

Efforts to improve nutritional knowledge in adolescent girls through contemporary video-based education

Windi Indah Fajar Ningsih, Indah Purnama Sari, Feranita Utama

Department of Nutrition, Faculty of Public Health, Universitas Sriwijaya
Jl. Palembang-Prabumulih KM. 32, Kampus Unsri Indralaya, Ogan Ilir, 30662, Indonesia

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ABSTRACT

Adolescent girls belong to a vulnerable age group that experiences nutritional problems with various risks of health problems such as anemia, chronic energy deficiency, and overnutrition. Increasing the nutritional knowledge of adolescent girls can be an opportunity to improve nutritional status throughout the initial 8000 days of life. This community service activity uses contemporary video media to expand the knowledge of adolescent girls related to nutrition. Community service is integrated with life-cycle nutrition courses. The target audience was 30 adolescent girls. This activity is located at SMA Negeri 4 Palembang for 1 month. The activity method was carried out by designing and making contemporary videos by 3rd semester nutrition students, followed by distributing educational videos to participants. Feedback from participants as well as pre- and post-test results were used in the evaluation process. Results from community service projects show that 30% of targets have anemia based on Hb examination with the GC-Hb tool, and 30% of targets have malnutrition based on IMT/U assessment. The target's knowledge increased after providing education with contemporary videos ($p < 0.0001$). After completing this community service project, it was concluded that the knowledge of adolescent girls increases by providing contemporary video-based nutrition education.

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1. INTRODUCTION

The adolescent period is a transitional phase characterized by significant growth, including increased muscle mass, development of fat tissue, and hormonal changes occurring in the child's body. Currently, Indonesian adolescents face three nutritional problems, commonly referred to as the triple burden of malnutrition, due to imbalanced nutrient intake persisting over an extended period. It is known that these three problems encompass malnutrition, overweight, and micro-nutrient deficiencies, especially anemia (Puspitasari et al., 2023). Anemia, one of the common nutritional problems experienced by adolescents, is caused by insufficient iron in the body. Hence, adolescent girls are at a higher risk of anemia compared to boys. This is influenced by the monthly menstrual cycle in females, where blood loss must be accompanied by an increased need for iron to replace the lost blood (Hardinsyah & Supariasa, 2016).

The incidence of anemia in Indonesia remains high to date, especially among adolescent girls. Based on data from the Basic Health Research (Riskesdas) of the Ministry of Health of the Republic of Indonesia in 2018, the prevalence of anemia in adolescent girls reached 32%. This reflects those three out of ten Indonesian adolescent girls experience anemia (Kemenkes RI, 2018b). The Household Consumption Survey (SKRT) conducted in 2001 recorded anemia prevalence in adolescent girls aged 10 to 19 years at 30%. Furthermore, research conducted in various regions of Indonesia shows varying prevalence of anemia among females, ranging from 32.4% to 61% (Kemenkes RI, 2018b).

One solution to address the issue of anemia in adolescent girls is the implementation of the Iron Supplementation Program (TTD) through school health facilities by the government (Kemenkes RI, 2018a). The main issue in implementing this program is the low compliance of adolescent girls to consume TTD, influenced by various factors such as knowledge, attitudes, and support from teachers and parents (Fitria et al., 2021).

Lack of nutritional knowledge can be linked to food intake behavior and nutritional status in adolescent girls, which can lead to health problems related to nutrition such as obesity, overweight, chronic energy deficiency (CED), and anemia (Puspitasari et al., 2023). The Basic Health Research (RISKESDAS) data in 2018 stated that the prevalence of CED in adolescent girls reached 36.3%, while the prevalence of overweight adolescents reached 13.5%, consisting of 9.5% overweight adolescents and 4% obese adolescents (Kemenkes RI, 2018b).

Health education is one way to increase nutritional knowledge. The use of videos as a health education medium is becoming increasingly common, especially because videos are considered effective in providing health information to the public compared to traditional methods such as lectures and discussions (Puspitasari et al., 2023). Education aims to provide understanding, shape attitudes, and encourage actions to form positive habits as an effort to maintain body health (Hardinsyah & Supariasa, 2016). Thus, it is expected that there will be a better change in nutritional status.

Achieving optimal nutritional status is the basis for forming a healthy life and a bright future for adolescents. The government has made various efforts to create adolescents with good nutritional status, one of which is through regulations from the Ministry of Health of the Republic of Indonesia regarding balanced nutrition messages. This regulation emphasizes the importance of eating three times a day, consuming vegetables, fruits, and protein, as well as bringing food and drinking water from home, and also important to limit consumption of fast food, sweet snacks, salty, and fatty foods for adolescents, not forgetting to brush teeth and avoid smoking (Janah & Ningsih, 2021). Studies also state that bringing nutritious food can support the fulfillment of the body's energy and nutritional needs (Suryaalamsah et al., 2019). Besides providing control over the types of food consumed, bringing healthy food can also guarantee the cleanliness and safety of food. By bringing food, energy needs will be fulfilled, thus continuing activities at school, the energy and protein levels in the food are closely related to the variation and amount of food consumed. The more and varied the menu in the food, the higher the contribution of energy and protein obtained to the recommended daily energy intake (Meliala et al., 2014).

The prevalence of anemia in adolescent girls at State Senior High School 4 Palembang remains high at 30%. In addition to anemia, adolescent girls at State Senior High School 4 are at risk of Chronic Energy Deficiency (59%), undernutrition (3%), and overnutrition (12%). Based on socioeconomic status, 55% of these adolescents come from families with family income less than the Regional Minimum Wage (UMR) of Palembang. Various nutritional problems experienced by adolescent girls will be one of the causes of stunting in the future. Therefore, efforts are needed to optimize the delivery and increase awareness of nutrition in adolescents through Communication, Information and Education (KIE)

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activities. Communication, providing information, and education are strategic steps that can be taken. The current video is chosen to increase the interest of adolescent girls in understanding the information provided and challenges for students to integrate nutrition material in the adolescent life cycle through the creation of attractive and preferred current education for adolescent girls.

This community service activity aims to improve the nutritional knowledge of adolescent girls at State Senior High School 4 Palembang with the help of contemporary video media. Based on a survey conducted by Statista (Nurhayati-Wolff, 2021), the most frequently accessed/popular social media in Indonesia is YouTube, followed by WhatsApp and Instagram. Nurhayati-Wolff (2021) stated that the average use of social media in Indonesia every day is 3 hours 14 minutes. Thus, contemporary video media is an alternative that is suitable for adolescents to increase students' knowledge and skills when providing health education to the community is the expected outcome. Therefore, this service program aims to provide nutritional status data and provide nutrition education through contemporary video-based education to improve knowledge in adolescent girls.

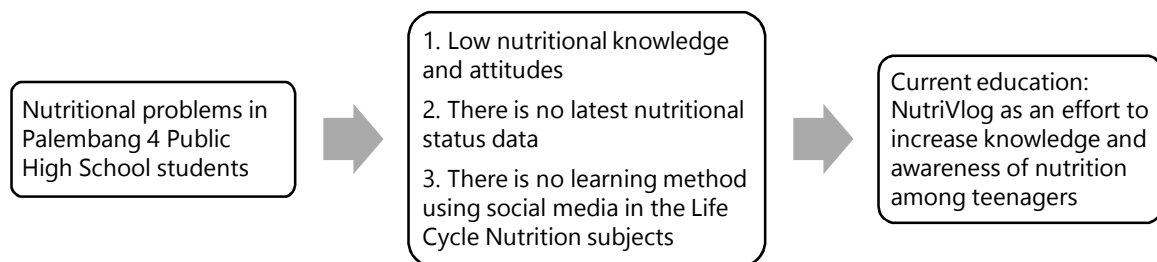


Figure 1. Framework for solving nutritional problems in adolescent girls

2. METHODS

Community service was carried out at State Senior High School (SMAN) 4 Palembang from September to October 2023. Participants in this community service were 30 young students at SMA Negeri 4 Palembang and 10 students involved who were taking life cycle nutrition courses at the nutrition study program, Faculty of Public Health, Sriwijaya University.

Activities Methods

The community service implementation involves several stages of activities, namely the creation and design of videos by students for one month (September). The videos created are educational videos related to anemia, balanced nutrition for adolescents, and healthy packed lunches for adolescents in schools. Once the videos are produced, they will be distributed to adolescent girls at State Senior High School 4 Palembang via Instagram @nutri.vlog. The videos can also be accessed through: https://drive.google.com/drive/folders/1ITsW1yWk0_tf13I6sTDBFpHEXlbnClG0?usp=drive_link

The field activities were conducted on October 6, 2023, with the agenda including nutritional status measurements comprising weight measurement using an Omron digital scale with a precision of 0.01 kg, calibrated height measurement using a microtoea with a precision of 0.01 cm, arm circumference measurement using a GEA brand metlin with a precision of 0.01 cm, and hemoglobin level measurement

using a GC-Hb device. Weight and height data were processed to determine nutritional status (BMI/Z) using the WHO Anthro Plus application. On the same day, a socialization session was conducted regarding the Instagram social media platform Nutrivlog. Additionally, a pre-test was administered. Participants were asked to watch three video posts uploaded on Instagram within one week. Subsequently, participants were requested to actively participate in creating a similar video as feedback for the activity. The post-test was conducted on October 16. In addition to the post-test implementation, on the same day, the participant-generated feedback videos regarding their involvement in creating educational videos were screened, followed by a collective effort to encourage the intake of iron supplement tablets.

Evaluation Design

Evaluation is carried out by providing pre and posttests, to see participants' knowledge regarding nutrition and health. The questions asked included iron anemia, upper arm circumference, diet trends, menstruation, physical activity, indicators of healthy clean-living behavior (PHBS), plate contents, consumption of fruit and vegetables, fast food, bringing lunch, criteria for healthy snacks, and nutritional adequacy figures.

3. RESULTS AND DISCUSSION

Results

The implementation of community service activities is divided into 2 stages, namely making educational videos, as well as service activities carried out at SMA Negeri 4 Palembang. The first stage begins with making an educational video by the students involved. The educational and promotional materials created include blood supplement tablets, balanced diets for teenagers and healthy provisions for teenagers. Creating an Instagram account is used as an educational medium that functions to upload nutritional educational content. The choice of Instagram as an educational medium was due to its high popularity among young women, apart from that, Instagram is also easy to access and organized. Figure 2 is a display of Instagram @nutri.vlog which is used as social media used for participant education.

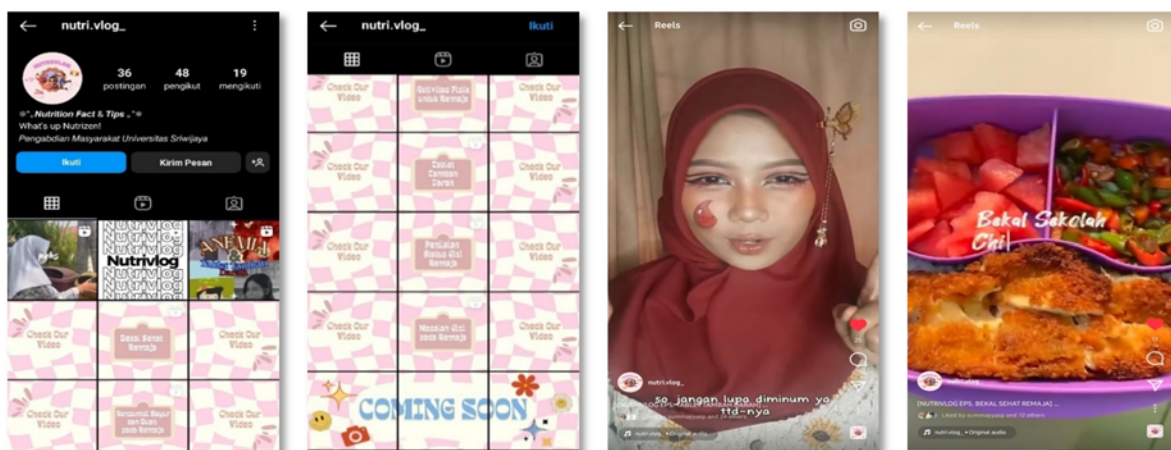


Figure 2. Nutrivlog social media

Figure 3. Contemporary educational video regarding adolescent anemia

Figure 4. Contemporary educational videos related to school supplies

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Audiovisual education presented in engaging and creative videos has the potential to effectively convey educational messages to respondents. For example, in Figure 3, a screenshot from the video explaining anemia and the importance of Iron Supplement Tablets (TTD) with a touch of makeup art can enhance the attractiveness to viewers and facilitate the understanding and application of the information in daily life. According to Nugroho et al. (2021), audiovisual education approach can provide significant stimulation by combining moving images and sound in a short time, making it easier for viewers to grasp the information and messages conveyed. Additionally, there are other screenshots from the video, such as in Figure 4, discussing healthy packed lunches, outlining their benefits, and encouraging the habit of bringing packed lunches from home.

The second stage of the community service activity was conducted at State Senior High School 4 Palembang. This activity involved two meetings. In Figure 5, documentation of the activities conducted can be seen. On the first day, before receiving the health education material, adolescents first took a pretest to assess their knowledge and attitudes regarding adolescent nutrition (Figure 5a). Additionally, assessments of nutritional status, including measurements of height, weight, upper arm circumference, Hb levels, and other data were conducted (Figure 5b).



Figure 5. (a) Pre-test; (b) Checking participants' health status; (c) Socialization of health education; (d) Socialization of making health education videos

Students are involved in socializing current educational videos via the Nutrivlog Instagram as well as providing guidance regarding the process of implementing this community service activity (Figure 5c). On the 10th day, the service team visited the school again to commit to diligently drinking blood supplement tablets with the symbol of drinking TTD together and continuing to carry out a post test. The activity closed with the screening of a video made by participants as feedback from this community service activity. The best videos are given appreciation so that participants remain enthusiastic in participating in educating their peers through contemporary videos (Figures 3 and 4). The video link and

pre-test and post-test questions can be accessed on the following Google Drive: https://drive.google.com/drive/folders/1ITsW1yWk0_tf13I6sTDBFpHEXlbNclG0?usp=drive_link. The detailed schedule for implementing community service can be found in Table 1.

Table 1. Community service program schedule regarding health education

1st Meeting (October 6 2023)	
Activities	<ul style="list-style-type: none"> - Opening - Introduction of the implementing group - Completing the pretest - Assessment regarding nutritional status, which includes height, weight and eating patterns - Measurement of Hb levels - Introduction to educational media Instagram @nutri.vlog - Directions for accessing educational videos
Results	<ul style="list-style-type: none"> - Introduce the implementation of community service programs carried out - Know the nutritional knowledge of teenagers before receiving educational material - Providing nutritional knowledge through contemporary educational videos
2nd Meeting (October 16 2023)	
Activities	<ul style="list-style-type: none"> - Handing over Blood Supplement Tablets, and drinking them simultaneously when the activity is carried out - Posttest filling - Provide closing words and thanks - Video screening of feedback from participants - Closing
Results	<ul style="list-style-type: none"> - Knowing the nutritional knowledge of teenagers after receiving educational material - Get feedback from participants - Give acknowledgements to participants indicating the end of community service activities.

Table 2. Participants' characteristics

Variables	Total (n=30)	Percentage (%)
Anemic Status		
Anemia	9	30
Not Anemic	21	70
Nutritional status		
Malnutrition	11	36.7
Good Nutrition	15	50
More Nutrition	3	10
Obesity	1	3.3
TTD Consumption Compliance (last 1 month)		
Consumption	7	23.3
Not consumed	23	76.7

Table 2 shows that 30% of the participants experienced anemia (Hb less than 12). This figure indicates that the prevalence of anemia at State Senior High School 4 Palembang is higher than the research findings related to anemia at State Senior High School 1 Sp Padang, Kabupaten Ogan Ilir, which reported anemia prevalence of 16% (Utama et al., 2020), and slightly lower than the results of the Riskesdas survey in 2018, which stated that anemia among adolescents in Indonesia was around 32% (Kemenkes, 2018b). These figures also depict the occurrence of anemia at State Senior High School 4 Palembang, which still falls within the realm of public health issues among adolescents.

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The continued high prevalence of anemia among adolescent girls at State Senior High School 4 Palembang may be due to the insufficient consumption of Iron Supplement Tablets, as evidenced by Table 2, where only 23.3% of the participants consumed TTD in the past month. This underscores the importance of enhancing understanding and compliance among adolescent girls regarding supplementary iron intake as an effort to address anemia.

From the results of nutritional status measurements shown in Table 2, 36.7% of the female students were found to have poor nutritional status, 10% were experiencing overnutrition, and 3.3% were obese. These findings indicate the need for further efforts to enhance understanding and behavior related to healthy eating patterns and nutrition among female students to ensure better nutritional status attainment.

Table 3. Average pre-test and post-test scores on total knowledge of female students

Variable	Pre test	Post test	Gap	p-value
	$\bar{x} \pm sd$	$\bar{x} \pm sd$	$\bar{x} \pm sd$	
Total	4.97 ± 1.29	7.50 ± 0.68	2.53 ± 1.41	<0.0001

Note: The data is not normally distributed, so the Wilcoxon test was utilized

From the results of the analysis using the Wilcoxon Test in Table 3, it was found that the average score after the intervention was higher than before the intervention. Before being given education, the average knowledge of participants was 4.97, while after being given education with contemporary videos, knowledge increased to 7.50. Apart from that, the results of statistical tests also showed that there was a difference in rheumatism knowledge before and after the intervention was carried out (p-value <0.05).

Discussion

Adolescents often face challenges related to nutrition, and one of the most common issues is anemia. Hardinsyah & Supariasa (2016) stated that this problem arises due to the inadequate fulfillment of the body's nutritional needs. Adolescents require increased nutritional intake to support physical and psychological growth and development. Additionally, lifestyle changes and eating habits, coupled with inadequate nutrient intake, also contribute to individual nutritional status.

In this community service project, it was found that most participants did not consume Iron Supplement Tablets (TTD) within the specified period. Based on the Guidelines for Iron Supplement Tablet (TTD) Provision for Adolescent Girls issued by the Indonesian Government through the Ministry of Health RI (Kemenkes RI, 2020), it is known that TTD should be consumed regularly, one tablet per week. Moreover, adolescent girls aged 10-19 years, and women of childbearing age (WUS) should routinely consume one TTD tablet every day during menstruation. Therefore, for the purpose of TTD provision, the menstrual cycle is calculated for ten days, resulting in a total of thirteen tablets received by adolescent girls per month (Ristanti et al., 2023).

The recommendations given are often not followed correctly, as evidenced by research conducted by Siyami et al. (2023), which found a low proportion of adolescents who consume TTD regularly during menstruation. This can happen for several reasons, such as forgetfulness, boredom, laziness, not feeling the need, the metallic taste of iron supplements, and the presence of side effects such as dizziness, nausea, and drowsiness after taking TTD (Hamranani et al., 2020). However, TTD consumption can help

maintain the body's iron balance, thus preventing anemia. Therefore, adherence to the TTD consumption schedule needs to be emphasized to maximize its benefits.

Based on the research results, it is also known that there is a low proportion of participants who did not consume iron tablets in the past month. Similar findings were also observed in research conducted by [Nurjanah & Azinar \(2023\)](#), where only 25.2% of female adolescents were compliant with iron tablet consumption out of 210 research participants. In Pamangin's study (2023), it was also found that out of fifty participants who did not consume iron tablets, 46% of female adolescent participants did not know what TTD was, emphasizing the importance of nutritional education.

The fact that some adolescent girls still have poor nutritional status may be due to eating disorders such as unhealthy diets, irregular eating patterns, consumption of high-fat and high-carbohydrate foods, and consumption of foods with low nutrient content ([Hardinsyah & Supriasa, 2016](#)). Therefore, adolescent girls need to pay attention to meeting their nutritional needs to prevent nutritional problems, enabling them to play a crucial role in the 8000 HPK initiative and contribute optimally to efforts to prevent stunting.

Knowledge measurement in students was conducted to determine the impact of nutritional education through Nutrivlog. This result can also provide an overview of the nutritional education material on anemia, balanced nutrition, and healthy snacks received and understood by the students. Knowledge measurement used a questionnaire with 10 questions related to the educational material provided. Each question was given a weight of 1 point for a correct answer. Table 3.3 shows the pretest and posttest scores of the students, indicating a difference in nutritional knowledge after the education was provided. This is similar to the study by [Pakhri et al. \(2018\)](#), which showed changes in the average scores related to nutritional knowledge after the education was provided, as evidenced by the significant value of 0.000 ($\alpha < 0.05$). However, nutritional education about anemia, balanced nutrition, and healthy snacks through social media in the form of videos from Nutrivlog shows weaknesses, namely the lack of data on nutritional status and initial knowledge.

At the time the service was conducted, there was no recent nutritional status data before the intervention, so measurements of adolescent nutritional status through anthropometry, Hb examination, and dietary assessment are needed to obtain updated data. Meanwhile, this activity can demonstrate an increase in nutritional knowledge and awareness among adolescent girls at State Senior High School 4 Palembang through nutrition education and promotion using social media. There is also an improvement in adolescent nutritional status after the intervention, as evidenced by increased knowledge and awareness of adolescent girls regarding balanced nutrition and improved nutritional status.

The use of social media, in the form of Instagram reels videos from Nutrivlog, has proven to be effective in providing health education to the community, especially adolescent girls. This is because the selection of videos as a means of nutritional education can stimulate visual and auditory senses, helping adolescents to quickly receive and remember the information provided ([Nugroho et al., 2021](#)). This is consistent with the results of a literature review conducted by [Yulia \(2018\)](#), which found that providing education through social media is one of the effective methods in providing health education.

Therefore, nutritional education about anemia, balanced nutrition, and healthy snacks through social media in the form of videos from Nutrivlog shows good effectiveness in increasing knowledge and awareness of nutrition among adolescent girls at State Senior High School 4 Palembang. Nutritional education via Instagram can influence changes in knowledge and attitudes among high school adolescents in Bengkulu City ([Nomiaji et al., 2020](#)). The results of this service are also supported by the

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service by [Hakimia et al. \(2023\)](#), which showed that education using audiovisual video media is effective in increasing knowledge among female students of SMP 17 Semarang regarding the importance of consuming iron tablets. Education through trendy videos can also serve as a good stimulus for participants to educate their peers through the creation of similar videos. This can be an innovation in the development of science and technology as well as an innovation for the government in preventing health problems among adolescents through peer education.

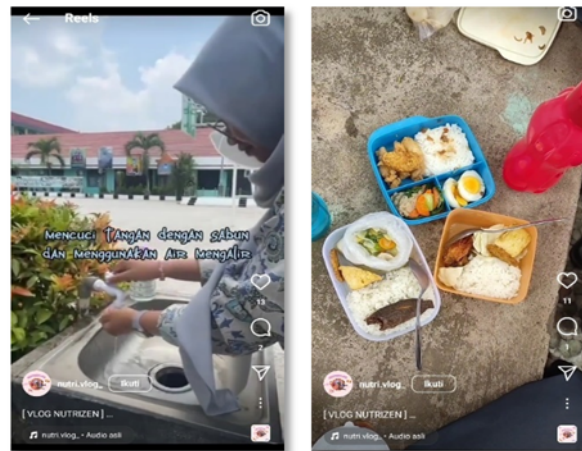


Figure 6. Videos made by participants as feedback

Figure 6 is a form of feedback from participants in the form of video uploads of implementing health information posted via Instagram @nutri.vlog, apart from being feedback, this form of video upload can be proof of participants' enthusiasm in this community service activity.

4. CONCLUSION AND RECOMMENDATIONS

The Community Service conducted at State Senior High School 4 Palembang aimed to increase knowledge related to nutrition among female adolescents through education and promotion utilizing trendy video media. Based on the results of the community service, it was found that there was a change in nutritional knowledge before and after the intervention, indicating that providing education through trendy video media is an effective method to broaden awareness of the importance of nutrition among adolescent girls. Additionally, it was found that 30% of the target population experienced anemia based on Hb examination using a GC-Hb device, and 30.6% of the target population experienced malnutrition according to BMI assessment. Most participants did not consume Iron Supplement Tablets (TTD) regularly within the specified period, with only 23.3% of participants consuming TTD in the last month. These findings can serve as evidence of one of the reasons for the high prevalence of anemia among adolescent girls at State Senior High School 4 Palembang.

Nutrition education through trendy videos should continue to be conducted and developed as an effort to improve the health and nutrition awareness of adolescent girls. A suggestion for future research is to upload educational content to other trending social media platforms such as TikTok's "For You Page" (FYP), to reach a wider audience, not only adolescents but also involve other relevant parties such as parents and teachers. The provision of educational materials should be continuously updated to keep up with the times.

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