



The effect of nutrition education using animated video and leaflet media on sugar-sweetened beverage consumption among adolescents

Sarah Mardiyah*, Annisa Nursita Angesti, Kartika Wandini

Department of Nutrition, Faculty of Health, Universitas Mohammad Husni Thamrin,
Jalan Raya Pondok Gede No. 23-25 Kramat Jati, Jakarta Timur 13550, Indonesia

*Correspondence : sarahmardiyah@gmail.com

ABSTRAK

Latar Belakang: Tingginya minuman manis yang beredar di kalangan remaja, mencerminkan tren konsumsi yang semakin meningkat dan mengkhawatirkan. Konsumsi minuman manis di kalangan remaja tidak hanya berdampak pada kesehatan individu, tetapi juga berpotensi menyebabkan masalah kesehatan masyarakat jangka panjang. Upaya edukasi menjadi langkah penting untuk menekan konsumsi minuman berpemanis, terutama di kalangan remaja. Media video animasi dan leaflet merupakan media pembelajaran yang cukup sering digunakan dan efektif untuk penyampaian informasi, sehingga diharapkan memiliki pengaruh yang signifikan terhadap perubahan konsumsi pada remaja.

Tujuan: Penelitian ini bertujuan untuk mengetahui pengaruh edukasi gizi dengan media video animasi dan leaflet terhadap konsumsi minuman berpemanis pada remaja.

Metode: Penelitian ini menggunakan desain quasi experimental with pre-posttest design. Sampel dibagi menjadi dua kelompok yaitu kelompok yang diberikan edukasi gizi dengan media video animasi dan yang dengan media leaflet. Masing-masing kelompok berjumlah 30 responden. Data konsumsi minuman berpemanis diketahui dengan menggunakan Food Frequency Questionnaire.

Hasil: Terdapat pengaruh pemberian edukasi gizi menggunakan media leaflet terhadap peningkatan pengetahuan tentang minuman berpemanis ($p=0,002$), sedangkan pada kelompok media video animasi peningkatan tidak signifikan ($p=0,067$). Terdapat pengaruh pemberian edukasi gizi baik dengan media video animasi ($p=0,000$) maupun leaflet ($p=0,002$) terhadap penurunan frekuensi konsumsi minuman berpemanis. Terdapat pengaruh pemberian edukasi gizi baik dengan media video animasi ($p=0,000$) maupun leaflet ($p=0,001$) terhadap volume konsumsi minuman berpemanis.

Kesimpulan: Edukasi gizi menggunakan media leaflet terbukti lebih efektif dibandingkan video animasi dalam meningkatkan pengetahuan tentang minuman berpemanis. Pemberian edukasi gizi baik dengan media video animasi maupun leaflet mampu menurunkan frekuensi dan volume konsumsi minuman berpemanis secara signifikan.

KATA KUNCI: edukasi gizi; leaflet; minuman berpemanis; remaja; video animasi



ABSTRACT

Background: The high prevalence of sugary drinks consumed among adolescents reflects an increasing and concerning trend. The consumption of sugary drinks among adolescents not only impacts individual health but also poses the risk of long-term public health problems. Nutrition education is an important effort to reduce the consumption of sugar-sweetened beverages, particularly among adolescents. Animated videos and leaflets are widely used and effective educational media for delivering information and are therefore expected to significantly influence changes in adolescents' consumption behavior.

Objectives: This study aimed to determine the effect of nutrition education using animated video and leaflet media on adolescents' consumption of sugar-sweetened beverages.

Methods: This study applied a quasi-experimental design using pre–posttest. The sample was divided into two groups: one received nutrition education via animated video and the other via leaflet. Each group consisted of 30 respondents. Data on the consumption of sugar-sweetened beverages were collected using the Food Frequency Questionnaire (FFQ).

Results: Nutrition education using leaflet media significantly increased knowledge about sugar-sweetened beverages ($p=0.002$), whereas the animated video group showed no significant improvement ($p=0.067$). Both animated video ($p=0.000$) and leaflet ($p=0.002$) interventions significantly reduced the frequency of sugar-sweetened beverage consumption. Additionally, both animated video ($p=0.000$) and leaflet ($p=0.001$) interventions significantly decreased the volume of sugar-sweetened beverage consumption.

Conclusions: Nutrition education using leaflets proved more effective than animated videos in improving knowledge about sugar-sweetened beverages. However, both animated video and leaflet media effectively reduced the frequency and volume of sugar-sweetened beverage consumption among adolescents.

KEYWORDS: adolescents; animated video; leaflet; nutrition education; sugar-sweetened beverages

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INTRODUCTION

In recent years, the consumption of modern sugar-sweetened beverages (SSBs) has become increasingly popular among adolescents and school-aged children in Indonesia. Prior to the year 2000, packaged sweet drinks were limited to products such as soda, sweetened tea, juice, milk, and fermented milk beverages. Today, however,

the market has expanded to include sweetened coffee, flavored water, energy drinks, honey-based beverages, bubble tea, and powdered drinks (1). The widespread availability of these products, combined with diverse flavors, attractive branding, and affordable prices, has fueled a sharp rise in adolescent consumption. This trend is concerning, as excessive SSB intake is

strongly associated with obesity, type 2 diabetes mellitus, cardiovascular diseases, and certain cancers (2). The growing enthusiasm for SSBs is reflected in national consumption patterns.

Reports from the Center for Indonesia Strategic Development Initiatives (CISDI) indicate that SSB consumption in Indonesia increased 15-fold between 1996 and 2014, from 51 million liters to 780 million liters (3). In 2015, Indonesia ranked third among ASEAN countries in per capita SSB consumption (20.23 liters per person), after Singapore (76.32 liters) and Thailand (59.81 liters). Further analysis of 32 cities showed that packaged tea was the most frequently consumed SSB in 2016 (4,5). A more recent survey conducted by the Indonesian Consumers Foundation (YLKI) in 2023 revealed that 25.9% of children under 17 years consumed SSBs daily, while 31.6% consumed them two to six times per week.

Nutrition education has thus become an important strategy to reduce SSB consumption, particularly among adolescents who may be unaware of the associated health risks. Evidence suggests that the ability to interpret food and beverage labels such as sugar, calorie, and additive content plays a critical role in shaping consumption patterns, enabling adolescents to make healthier choices (6). Among various approaches, animated video media can deliver health information in an engaging and interactive way, making complex messages easier to understand and recall. Characters within

animations can also serve as role models, encouraging adolescents to adopt healthier choices such as drinking water or natural fruit juice (7,8). Similarly, leaflets represent a cost-effective medium, offering concise and targeted information that can be accessed repeatedly. When designed with simple language and appealing visuals, leaflets can effectively support adolescent learning and reinforce healthy behaviors (9).

Both animated videos and leaflets present unique advantages in health education. However, to date, no study has specifically investigated the comparative effects of these two media on adolescent SSB consumption. Previous studies have examined the effectiveness of different educational media, but with a focus on other topics such as general nutrition knowledge or healthy eating behaviors. Therefore, this study seeks to address this research gap by evaluating the impact of nutrition education using animated videos and leaflets on adolescents' SSB consumption. Given the serious health risks posed by excessive SSB intake, this research provides timely and relevant evidence to support adolescent health promotion.

MATERIALS AND METHODS

This study was conducted from May to June 2025 at Muhammadiyah Senior High School, Cileungsi, Bogor Regency, West Java. A quantitative approach was applied using a quasi-experimental design with a pre–posttest. The participants were divided

into two groups: one group received nutrition education through animated video media on sugar-sweetened beverages (SSBs), while the other group received nutrition education through leaflet media. The study population comprised all eleventh-grade students of Muhammadiyah Senior High School, Cileungsi, while the sample consisted of students who met the inclusion and exclusion criteria. The inclusion criteria were: (1) active eleventh-grade students enrolled in the school and (2) willingness to participate by signing informed consent. The exclusion criterion was failure to complete the entire study process.

A total of 60 students were recruited using a total sampling technique, with 30 students in the animated video group (class XI B2) and 30 in the leaflet group (class XI A2). In experimental or quasi-experimental research with two groups, a minimum of 30 respondents per group (a total of 60) meets the statistical, logistical, and methodological requirements. Therefore, it is considered adequate to fulfill the assumption of normal distribution and ensure good statistical test power (10,11). Data collection involved four trained enumerators with a background in nutrition science.

The instruments used included: (1) a knowledge questionnaire to assess students' understanding of SSBs, were developed based on the Indonesian Pedoman Gizi Seimbang and previous studies on sugar-sweetened beverages (SSBs). The knowledge questionnaire consisted of 15 multiple-choice items that were evaluated by

nutrition experts, covering the definition, types, and health impacts of SSBs, as well as recommended sugar intake, label reading, and healthier drink alternatives. The questionnaire underwent validity and reliability testing prior to data collection.

Knowledge data were collected by gathering respondents in a classroom and providing them with a Google Form link to complete; (2) a Semi-Quantitative Food Frequency Questionnaire (SQ-FFQ) to measure SSB consumption, covering 133 types/brands of SSBs identified in a preliminary survey, with a recall period of the last three weeks; and (3) animated videos and leaflets as educational media. Three videos and three leaflets were used: the first video and leaflet explained definitions and types of SSBs, the second described the health impacts of SSB consumption, and the third presented information on recommended sugar intake, how to read nutrition labels, and healthier drink alternatives. Each video lasted 4–5 minutes and was played three times during each session.

The animated video and leaflet were developed through a systematic process that began with identifying the target audience, learning objectives, and content requirements relevant to the study. A narration script was then designed for the video, and the leaflet layout was created. The video was produced using Canva and CapCut, incorporating narration, background music, and simple animations to enhance engagement. The leaflet was developed using Canva, featuring

colorful illustrations and clear typography to improve readability and visual appeal. Both media were subsequently validated by experts

in nutrition and health education, followed by a feasibility test. The following illustrates the flow of the study (Figure 1).

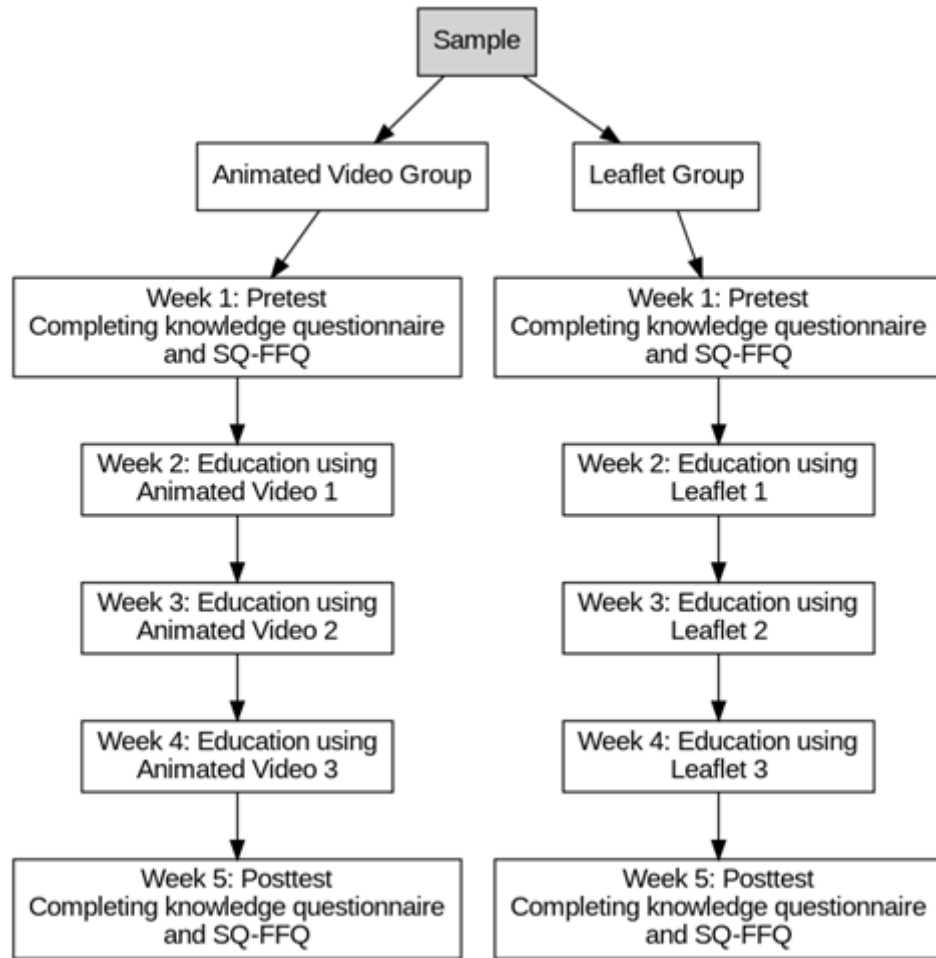


Figure 1. The research flow



Figure 2. (a) Video; (b) Leaflet

Prior to the intervention, a media feasibility test was conducted on May 14, 2025. The feasibility test was conducted on 28 tenth-grade students who were not included in the main study sample. The inclusion criteria were: (1) active students enrolled at Muhammadiyah Senior High School, Cileungsi; (2) willing to participate voluntarily in the feasibility test; and (3) able to understand and provide feedback on the educational media (animated videos and leaflets). Students who were absent during the feasibility session were excluded. Participants were asked to view the three videos and read the three leaflets, then complete an online feasibility questionnaire assessing color, text, images, audio, and content using a four-point Likert scale (1 = strongly disagree to 4 = strongly agree). The results indicated that both media were highly feasible for use in the study. Data analysis was performed using the Wilcoxon test to examine pre–post changes in consumption within groups, and the Mann–Whitney test to compare mean differences between groups. This analysis was performed using SPSS software. This study was accompanied by a Participant Information Sheet and an Informed Consent Form to ensure that participants received adequate information and voluntarily agreed to take part in the research. Ethical approval was obtained from the Health Research Ethics Committee of

Universitas Muhammadiyah Purwokerto (No. KEPK/UMP/195/2025).

RESULTS AND DISCUSSIONS

A total of 60 students participated in this study, consisting of 30 students who received nutrition education through animated video media and 30 students who received nutrition education through leaflet media. The respondents' characteristics included gender, father's education, mother's education, and nutritional status.

Referring to **Table 1**, it can be concluded that the gender distribution was relatively balanced in both groups, with a predominance of females (56.7% in the animated video group and 63.3% in the leaflet group). This indicates that most respondents were adolescent girls. The majority of respondents in the animated video group were aged 17 years (76.7%), while the leaflet group showed more variation, although 17 years still predominated (63.3%). There were no 18-year-old respondents in the animated video group, whereas in the leaflet group there were 3.3%. The results of the statistical tests (Independent t-test) showed that there were no statistically significant differences between the animated video group and the leaflet group in terms of sex, age, parents' education, and nutritional status ($p > 0.05$ for all variables).

Table 1. Characteristics of participants

Characteristic	Animated Video Group		Leaflet Group	
	n	%	n	%
Sex				
Male	13	43.30	11	36.70
Female	17	56.70	19	63.30
Age				
16 years	7	23.30	10	33.30
17 years	23	76.70	19	63.30
18 years	0	0	1	3.30
Mother's Education				
Junior High School/Equivalent	4	13.30	5	16.70
Senior High School/equivalent	14	46.70	18	60
Academy/University	12	40	7	23.30
Father's Education				
Elementary/Equivalent	0	0	2	6.70
Junior High School/Equivalent	0	0	2	6.70
Senior High School/equivalent	14	46.70	13	43.30
Academy/University	16	53.30	13	43.30
Nutritional Status				
Underweight	0	0	1	3.30
Normal	19	63.30	26	86.70
Overweight	6	20	1	3.30
Obese	5	16.70	2	6.70

Most mothers of respondents had completed secondary education (senior high school or equivalent), i.e., 46.7% in the animated video group and 60.0% in the leaflet group. The proportion of mothers with higher education (academy/university) was higher in the animated video group (40.0%) compared to the leaflet group (23.3%). Fathers generally had secondary to higher education, with most in the animated video group graduating from academy/university (53.3%). In the leaflet

group, the proportion of fathers' education was equal between high school (43.3%) and academy/university (43.3%). Overall, most respondents had good nutritional status. However, good nutrition was more prevalent in the leaflet group (86.7%) compared to the animated video group (63.3%). The animated video group had higher proportions of overweight (20.0%) and obesity (16.7%) compared to the leaflet group (3.3% and 6.7%, respectively).

Table 2. Differences in mean scores of knowledge, frequency, and volume of Sugar-Sweetened Beverage (SSB) consumption before and after education

Variables	Animated Video Group (n=30)	Leaflet Group (n=30)
	Mean ± SD	Mean ± SD
Knowledge		
Before	80.97 ± 13.04	74.29 ± 16.63
After	86.42 ± 11.34	85.96 ± 12.1
<i>P-value</i>	0.07	0.00*
Frequency of Consumption/Day		
Before	2.32 ± 3.71	3.18 ± 2.16
After	0.88 ± 1.05	2.16 ± 2.06
<i>P-value</i>	0.00*	0.00*
Volume of Consumption/Day (ml)		
Before	568.51 ± 1014.02	982.09 ± 437.59
After	208.53 ± 247.24	437.59 ± 388.94
<i>P-value</i>	0.00*	0.00*

*Statistically significant ($p < 0.05$)

Referring to **Table 2**, for the knowledge variable, the animated video group showed $p > 0.05$, indicating no significant difference in knowledge scores before and after education. However, there was a tendency for an increase in the average score. In contrast, the leaflet group showed $p < 0.05$, indicating a significant improvement in knowledge after education. Thus, nutrition education using leaflet media significantly increased knowledge. For the frequency of SSB consumption per day, both the animated video

group ($p < 0.05$) and the leaflet group ($p < 0.05$) showed significant reductions after education. Therefore, nutrition education using either animated videos or leaflets significantly reduced SSB consumption frequency.

For the volume of SSB consumption per day, both groups also showed significant reductions ($p < 0.05$). Thus, nutrition education with either animated videos or leaflets effectively reduced the volume of SSB consumption.

Table 3. Differences in knowledge, frequency, and volume of SSB consumption between animated video and leaflet groups

Variables	Animated Video Group Mean ± SD	Leaflet Group Mean ± SD	P-value
Knowledge	86.42 ± 11.34	85.96 ± 12.10	0.96
Frequency	0.88 ± 1.049	2.16 ± 2.06	0.00*
Volume (ml)	208.53 ± 247.24	437.59 ± 388.94	0.00*

*Statistically significant ($p < 0.05$)

Based on **Table 3**, for knowledge variable, $p > 0.05$, indicating no significant difference between groups after education. This means both groups reached a relatively similar level of knowledge. For frequency, $p < 0.05$, indicating significant differences between the groups. This difference suggests that education using animated videos has a stronger impact on reducing consumption frequency compared to leaflets. For volume, $p < 0.05$, also indicating significant differences, where animated videos were more effective in reducing SSB consumption volume compared to leaflets.

The effect of nutrition education using animated videos and leaflets on knowledge

Improving adolescents' knowledge is a key objective of school health education programs. According to Notoatmodjo (2020), adequate knowledge forms the foundation for healthy attitudes and behaviors. Print media such as leaflets and audiovisual media such as animated videos are often used to support educational processes (12).

Choosing the appropriate medium is crucial, as each has its strengths and limitations (13). Leaflets provide practicality, portability, and flexibility for repeated reading. In contrast, animated videos offer visual and auditory elements that capture attention and explain concepts in a more engaging and interactive way (14). However, the effectiveness of these media can vary depending on the characteristics of the target audience, the type of material, and the context

in which the education is delivered (15).

The results showed an increase in knowledge scores in both intervention groups, with the animated video group demonstrating an average increase of 5.45 points and the leaflet group an average increase of 11.67 points. However, in the animated video group, the increase was not statistically significant, indicating that the intervention did not produce a sufficiently strong effect in improving adolescents' knowledge. In contrast, the leaflet group showed a statistically significant improvement, suggesting that the leaflet intervention had a strong and meaningful effect on enhancing adolescents' knowledge.

This result may be attributed to the characteristics of audiovisual learning and the cognitive processing capacity of adolescents. Although animated videos are engaging and visually appealing, their effectiveness in increasing knowledge depends on the amount of information that can be retained during a short viewing period. Furthermore, the video intervention in this study was presented only a few times without repetition or review opportunities, whereas leaflets allowed participants to read repeatedly and process the information at their own pace. Printed materials are often more effective for improving declarative knowledge, while videos are better at influencing attitudes and behaviors.

Therefore, although the animated video successfully increased attention and motivation, its short duration and limited exposure likely resulted in a weaker impact on

measurable knowledge improvement compared to the leaflet medium (16). This finding aligns with prior studies Kasman et al. (2020) and Ardiansyah (2016) showing that leaflets were more effective than videos in increasing adolescent knowledge about smoking hazards (17, 18). The difference in the level of significance between the interventions using animated video and leaflet media may be attributed to several factors, including the baseline scores of each group and information retention. At the pretest, the leaflet group had a lower mean knowledge score (74.29) compared to the animated video group (80.97). However, the results showed no significant difference in the posttest mean knowledge scores between the animated video group (85.96) and the leaflet group (86.42), indicating that the knowledge levels of both groups were relatively similar after the education. These findings explain why the increase in the mean score was greater in the leaflet group than in the animated video group.

Leaflets allow readers to review the material repeatedly as needed, thereby facilitating comprehension and enabling them to process information at their own pace. This process supports the development of long-term memory (19). In contrast, animated videos have a limited duration and require full concentration during playback. If the information is delivered too densely and rapidly, its effectiveness is limited to the viewing period, and information retention decreases without opportunities for repeated access.

According to Ebbinghaus's forgetting curve theory, without repetition or re-exposure to the material, most information will be quickly forgotten, particularly within the first 24 hours (20, 21). A video shown only once may therefore lead to decreased information retention, as respondents are unable to revisit the content as needed. Conversely, leaflets as printed media can be accessed repeatedly, making it easier for respondents to process and retain information.

The effect of nutrition education using animated videos and leaflets on the frequency of SSB consumption

One of the most evident indicators of successful health education is behavioral change. Health and nutrition education enhances individuals' knowledge and understanding, which in turn fosters positive attitudes and promotes healthier behaviors (22). Based on interviews using the Food Frequency Questionnaire (FFQ), prior to the intervention, respondents in the animated video group had an average frequency of sugar-sweetened beverage (SSB) consumption of 2.32 times per day, while the leaflet group consumed more frequently at 3.18 times per day. Following three weekly educational sessions covering different topics (week 1: definition and types of SSBs; week 2: health impacts of SSB consumption; week 3: recommended sugar intake, how to read nutrition labels, and healthy beverage alternatives), respondents were re-interviewed using the FFQ.

The post-intervention results showed a significant reduction in consumption frequency in both groups. After the education, the animated video group reported a mean frequency of 0.88 times per day, while the leaflet group decreased to 2.16 times per day. The reduction was more pronounced in the animated video group, with 26 respondents reporting a decrease compared to 24 respondents in the leaflet group. Bivariate analysis indicated $p < 0.05$, confirming significant differences between pre- and post-intervention in both groups. Therefore, it can be concluded that nutrition education using both animated video and leaflet media had a significant effect on reducing the frequency of SSB consumption.

Animated videos can be designed to suit the target audience—in this study, adolescents by incorporating engaging and interactive visuals, simple language, and appropriate pacing and intonation, thereby making them effective in delivering health information and messages. In contrast, leaflets are a practical medium that can be read repeatedly and carried anywhere, enabling respondents to better understand and recall the content. These findings are consistent with Atilah et al. (2019), who reported that exposure to both video and leaflet (warning labels) significantly reduced intentions to consume fast food and soft drinks (23).

The between group comparison also showed a $p < 0.05$, indicating a significant difference in the frequency of sugar-

sweetened beverage consumption between the animated video and leaflet groups. This finding suggests that animated video education was more effective than leaflet education in reducing consumption frequency. Similar results were reported by Yuliasih et al. (2025), who found significant differences in reproductive health attitudes and practices, with higher scores in the video group compared to the e-leaflet group ($p < 0.001$) (24). Animated videos combine both audio and visual elements, engaging two senses simultaneously, which enhances understanding and memory retention. As a result, the retention of health messages tends to be stronger than with leaflet media (25, 26). Videos with appealing visuals make it easier for viewers to absorb health messages, which may stimulate intentions to adopt healthier behaviors, such as choosing water instead of sugary drinks. Research has also shown that the use of narratives is more effective in improving positive attitudes and intentions to practice healthy behaviors compared with media that present information in a straightforward manner, such as leaflets (27).

The results demonstrated that the animated video intervention effectively reduced the frequency and volume of sugar-sweetened beverage (SSB) consumption, although it did not produce a significant increase in participants' knowledge scores. This outcome may be attributed to the characteristics of audiovisual learning and the mechanisms underlying behavior change. Animated videos are inherently more

emotionally engaging and persuasive, activating affective and motivational pathways rather than relying solely on cognitive processing (27). Thus, even without a measurable improvement in factual knowledge, the visual and narrative components of the video may have influenced participants' attitudes and intentions, leading to observable behavioral changes.

Moradi and Zihagh (2022) and Mayer (2024), further emphasize that audiovisual materials convey messages through both verbal and non-verbal channels, thereby enhancing persuasiveness and emotional resonance. When information is presented in an appealing visual format combined with storytelling elements, it can effectively stimulate motivation for behavioral modification, even in the absence of substantial cognitive gains (16, 28).

The effect of nutrition education using animated videos and leaflets on the volume of SSB consumption

In general, producers of SSBs target adolescents in their marketing strategies due to the transitional phase from childhood to adulthood, during which adolescents tend to follow prevailing social trends, such as the consumption of newly popular SSBs. Adolescents also spend most of their time at school with peers, making peer influence and media exposure significant factors associated with SSB consumption (29). Easy access to food and beverages around schools further increases the likelihood of unhealthy snacking,

supported by students' pocket money (30).

In this study, education was delivered in three consecutive weekly sessions. This staged and repeated education was effective in reducing SSB consumption. The results showed that both animated video and leaflet media reduced the volume of SSB intake. In the animated video group, the mean reduction was 359.98 ml, decreasing from 568.51 ml to 208.53 ml. In the leaflet group, the reduction was larger at 544.5 ml, decreasing from 982.09 ml to 437.59 ml.

Animated videos are often used in student learning because they are considered capable of presenting objects and events more meaningfully, making them easier to understand. Audiovisual media have been shown to increase interest and motivation, thereby improving independence and facilitating changes in knowledge, attitudes, and behavior. Similarly, leaflets are also effective as they present messages systematically, concisely, and clearly through both text and visuals. Leaflets are particularly effective because they can be read repeatedly (31).

An experimental study in Shanghai, China, involving children and adolescents also demonstrated a decrease in SSB consumption in both intervention and control groups after a one-year educational program. The intervention group reduced their mean SSB intake from 286 ml/day to 220.9 ml/day, while the control group decreased from 286 ml/day to 254.4 ml/day. This reduction was observed among both male and female students. SSB

consumption was measured using a semi-quantitative FFQ that included carbonated beverages, sweetened fruit and vegetable juices, protein drinks, probiotic drinks, sweetened milk, sweetened tea and coffee, and milk tea, which are popular in China. The study reported a significant effect in the intervention group ($p = 0.034$), with a mean decrease of 35 ml/day after adjusting for age, sex, and grade level (32). Although families play a central role in shaping healthy lifestyles, schools are equally important as students spend most of their time there. Schools provide an ideal environment for promoting healthy eating habits regardless of age, socioeconomic status, culture, or ethnicity. A systematic review of school-based interventions, including educational/behavioral, legislative/environmental, and combined approaches, showed significant reductions in SSB consumption. Educational/behavioral interventions alone reduced SSB intake by 65%, while combined interventions reduced intake by 66.7%. Legislative/environmental interventions achieved the highest success rate, at 90% (33).

CONCLUSIONS AND RECOMMENDATIONS

There was a significant effect of nutrition education using leaflet media on improving knowledge about sugar-sweetened beverages, whereas the improvement in the animated video group was not significant. Nutrition education delivered through both animated videos and leaflets had a significant

effect on reducing the frequency and volume of sugar-sweetened beverage consumption.

It is recommended to ensure the continuity of nutrition and sugar-sweetened beverage (SSB) education programs for teachers, school administrators, and parents in order to create an environment that supports healthy consumption patterns. Such education can be delivered by combining animated video and leaflet media to maximize attractiveness and information retention, thereby making the messages more effectively received by adolescents.

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