeks after the intervention and analyzed using the Wilcoxon Signed Ranks and Mann-Whitney U tests

Results, Both groups improved significantly after the intervention, but the increase in the intervention group was significantly greater than in the control group (mean rank 34.17 versus 25.83; $p < 0.001$).

Conclusions, Educational videos were more effective than leaflets and lectures in improving healthy lifestyle implementation.

Implication. Health workers should integrate educational videos into routine antenatal care to support the prevention of gestational diabetes.

Keywords: Gestational Diabetes Mellitus, Educational Video, Healthy Lifestyle, Health Education, Pregnant Women



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INTRODUCTION

Gestational Diabetes Mellitus (GDM) is one of the most common medical complications of pregnancy and represents a growing global health challenge. GDM is defined as glucose intolerance first recognized during pregnancy and, if left untreated, can cause serious complications for both mother and fetus, including macrosomia, preterm birth, preeclampsia, and an increased risk of type 2 diabetes later in life (Kautzky-Willer et al., 2023;Feldman et al., 2020). Data from (International Diabetes Federation (IDF), 2021) recorded approximately 21.1 million live births affected by hyperglycemia in pregnancy, representing 16.7% of women aged 20–49 years globally, with the highest burden found in low- and middle-income countries. This rising prevalence is closely linked to increasing rates of obesity, sedentary lifestyles, and unhealthy diets among women of reproductive age, all of which are modifiable factors that can be addressed through lifestyle change (Sweeting et al., 2024)

In Indonesia, the prevalence of diabetes mellitus reaches 10.6%, with approximately 19,465,100 people affected (International Diabetes Federation (IDF), 2021). Based on the 2018 Basic Health Research (Riskesdas), Aceh Province ranks eighth among Indonesian provinces with the highest number of diabetes mellitus cases, with the city of Lhokseumawe reporting 4,565 diabetes cases (Hanif et al, 2023;Kemenkes, 2019). This high figure indicates that pregnant women in the Aceh region, particularly in Lhokseumawe, are in a vulnerable position with respect to GDM complications. Key contributing risk factors include being overweight, a family history of diabetes, maternal age above 35 years, and suboptimal diet and physical activity, all of which are directly related to the daily lifestyle of pregnant women (Feldman et al., 2020; Birch et al., 2021)

Healthy lifestyle modification is the most effective and safest primary prevention strategy for GDM. Interventions that include a balanced, nutritious diet, regular physical activity, weight control, and stress management have been shown to significantly reduce the risk of GDM and improve pregnancy outcomes for both mother and baby (Lin et al., 2020; Rasmussen et al., 2020). Diets for pregnant women at risk of GDM need to maintain a balance of macronutrients, particularly complex carbohydrates, along with adequate micronutrient intake, to support fetal growth and development while maintaining controlled blood glucose levels (Rasmussen et al., 2020). In addition, regular moderate-intensity physical activity during pregnancy has been shown to improve insulin sensitivity and contribute to better glycemic control (Lin et al., 2020). Consistent implementation of a

healthy lifestyle by pregnant women is therefore key to preventing and managing GDM non-pharmacologically.

Although the benefits of a healthy lifestyle in preventing GDM have been scientifically established, its implementation at the individual level still faces various challenges. Many pregnant women have not consistently applied the recommended healthy diet and physical activity, partly due to a lack of exposure to information that is practical, easy to understand, and accessible at any time (Dissassa et al., 2023; Thomas et al., 2020; Mostafa Abdelmonem Desoky et al., 2022). Socioeconomic factors, education level, limited access to health services, and cultural norms also act as barriers affecting pregnant women's ability to implement recommended lifestyle changes (Feldman et al., 2020; Hagrass, 2019). Therefore, educational media are needed that not only convey information but are also able to motivate and encourage pregnant women to actively change their behavior and apply a healthy lifestyle in their daily lives.

Educational video is an intervention medium that addresses this challenge. Unlike lectures, which are one-directional, and leaflets, which rely solely on text, video combines visual and auditory stimuli simultaneously, making it more effective at conveying behavior change messages, increasing motivation, and encouraging the real-world adoption of a healthy lifestyle (Angelin Lavanya & Krishnaveni M, 2020; Maharjan et al., 2022). Studies show that educational videos containing direct demonstrations of healthy food choices, safe physical activity techniques during pregnancy, and weight-management strategies provide more concrete guidance that is easier for pregnant women to imitate compared with conventional educational media (Maharjan et al., 2022). Furthermore, videos can be accessed repeatedly at flexible times, making them a relevant and practical medium for pregnant women facing various constraints in accessing health services.

Previous research in Aceh has shown that health education effectively improves pregnant women's knowledge of gestational diabetes mellitus (GDM). A study by (Elizar et al., 2025, 2026) demonstrated that education through the lecture method significantly improved pregnant women's knowledge. This finding was reinforced by a follow-up study showing that a combination of lectures and leaflets was more effective than lectures alone at improving pregnant women's knowledge of GDM, indicating that the use of visual media can enhance the effectiveness of health education.

Nevertheless, both studies focused solely on knowledge improvement and relied on lectures and leaflets as educational media. To date, the potential of educational videos that

integrate visual and auditory elements to encourage the implementation of a healthy lifestyle as a means of GDM prevention has not been widely studied, particularly among pregnant women in the working area of the Lhokseumawe City Community Health Center. This gap forms the basis and scientific justification for the present study.

LITERATURE REVIEW

Gestational diabetes mellitus (GDM) is a major endocrine problem of pregnancy with several confirmed risk factors that have been linked to adverse pregnancy-related outcomes (Kouhkan, Najafi, et al., 2021). Their findings identified maternal age, obesity, family history of diabetes, a previous history of GDM, and a previous history of macrosomia as risk factors for the occurrence of gestational diabetes mellitus. With GDM rates rising worldwide, health care providers must pay attention to these risk factors for early diagnosis of GDM. Given the serious short- and long-term impacts on mother and child, early screening and appropriate management of GDM are needed, particularly in Asia and low- and middle-income countries. Providing health education programs through media can help improve pregnant women's knowledge for effective prevention and management. A simple, clear GDM education program concept is needed to improve health-seeking behavior through psychoeducation, counseling, and health education.

Health education plays an important role in improving public health, yet it is often overlooked due to limited understanding and a lack of awareness of health promotion strategies. The importance of health education within the health care system cannot be underestimated, as it has significant potential to improve public health outcomes. Through health education programs, mothers can be empowered to actively participate in making the right choices regarding their care (Rizvi, 2022b). Engaging and persuasive health education media make it easier for the target audience to receive the health messages being conveyed.

Educational videos have become an important innovation in efforts to promote healthy lifestyle practices among pregnant women, particularly to prevent gestational diabetes (Meloncelli et al., 2023). Video-based educational approaches delivered via online applications and telehealth improve pregnant women's knowledge and motivation to adopt healthy lifestyles. Intervention programs that use educational websites and telehealth coaching report high satisfaction among women with a history of GDM. According to (Meloncelli et al., 2023; O'Reilly et al., 2021; Rollo et al., 2020), educational video content typically covers important healthy eating patterns, such as fiber consumption, reducing sugar

intake, choosing complex carbohydrates, and physical activity during pregnancy, as well as attention to the risks and prevention of gestational diabetes and behavior-change techniques for improving a healthy lifestyle. Recent studies by O'Reilly et al. (2021) and Rollo et al. show that educational videos and eHealth interventions are well received by pregnant women and women with a history of GDM. Most participants felt helped and were willing to recommend the program. The main challenges are maintaining participation and ensuring the content remains relevant. Educational videos can be combined with online consultation sessions to answer participants' questions.

The implementation of a healthy lifestyle for diabetes prevention in pregnant women is a series of behavior modification-based interventions that include balanced nutrition, regular physical activity, weight monitoring, and health education, aimed at optimizing glycemic control and reducing GDM risk factors during pregnancy (Association, 2024). Implementing a healthy lifestyle consisting of a balanced and nutritious diet, regular physical activity, weight monitoring, health education, and blood glucose monitoring is a key step in preventing gestational diabetes in pregnant women (PERKENI, 2021).

METHOD

This quantitative study employed a quasi-experimental, nonequivalent control group design to evaluate the effect of educational videos on the implementation of healthy lifestyle practices for the prevention of gestational diabetes among pregnant women attending antenatal care at the Lhokseumawe City Community Health Center. Participants were selected using purposive sampling based on predefined inclusion and exclusion criteria. The intervention group in this study consisted of pregnant women who received an educational video on implementing a healthy lifestyle, while the control group received education only through leaflets and lectures. Sample size was calculated using the Lemeshow formula, yielding 29 respondents per group; after applying a 10% correction to anticipate potential dropout and loss to follow-up, the final sample size was 32 participants per group, for a total of 64 pregnant women.

Data were collected using a modified questionnaire developed by Lin et al. (2020) that had been translated into Indonesian. The pretest and posttest contained questions on the characteristics of pregnant women and statements on the implementation of a healthy lifestyle for the prevention of gestational diabetes mellitus, with response options of always, often, sometimes, and never, covering diet (13 statements), physical activity (7 statements),

weight control and health monitoring (5 statements), stress management and social support (5 statements), and adherence to implementing a healthy lifestyle (3 statements). The posttest was carried out two weeks after the intervention because the implementation of a healthy lifestyle, as the study outcome, requires time to be put into practice in daily life. This interval allowed respondents to apply the given recommendations so that the measurement results more accurately reflect real behavior change, while also reducing the influence of the testing effect and minimizing the possibility of change due to other factors during pregnancy.

This study used the independent samples t-test. Before conducting the independent t-test, a normality test was performed; if the data were not normally distributed, the Mann-Whitney test was used in SPSS.

The study activities are illustrated in Figure 1 below.

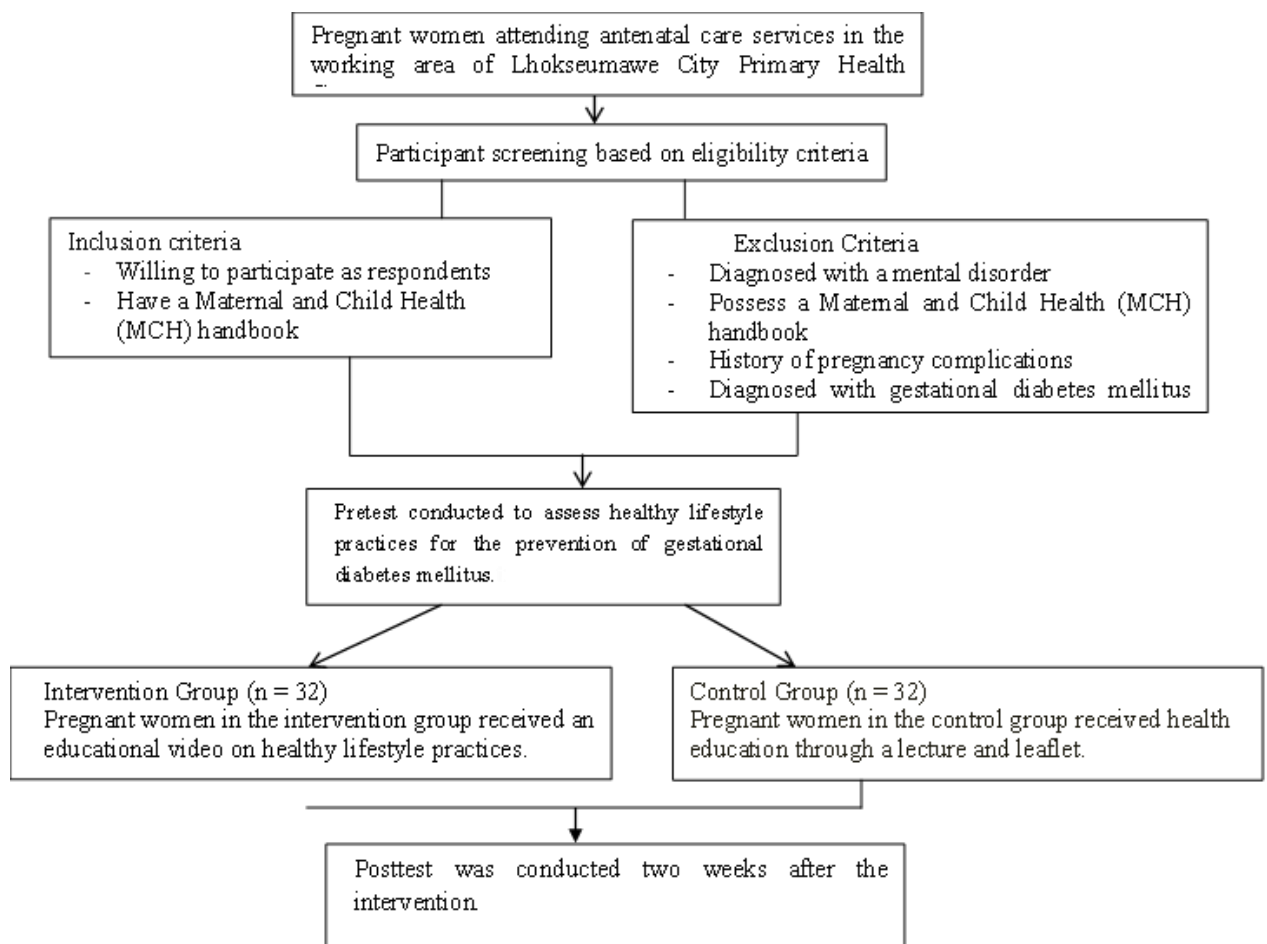


Figure 1. Research Flow

DISCUSSION

Demographic Characteristics of Pregnant Women

The characteristics of pregnant women in the intervention and control groups were relatively similar, indicating comparability between the study populations. As presented in Table 1, the majority of respondents were within a healthy reproductive age range, had a secondary-level education, were mostly housewives, and their husbands generally worked in the informal sector.

Table 1. Demographic Characteristics of Pregnant Women Attending Antenatal Care

Characteristic	Intervention	Control
	n (%)	n (%)
Maternal Age		
20-35 years	25 (78.1)	17 (53)
<20 or > 35 years	7 (21.9)	15 (47)
Maternal Education		
Higher	8 (25)	9 (28.1)
Secondary	19 (59.4)	21 (65.6)
Basic	5 (15.6)	2 (6.2)
Husband's Education		
Higher	9 (28.1)	8 (25.0)
Secondary	17 (53.1)	22 (68.8)
Basic	6 (18.8)	2 (6.2)
Maternal Occupation		
Housewife	30 (93.8)	27 (84.4)
Civil servant	1 (3.1)	3 (9.4)
Private employee	1 (3.1)	2 (6.3)
Farmer/trader/fisherman	0 (0)	0 (0)
Husband's Occupation		
Self-employed	18 (56.3)	5 (15.6)
Civil servant	2 (6.3)	4 (12.5)
Private employee	2 (6.3)	4 (12.5)
Farmer/trader/fisherman	8 (25)	19 (59.4)
Gravida		
Primigravida	7 (21.9)	14 (43.8)
Multigravida	22 (68.8)	16 (50)
Grandemultigravida	3 (9.4)	2 (6.3)
Parity		
Nullipara	5 (7.8)	5 (15.6)
Primipara	15 (23.4)	22 (68.8)
Multipara	11 (17.2)	5 (15.6)
Grandemultipara	1 (1.6)	
History of Contraceptive Use		
Yes	13 (40.6)	25 (78.1)
No	19 (59.4)	7 (21.9)

Source of Information about GDM Health worker		
Social media	18 (56.2)	20 (62,5)
Community health cadre	11 (34.4)	5 (15.6)
	3 (9.4)	7 (21.9)
History of Diabetes Mellitus		
Ya	1 (3.1)	3 (9.4)
Tidak	31 (96.9)	29 (90,6)
History of Blood Glucose Screening		
Ya	14 (43.8)	23 (71.9)
Tidak	18 (56.3)	9 (28.1)
Family History of Diabetes Mellitus		
Ya	10 (31.2)	7 (21.9)
Tidak	22 (68,8)	25 (78.1)
Medical History of Hypertension		
Ya	6 (18.8)	1 (3.1)
Tidak	26 (81.3)	31 (96.9)
Fetal Macrosomia		
Ya	0(0)	2 (6.3)
Tidak	32 (100)	30 (93,7)
BMI		
Underweight	1 (3.1)	0
Normal	19 (59.4)	12 (37.5)
Overweight	5 (15.6)	9 (28.1)
Obese	7 (21.9)	11 (34.4)

Table 1 presents the baseline characteristics of respondents in the intervention and control groups. Most participants in the intervention group were aged 20–35 years (78.1%), whereas the control group showed a more balanced age distribution. In both groups, secondary education was the predominant educational level for both mothers and husbands, and most mothers were housewives. Self-employment was the most common occupation among husbands in the intervention group (56.3%), while farming, trading, and fishing predominated in the control group (59.4%). The intervention group included a higher proportion of multigravida and multipara women. Previous contraceptive use and prior blood glucose screening were more common in the control group, whereas health workers were the primary source of information on Gestational Diabetes Mellitus (GDM) in both groups. A personal history of diabetes mellitus was uncommon in both groups..

Tabel 2. Variabel Penelitian

Variabel	Intervention	Control
	n (%)	n (%)
Knowledge about GDM		
Good	19 (59.4)	15 (46.9)
Poor	13 (40.6)	17 (53.1)
Awareness of GDM Screening and Treatment		
Good	14 (43.8)	8 (25)
Poor	18 (56.3)	24 (75)
Awareness of GDM Consequences		
Good	13 (40.6)	13 (40.6)
Poor	19 (59.4)	19 (59.4)
Implementation of a Healthy Diet for Diabetes Prevention		
Good	13 (40.6)	20 (62.5)
Poor	19 (59.4)	12 (37.5)
Physical Activity		
Often	16 (50)	18 (56.3)
Rarely	16 (50)	14 (43.8)
Weight Control and Health Monitoring		
Often	15 (46.9)	16 (50)
Rarely	17 (53.1)	16 (50)
Stress Management and Social Support		
Good	18 (56.3)	22 (68.8)
Poor	14 (43.8)	10 (31.3)
Adherence to Implementing a Healthy Lifestyle		
Adherent	21 (65.6)	15 (46.9)
Non-adherent	11 (34.4)	17 (53.1)

Table 2 summarizes respondents' knowledge, awareness, and healthy lifestyle practices related to Gestational Diabetes Mellitus (GDM). The intervention group showed higher proportions of good knowledge about GDM, awareness of GDM screening and treatment, and adherence to a healthy lifestyle than the control group. Awareness of GDM consequences was similar in both groups. In contrast, the control group demonstrated higher proportions of good healthy dietary practices, frequent physical activity, and good stress management and social support, while weight control and health monitoring were comparable between groups.

Table 3. Shapiro-Wilk Normality Test Results

Group	Variable	Test Statistic	p-value
Intervention	Pretest Healthy Lifestyle Implementation	0.973	0.587
	Posttest Healthy Lifestyle Implementation	0.916	0.016
Control	Pretest Healthy Lifestyle Implementation	0.965	0.370
	Posttest Healthy Lifestyle Implementation	0.938	0.067

The normality of the data in each group was then assessed using the Shapiro-Wilk test. The results showed that the data in both groups were not normally distributed (p -value < 0.05). Therefore, the effect of the educational video intervention on the implementation of a healthy lifestyle for the prevention of gestational diabetes mellitus was analyzed using the Wilcoxon signed-rank test.

Table 4. Wilcoxon Signed Ranks Test Results for Pretest and Posttest in the Intervention and Control Groups

Group	n	Z	p-value
Intervention	32	-4.948	0.001
Control	32	-4.949	0.001

The Wilcoxon Signed Ranks test results showed a significant increase in healthy lifestyle implementation scores between pretest and posttest in both the intervention group ($Z = -4.948$; $p < 0.001$) and the control group ($Z = -4.949$; $p < 0.001$). Next, the Mann-Whitney U test was performed to assess the difference between the two groups.

Table 5. Mann-Whitney U Test Results Comparing the Intervention and Control Groups

Group	n	Mean Rank	Sum of Ranks	p-value
Intervention	32	34.17	1093.50	0.000
Control	32	25.82	986.50	
Total	64			

The Mann-Whitney U test results showed that the intervention group's posttest score had a higher mean rank (34.17) than the control group (25.83), and this difference was statistically significant ($p < 0.001$), indicating that the intervention had a significant effect

on the implementation of a healthy lifestyle as a measure for preventing gestational diabetes mellitus.

The Effect of Educational Video on the Implementation of a Healthy Lifestyle for the Prevention of Gestational Diabetes in Pregnant Women

This study aimed to analyze the effect of providing educational videos on the implementation of a healthy lifestyle as a measure to prevent gestational diabetes mellitus (GDM) among pregnant women. The Wilcoxon Signed Ranks test results showed that both the intervention and control groups experienced a significant increase in healthy lifestyle implementation scores between pretest and posttest. However, the Mann-Whitney U test results showed that the increase in the intervention group was significantly greater than in the control group. This finding indicates that providing educational videos made a meaningful additional contribution to changing pregnant women's behavior, beyond the effect of time or the standard information exposure also received by the control group.

The increase in scores that occurred in both groups is consistent with the view that health education in any form contributes to improving public health behavior in general. The control group in this study still received routine antenatal care that included health counseling, so it is reasonable that an increase occurred even without the video intervention. This is also consistent with the findings of (Elizar et al., 2025, 2026) who compared leaflet media with the lecture method and found that both conventional education methods were still able to improve pregnant women's knowledge about GDM, albeit with different magnitudes of increase between the media.

A more substantial difference was instead seen in the comparison between groups, where the group that received the educational video showed an increase in healthy lifestyle implementation of a much greater magnitude. This finding reinforces evidence from (Angelin Lavanya & Krishnaveni M, 2020) which showed that a video teaching programme was effective in improving GDM prevention among pregnant women compared with a conventional educational approach. The effectiveness of video as an educational medium is also supported by (Maharjan et al., 2022) who demonstrated that a socio-culturally adapted educational video significantly improved maternal and newborn health knowledge in a rural Nepalese community. The advantage of video lies in its ability to deliver information audiovisually, in a way that can be repeated and is easier for pregnant women with various educational backgrounds to understand, compared with print media or one-directional lectures.

The greater behavior change in the intervention group can also be explained through the Health Belief Model framework, as found by (Desoky et al., 2022), who showed that an education package designed based on the health belief model was able to improve the lifestyle of women with gestational diabetes. The educational video in this study likely not only increased knowledge but also shaped perceptions of GDM risk and its susceptibility and severity, thereby encouraging pregnant women to more consistently adopt a healthy diet, engage in physical activity, and monitor weight. This is consistent with the better implementation of a healthy diet in the intervention group compared with the control group, as shown in the research variable results.

It should also be noted that the quality of educational video content greatly determines the success of the intervention. (Birch et al., 2022) found that not all educational videos about GDM circulating on online platforms have adequate content quality and accuracy. Therefore, the success of the educational video in this study is presumed to be inseparable from a standardized content-development process based on clinical guidelines, so that the information received by pregnant women aligned with the GDM prevention and management standards recommended by (Association, 2024) and the Indonesian Society of Endocrinology (PERKENI, 2021).

The importance of lifestyle-based interventions in GDM prevention is also reinforced by (Lin et al., 2020) who showed that lifestyle interventions in high-risk pregnant women were able to reduce the incidence of GDM and improve maternal outcomes. Similarly (Rasmussen et al., 2020) emphasized that dietary and lifestyle regulation are key components of GDM management. The findings of this study complement existing evidence by showing that educational videos can be an effective and efficient medium for promoting the adoption of such a healthy lifestyle, particularly at the prevention stage before GDM occurs.

The characteristics of respondents in this study also provide important context for the results obtained. The proportion of pregnant women with a family history of diabetes, excess body mass index, and varying history of contraceptive use between the intervention and control groups is consistent with the GDM risk factors identified by (Kouhkan, Ph, et al., 2021) and (Sweeting et al., 2024) namely age, parity, family history, and body mass index as key determinants of GDM risk. (Kautzky-Willer et al., 2023)) also emphasize that early detection and lifestyle modification in high-risk groups are the most effective prevention strategy, which is relevant to the educational video's target in this study.

From a local public health perspective, this finding is also relevant to conditions in Aceh Province, where non-communicable diseases, including diabetes, remain a health challenge for pregnant women (Hanif et al, 2023). The low level of screening awareness and knowledge about GDM among most respondents in this study is also consistent with the findings of (Dissassa et al., 2023) in Ethiopia and (Thomas et al., 2020) In India, both of which reported that pregnant women's knowledge of GDM remains relatively low in various developing countries. This underscores the importance of easily accessible, replicable educational interventions, such as videos, particularly in areas with limited access to health workers.

Although the results of this study demonstrate the effectiveness of educational videos, several limitations should be considered. The implementation of a healthy lifestyle in this study was measured based on self-report, which is potentially subject to social desirability bias. The study by (Subarto et al., 2022) reminds us that a mother's experience in managing GDM is greatly influenced by family and health-worker support, factors that were not measured in depth in this study. Future research should consider integrating educational videos with other digital-technology-based approaches, such as mHealth coaching, as developed by (O'Reilly et al., 2021) (Rollo et al., 2020) an eHealth lifestyle program for women with a history of gestational diabetes could be a further development to strengthen the sustainability of behavior change after the intervention period ends. A multicomponent approach combining education, dietary monitoring, and social support, as proposed in the gut-healthy diet intervention protocol by (Meloncelli et al., 2023) may also have the potential to yield better results than a single video-based intervention.

Overall, the results of this study provide empirical evidence that educational video is an effective medium for improving the implementation of healthy lifestyle practices among pregnant women as a measure to prevent gestational diabetes. These findings reinforce the recommendations of various guidelines and previous studies that targeted, accessible, evidence-based health education needs to be routinely integrated into antenatal care to reduce the risk of GDM and its complications for both mother and baby.

CONCLUSION

This study concludes that educational video is significantly more effective than conventional education in improving the implementation of healthy lifestyle practices among pregnant women as a measure to prevent gestational diabetes mellitus. Although both

groups showed improvement after the intervention, the increase in the educational-video group was greater, indicating that this medium is more effective in encouraging healthy behavior change among pregnant women

Implication

These findings indicate that educational videos could potentially be integrated into antenatal health education programs, as they are more practical, easier to understand, and can be accessed repeatedly by pregnant women. To be effective, the content needs to be developed in accordance with applicable clinical guidelines so that it can support improved knowledge and the implementation of a healthy lifestyle as a measure for preventing gestational diabetes mellitus. Future research is recommended to develop educational videos combined with digital technologies, such as mHealth or telehealth, to support the sustainability of behavior change.

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