

Improving Adolescent Knowledge and Attitude toward the Intergenerational Cycle of Undernutrition through Audiovisual Education: Findings from RESEPIN Study in Yogyakarta, Indonesia

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Abstract

Background: Adolescent health and nutrition contribute to the intergenerational cycle of undernutrition. **Objectives:** The aim of this study is to examine the effect of audiovisual education on adolescent knowledge and attitude toward the intergenerational cycle of undernutrition. **Material and Methods:** A clustered quasi-experimental study with a pre-and posttest design in Kulon Progo District, Yogyakarta, Indonesia. Participants were female adolescent students enrolled in Grade 7 at two junior high schools in Sentolo ($n = 120$) and Kalibawang ($n = 96$) subdistricts. We provided six topics related to adolescent health and nutrition throughout six online meetings for the intervention and control groups. In addition, the intervention group received audiovisual education through recorded videos, whereas the control group received education through e-leaflets following the online meetings. We assessed adolescent knowledge and attitude during pre-and posttest evaluations using Google Forms. Paired *t*-test was performed to analyze the data. **Results:** Both audiovisual and e-leaflet educations increased adolescent knowledge and attitude. Adolescents who received audiovisual education had significantly higher knowledge ($P = 0.046$) and attitude ($P = 0.034$) scores than adolescents who received education through e-leaflets. **Conclusions:** The audiovisual education intervention improved adolescent knowledge and attitude toward the intergenerational cycle of undernutrition than using e-leaflets.

Keywords: Adolescent, attitude, knowledge, leaflet, video

INTRODUCTION

Adolescents may act as agents of healthful change.^[1,2] In addition, their population is numerous, and their interest in learning is high.^[1] Thus, education-based interventions have the potential to enhance adolescent health outcomes and future generations.^[2-4]

Indonesia has faced several maternal and child nutrition issues, including childhood stunting (30.8%) and maternal anemia (48.9%).^[5] Previous works have suggested that both problems are highly related to adolescent pregnancy.^[6,7] Indonesia Basic Health Research results have found that five-tenths of stunted children are born from mothers aged 15–19 years. Four-tenth of pregnant adolescents suffer from chronic malnutrition.^[5] In addition, a study in India has shown a dose-responsively association between maternal age and

stunting. Compared to mothers aged 20 years or above, mothers aged 14–16 years (adjusted odds ratio [AOR]: 9.26; 95% confidence interval [CI]: 2.55–33.7), and 17–19 years (AOR: 2.12; 95% CI: 1.01–4.44) are more likely to give birth to stunted children.^[8]

Indonesia ranks 8th worldwide in early marriage, and one in nine women in Indonesia is married before they reach 18 years

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old.^[9] In fact, early-age marriage negatively impacts maternal and child health-nutrition and fertility and population growth, violence, education, labor, and earnings.^[10] Thus, it is essential to address maternal and child nutrition problems by targeting adolescent girls.

RESEPIN study aimed to examine the effects of audiovisual education on knowledge and attitude related to the intergenerational cycle of undernutrition among adolescents in Kulon Progo District, Yogyakarta Special Region, Indonesia. The findings of this study will support the Indonesian government to tailor programs to reduce intergenerational malnutrition and achieve Sustainable Development Goals Goal 3, which aims to ensure health and well-being for all at every stage of life. The existing programs include Healthy Community Movement (*Germas*), School Literacy Movement (GLS), and the Regional Medium-Term Development Plan of Kulon Progo District in 2017–2022.

SUBJECTS AND METHODS

Study design and participants

We conducted a clustered quasi-experimental with pre-and posttest design between July and September 2020 in Kulon Progo District, Yogyakarta, Indonesia. Kulon Progo was selected as the study site because it has been a stunting locus area since 2017, with a baseline stunting prevalence of 26.3%.^[11] Therefore, the district government aims to reduce stunting to 13.0% and anemia in pregnancy to 9.8% in 2022.^[12] We selected Sentolo and Kalibawang subdistricts as our study location, where stunting and anemia prevalences were the highest among other subdistricts in Kulon Progo District.

We selected purposively selected two public junior high schools with A-level accreditation in Sentolo and Kalibawang subdistrict. We then randomly allocated these schools into either intervention or control groups. Female adolescent students in Grade 7 who owned an android mobile phone or a laptop and whose parents provided informed consent were eligible to join the study. A total of 128 adolescents in the intervention group and 96 adolescents in the control group participated in the study. However, only 120 adolescents in the intervention group were able to complete the study. Figure 1 shows the intervention stages and their sample size.

Audiovisual education

RESEPIN was an abbreviation of *Remaja Sehat dan Pintar* in Indonesian that meant healthy and smart adolescent. RESEPIN study was an education-based intervention covering health, reproduction, nutrition, and anemia to improve adolescent knowledge and attitudes. Before the study, we developed the educational topics based on the need assessment with Kulon Progo public health department representatives, Kalibawang and Sentolo primary health centers, head of school, school committee, and parents Kalibawang and Sentolo Junior High Schools through focus group discussions.

We delivered the educational materials through six online meetings for both intervention and control groups biweekly. Each session lasted 60 min, covering each of the six topics: (1) anemia and balanced nutrition guideline (MyPlate), (2) adolescent roles toward zero stunting program in Kulon Progo District, (3) reproductive health, (4) family planning, (5) juvenile delinquency, and (6) clean and healthy lifestyle. Head of schools and teachers also attended these virtual sessions to provide motivational support and strengthen the students' enthusiasm. We also allocated 15–30 min additional time for a discussion session to students after each meeting. In addition, we provided a WhatsApp group for further discussion of each intervention and control group.

Students in the intervention group received the materials through videos following online meetings, whereas the control groups received e-leaflets for 3 weeks. Our primary outcome was adolescents' knowledge and attitudes toward the intergenerational cycle of undernutrition, which we assessed using online Google Forms. We conducted the pretest 1 week before the intervention. The first posttest was performed 1 week after the intervention, while the second posttest was 3 weeks after the intervention.

Statistical analysis

We used paired *t*-test to analyze the mean difference between pre-and posttest and an independent-sample *t*-test to examine the mean difference between the intervention and control groups. A level of significance was set at 0.05. All of the analyses were done using Stata 13.0 (StataCorp., College Station, TX, USA).

RESULTS

Table 1 shows the characteristics of study participants in the intervention and control groups. The majority of adolescents were female. There were no significant differences between the groups for parental age and parental education. Maternal employment was the only significant variable between both groups.

Our results showed that nearly 50% of students experience clinical anemia symptoms, such as fatigue, weakness, tiredness, lightheadedness, and paleness. Although most were thin, students mostly had standard body images related to their height and body weight. Most of them ever received information related to stunting, anemia, and MyPlate. They mostly gathered the info from the WhatsApp group during our research, television, and social media. Only a few received the information from health practitioners. Table 2 shows the students' nutritional status and health information.

Mean of attendance on online educational sessions

The mean of attendance on online education in the intervention group was slightly higher than in the control group. However, all students reached a minimum of 80% attendance [Figure 2].

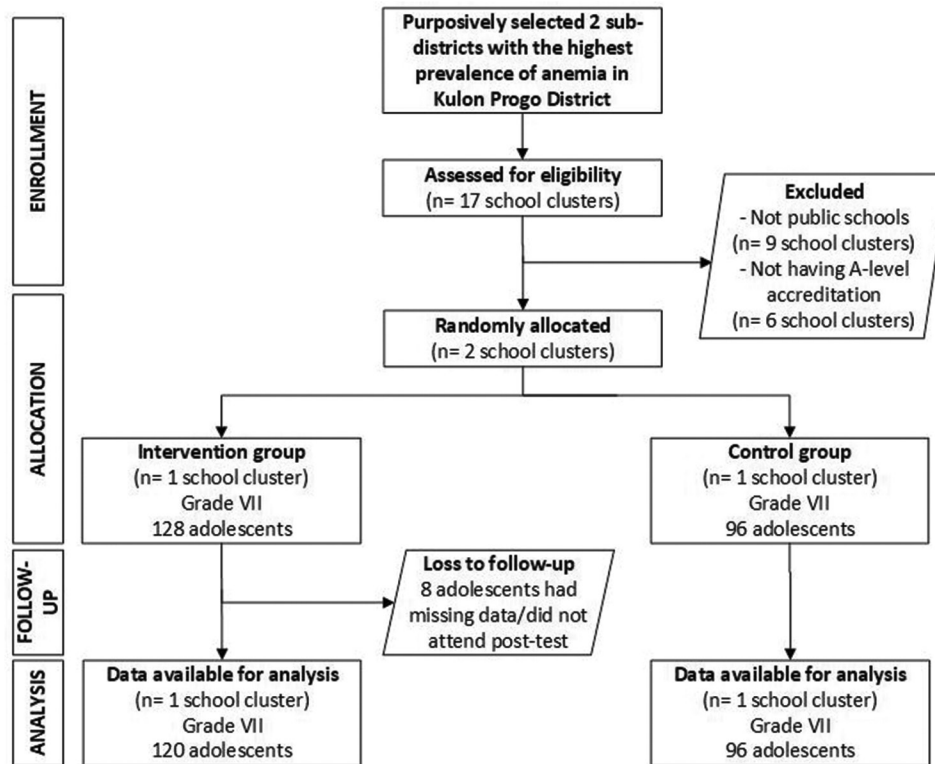


Figure 1: Flow diagram of intervention stages

Effect of RESEPIN education on knowledge and attitudes on the intergenerational cycle of undernutrition

Figures 3 and 4 show the detailed knowledge and attitude of the students in the intervention and control groups.

Our findings suggested that audiovisual and e-leaflet education increased the knowledge and attitudes of both intervention and control groups. Nonetheless, a significant improvement was shown in the intervention group with video ($P < 0.005$). Furthermore, the increase in attitude scores in the intervention group with video was higher than in the control group after the first and second interventions. On the other hand, the significant improvement in the control group was only shown during the second measurement [Table 3].

DISCUSSION

The results from the RESEPIN study demonstrated that audiovisual education using recorded videos had a positive effect on adolescent knowledge and attitude toward the intergenerational cycle of undernutrition. Although education using e-leaflets also showed positive results, knowledge and attitude were higher in audiovisual education than e-leaflet education.

Video provided opportunities for participants to sense and engage more in learning. Learning involving multiple senses, such as hearing and seeing, will have a higher understanding effect than learning that only applies a single sense.^[13] The learning process of educational videos has become an essential

part of education. Videos provide necessary content delivery facilities in virtual or online classrooms. The effective use of video as an educational tool can be effective by considering three elements: managing the cognitive load of video for students, maximizing student engagement with videos, and promoting active learning from videos.^[14]

In this study, we have considered the cognitive load of the video by selecting material based on a need assessment involving teachers, health program stakeholders, and parents/guardians of students. Regarding the active involvement of students in prescription education, there were discussion forums during virtual face-to-face and WhatsApp groups. In addition, the material presented was very relevant to promotive efforts to increase students' knowledge and attitudes related to adolescent health and their future.

Several studies revealed that technology could strengthen the learning process.^[15,16] Video could serve as a very effective educational tool.^[17-21] Video could increase student involvement in the learning process^[21] and visualize complex phenomena.^[22] It also helped students memorize educational materials in the long term since humans have limited memory.^[23]

Our findings suggested that adolescent knowledge and attitude who received e-leaflet education improved although lower than audiovisual education. The retention rate of education by reading or viewing pictures is only 30%.^[13] This retention may explain why audiovisual education performed better than e-leaflet education.

Table 1: Characteristics of study participants

Characteristics	Intervention group, n (%)	Control group, n (%)	P
Sex			
Male	35 (42.9)	34 (35.4)	0.250
Female	73 (57.1)	62 (64.6)	
Mother's education			
Low (<junior high school)	49 (40.8)	30 (81.1)	0.310
Middle (senior high school)	56 (66.7)	54 (56.8)	
High (higher education)	15 (12.5)	12 (11.6)	
Mother's age (years)			
≤40	49 (41.8)	51 (53.7)	0.060
>40	71 (59.2)	44 (46.3)	
Mother's occupation			
Working	67 (55.8)	30 (30.5)	0.008
Not working	53 (44.2)	66 (69.5)	
Father's education			
Low (<junior high school)	38 (31.6)	35 (36.8)	0.690
Middle (senior high school)	70 (58.4)	50 (52.6)	
High (higher education)	12 (10.0)	11 (10.5)	
Father's age (years)			
≤40	27 (28.4)	25 (31.8)	0.130
>40	68 (71.6)	71 (68.2)	
Father's occupation			
Working	120 (100.0)	96 (100.0)	0.055
Government employee	2 (1.8)	6 (6.3)	
Private employee	115 (96.5)	86 (89.5)	
Entrepreneur	3 (2.7)	4 (4.2)	

Finally, it is essential to note that our participants were Grade 7 students who entered a transitional growth and development phase between childhood and adulthood. They tend to show curiosity and willingness to seek health information. Thus, it becomes necessary to provide them with valid information through different resources.^[24] Although our participants ever heard about anemia, stunting, and MyPlate-related information from social media, our survey found that they never previously received the information from health practitioners. In fact, their first education was given through the RESEPIN study.

Furthermore, our participants were experiencing online school for the first time in 2020 due to the COVID-19 pandemic. Thus, online technology can be an innovative opportunity to provide various sources of information and support through multisectoral approaches, such as schools, local health departments/facilities, and families. At the same time, it is essential for further study or educational programs to consider how they use the technology to reduce disparities in accessing health information.^[25]

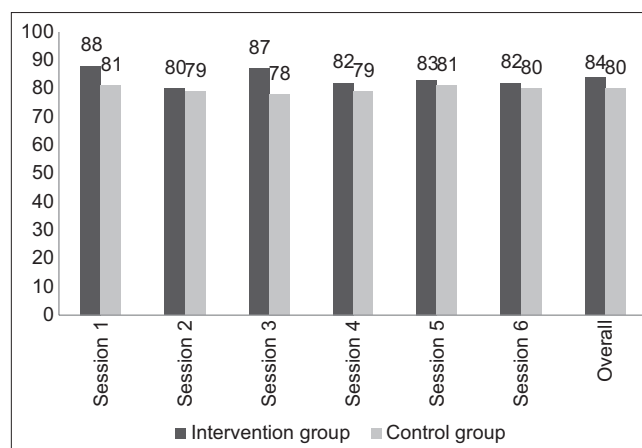
Strengths and limitations

Our study was the first in Indonesia to examine the effect of education on adolescent knowledge and attitude toward

Table 2: Nutritional status and health-related information

Variables	Intervention group, n (%)	Control group, n (%)	P
Anemia based on five clinical symptoms			
Yes	57 (47.5)	45 (46.9)	0.927
No	63 (52.5)	51 (53.1)	
BMI-for-age			
Thinnes (<-2 SD)	64 (53.3)	44 (45.8)	0.697
Normal (-2 SD - +1 SD)	43 (35.8)	41 (42.7)	
Overweight (> +1 SD - +2 SD)	6 (5.0)	6 (6.3)	
Obese (> +2 SD)	7 (5.8)	5 (5.2)	
Body image			
Overweight	28 (19.1)	18 (18.8)	0.935
Thin	19 (15.8)	17 (17.7)	
Normal	78 (65.1)	61 (63.5)	
Health information exposure			
Anemia-related information			
Ever heard	115 (94.8)	90 (93.7)	0.415
Never heard	5 (4.2)	6 (6.3)	
Stunting-related information			
Ever heard	94 (78.3)	82 (85.0)	0.230
Never heard	26 (21.7)	4 (15.0)	
MyPlate-related information			
Ever heard	101 (84.2)	83 (86.5)	0.428
Never heard	19 (15.8)	13 (13.5)	

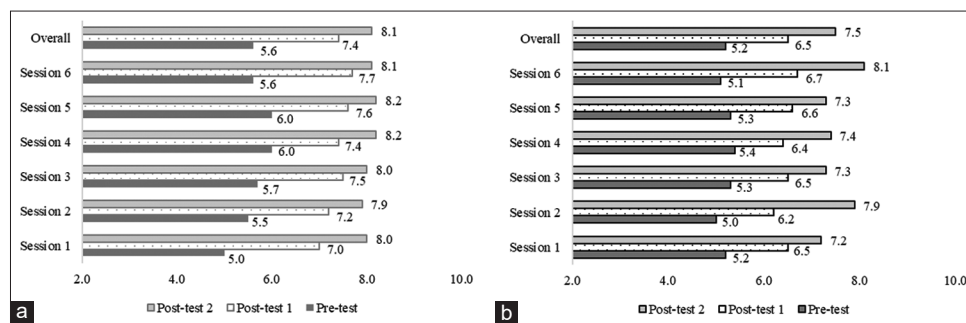
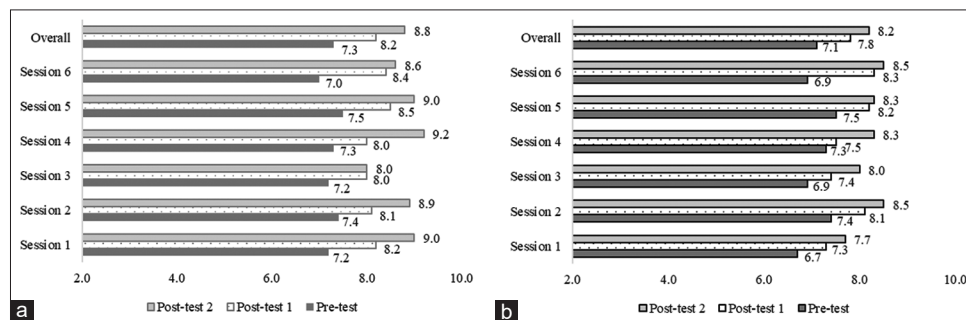
BMI: Body mass index, SD: Standard deviations

**Figure 2:** The mean of attendance on online educational sessions

the intergenerational cycle of undernutrition. We delivered educational materials covering a single topic of health or nutrition and an intergenerational cycle of adolescent health and nutrition. Our materials were based on the existing theory^[26] and needed assessment with related stakeholders. However, there are some limitations to our study. The control group was only those receiving education through e-leaflets. We did not examine the effect of our intervention and compared it to those who did not receive any educational intervention (e.g.,

Table 3: Effect of the audiovisual education in the RESEPIN study on knowledge and attitudes related to on intergenerational cycle of undernutrition

Variables	Pretest	Posttest 1	Posttest 2	Difference (posttest 2-pretest)	P
Knowledge					
Intervention group	5.6±1.8	7.4±2.8	8.1±1.9	3.5±1.1	<0.001
Control group	5.2±4.1	6.5±7.2	7.5±1.6	2.3±2.1	0.009
Difference	0.4±3.4	0.9±3.4	0.6±1.2	1.2±1.1	
P	0.987	0.034	<0.001	0.046	
Attitude					
Intervention group	7.3±2.1	8.2±2.2	8.8±2.4	2.5±2.0	<0.001
Control group	7.1±3.2	7.8±1.9	8.2±3.2	1.1±3.1	0.999
Difference	0.2±1.1	0.4±3.7	0.6±1.3	1.4±0.9	
P	0.383	0.070	0.0251	0.034	

**Figure 3: Knowledge of adolescents in the intervention group (a) and control group (b)****Figure 4: Attitudes of adolescents in the intervention group (a) and control group (b)**

routine program at school). This study was also restricted by the incompleteness of the possible confounding data, including the students' socioeconomic status.

CONCLUSION

RESEPIN study using audiovisual education increased adolescent knowledge and attitude toward the intergenerational cycle of undernutrition. Knowledge and attitude improvement of adolescents receiving audiovisual education were more significant than e-leaflet education. It is highly recommended that school-based educational programs continue to improve adolescent knowledge and attitude related to their health, nutrition, and the quality of future generations. The involvement of teachers, school staff, and multisectoral approaches may strengthen the program delivery.

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Conflicts of interest

There are no conflicts of interest.

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