



# Effect of education through video and packaging modifications of iron tablets on female adolescent behavior in the iron supplementation intake in SMPN 2 and SMPN 1 Parigi<sup>☆</sup>

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## ABSTRACT

**Objective:** The purpose of this study was to reveal the effect of providing education by video and modification of iron tablet packaging on young women's behaviour in the iron supplementation intake in SMPN 2 and SMPN 1 – Parigi.

**Methods:** This research was a quasi-experimental design with pretest–posttest control group design along with stratified random sampling, which was SMPN 2 Parigi as an Intervention group and SMPN 1 Parigi as a control group. The total sample of 62 respondents in each group.

**Result:** In the Wilcoxon Signed Ranks Test analysis, the Intervention group (video + modification of iron tablet packaging) valued  $p = 0.001 < 0.05$ . It means that there were differences in female students' knowledge, attitudes, and intentions in the pretest–posttest, while in the control group (video) obtained  $p$ -value =  $0.001 < 0.05$ , which showed differences in knowledge, attitudes, and intentions of female students in the pretest–posttest.

**Conclusion:** The development of educational media for iron tablet intake through the video along packaging modification of iron tablet contributed a significant effect on the knowledge, attitudes, and intentions of young women in the iron supplementation intake.

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## Introduction

Anemia is a condition of the haemoglobin (Hb) level in the blood is lower than normal.<sup>1</sup> WHO at the 65th World Health Assembly (WHA), agreed to reduce the anemia rate by 50% from the prevalence of anemia in women of childbearing age in 2025.<sup>2,3</sup> The cause of anemia was due to a lack of iron intake in foods marked by a lack of haemoglobin (Hb) levels (under normal). Adolescent girls are at risk of anemia because, during puberty, they experience menstruation, and accelerated growth and development, where this condition will be exacerbated if the intake of nutrients in the body is low.<sup>4</sup> Based on this commitment, the Indonesian government has overcome anemia in adolescent girls by giving one iron Tablets per week throughout the year for Increasing Hb level.<sup>5,6</sup>

RISKESDAS data in 2018 showed the prevalence of anemia among teenage girls was 25%.<sup>7</sup> In Central Sulawesi, the proportion of young women aged 10–19 years received iron tablets by

79.5%. Of this number, the proportion who takes the iron Tablets less than 52 tablets of 99.3%.<sup>8,9</sup> The three significant reasons for those who get iron Tablet but do not consume it as recommended (52 tablets) are forgetfulness (26.9%), bad taste and smell (23%), and feel unnecessary (17.3%).<sup>8</sup>

These problems may be prevented if teenagers have good knowledge over the anemia and its prevention. The knowledge will affect lifestyle and consumption patterns.<sup>10–12</sup> Teenagers with good knowledge will be able to apply their knowledge, and vice versa, poor knowledge leads them to not able to use good knowledge.<sup>13</sup> The higher understanding of adolescents about anemia, then the smaller the adolescents will experience anemia because they gained a lot of information about it.<sup>14</sup>

## Methods

This research was conducted at SMPN 2 and SMPN 1 Parigi, Parigi Moutong District, in February–April 2020. This research was a quasi-experimental design with a pretest–posttest control group design that aims to assess the effect of certain treatments on a variable. The independent variable in this study was the development of educational media (Video, and Modification of iron Tablet Packaging), and the dependent variable was knowledge, attitudes, and intentions.

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**Table 1**  
Frequency distribution of respondents by age in the intervention group (SMP 2 Parigi) and control group (SMPN 1 Parigi) in 2020.

Age (years)	Type of respondent			
	Intervention (video + packaging modification of iron tablet)		Control (video)	
	N	%	N	%
12	4	6.5	5	8.1
13	27	43.5	27	43.5
14	28	45.2	26	41.9
15	3	4.8	4	6.5
Total	62	100	62	100

The population in this study were all female students in 7th, 8th, and 9th grade in SMPN 2 (as an intervention group) and SMPN 1 Parigi (as a control group). The sample in this study was a female student in 7th grade and 8th grade. The sample size in the control group was 62 respondents, and the intervention group was 62 respondents; the total sample was 124 respondents.

## Results

### Characteristics of respondents

The result of observation toward respondent characteristics is displayed on the following Table 1.

The respondent characteristics were illustrated by age, as displayed in Table 1. Frequency distribution according to age; most of the respondents were 14 years old that was 45.2% in the intervention group, and 43.5% at 13 years old were in the control group.

The results of the analysis on the iron Tablet consumption behaviour in female adolescent against knowledge, attitudes, and intentions can be seen in Table 2 as follows.

The results of the descriptive analysis on pretest and posttest of knowledge based on the mean values in the intervention group (video and packaging modification of iron tablet) were from 5.81 to 14.29. There was a significant increase in the mean value of 8.48. In the control group, the means value was from 2.68 to 13.18, with a substantial increase in the mean value of 10.5. The difference between the posttest means the values of the two groups (intervention and control) was 1.11.

In the Wilcoxon Signed Ranks Test analysis, the Intervention group (video + packaging modification) obtained  $p=0.001 <0.05$ . It means that there was a difference in student knowledge in the pretest–posttest. At the same time, the control group (Video) gained  $p=0.001 <0.05$ , which showed differences in student knowledge in the pretest–posttest. This result found that the existence of education in the form of video + modification of iron tablet

**Table 2**  
Analysis of knowledge, attitudes, and intentions of pretest–posttest students in the intervention group (SMPN 2 Parigi) and control group (SMPN 1 PARIGI) in the iron supplementation intake.

Variable	N	Pretest					$p^{**}$	Posttest					Difference mean	$p^*$	$p^{**}$
		Min	Mean	Max	SD	Median		Min	Mean	Max	SD	Median			
<b>Knowledge</b>															
Intervention	62	2	5.8	9	1.3	6	0.000	12	14.3	15	0.9	15	8.5	0.001	0.000
Control	62	0	2.7	8	1.6	2		11	13.2	15	1.3	13	10.5	0.001	
<b>Attitudes</b>															
Intervention	62	23	28.7	34	1.9	29	0.001	37	39.1	40	1.1	39.5	10.4	0.001	0.000
Control	62	23	27.6	30	1.5	28		25	29.1	32	1.5	29	1.5	0.001	
<b>Intentions</b>															
Intervention	62	0	1.7	8	1.4	1	0.000	9	9.7	10	0.5	10	8	0.001	0.000
Control	62	0	0.8	3	0.8	1		2	4.3	6	1.3	4	3.5	0.001	

$p^*$  Wilcoxon Signed Ranks test, significant at  $p < 0.05$ .

$p^{**}$  Mann Whitney test, significant at  $p < 0.05$ .

packaging, and education through video only will increase the knowledge of young women about the consumption of iron tablets.

In the Wilcoxon Signed Ranks Test analysis, the intervention group (video + modification of iron tablet packaging) obtained  $p=0.001 <0.05$ . It means there were differences in student knowledge in the pretest–posttest. Besides, the control group (video) gained  $p=0.001 <0.05$ , which showed the difference in students' knowledge in the pretest–posttest. This result proved that the existence of education in the form of video + packaging modification, and education only by video would increase the knowledge of female adolescent over the iron Tablet intake.

Comparative tests in the intervention and the control groups by performing the Mann Whitney test on the knowledge variable identified that both the pretest–posttest had a  $p$ -value = 0.001 < 0.05. It means there was a change in the intervention and the control groups toward the knowledge of the iron supplementation intake.

The attitude variable in the pretest–posttest Descriptive analysis of the Intervention group based on the Mean values obtained was 28.65 and 39.10. The pretest–posttest of the control group based on the mean values was 27.60 and 29.08. According to the average score of the attitude pretest, the difference score was 1.05 between the intervention group and the control group. On the average score of attitude posttest, there was a difference of 10.02 between the intervention and the control groups.

Following the Wilcoxon Signed Rank Test, the pretest–posttest analysis on attitudes valued of  $p=0.001 <0.05$ . It means there were differences in the attitudes of female students in the intervention group (video + iron tablet packaging modification) towards changes in attitudes of young female students about iron tablets intake. In the control group with the same test, obtained  $p=0.001 <0.05$ . It means there were differences in the attitudes of female adolescents in the pretest–posttest. In other words, there was a significant impact on the effect of giving the video to the changes in attitudes of young women students about the intake of iron supplementation.

The comparative test between the intervention and control groups through Mann Whitney on attitudes valued  $p=0.001$  in the pretest, and  $p=0.000$  in posttest where this value was less than 0.05. It means there is an influence both in the intervention group and the control group. Thus both the intervention group and the control group both have different attitudes on the pretest and posttest.

In the descriptive analysis, there was an increase in the average score of students' intentions in the pretest and posttest of the intervention group (video + modification of iron tablet packaging), from the pretest value of 1.66, which had an increase in the posttest by 9.68. In the control group, there was an increase in intentions, both pretest and posttest. By the average score of the pretest, the difference of intention valued of 0.89 between the intervention and control groups. Also, the mean score of the posttest between the intervention and control groups was 5.39.

By Wilcoxon Signed Ranks Test analysis, the intervention group (video + packaging modification of iron tablet) on the intention variable in pretest–posttest obtained  $p$ -value = 0.001 < 0.05. It means there were differences in the intentions of the female adolescent in the pretest–posttest. It revealed there was an influence of giving intervention (Video + Modification of Iron tablet) towards students' intentions change about iron tablet intake. The control group gained  $p$ -value = 0.001 < 0.05. It means there were differences in student intentions in the pretest–posttest, or there was an effect of giving the video to students' interest changes in the consumption of iron tablets.

Comparative test toward the intervention and control groups by the Mann Whitney test on the intention variable result  $p$  = 0.001 < 0.05 in both the pretest–posttest. It means there was a change in the intervention and control group about the intention to consume the iron tablet.

## Discussion

### Knowledge

Both educational media, educational videos as well as a combination of educational videos and the modification of the supplement packaging, can be used as an effort to increase the knowledge of young female about iron tablet intake.<sup>15</sup> Those both media have a significant increase in knowledge improvement in young women about iron supplementation intake.<sup>5,16</sup> Female adolescent's knowledge about anemia, including the causes, prevention, and effects, would be rise after being educated both in the form of video or a combination of video and packaging modification of iron tablet.<sup>9,17</sup>

Education in the form of videos and modifications to the packaging may increase the knowledge of young women. Knowledge is the result of human sensing or the result of knowing about objects through their senses (eyes, nose, ears, and so on).<sup>18</sup> The intensity of attention and perception over an object significantly affects the knowledge possessed as a result of the sensing carried out.

This research is in line with previous research that found that knowledge given before intervention formed of video as media explanation in the pretest is enough, and knowledge after the posttest is good.<sup>3,19</sup> As well revealed there is a significant influence on the knowledge and compliance of the iron supplementation intake using print media in the form of a monitoring card.<sup>12,16,20,21</sup>

There is an increase in the knowledge after given education about anemia.<sup>3,7</sup> There is a difference in the level of knowledge before and after the intervention through poster media. The amount of knowledge has increased with significant changes.<sup>1,14</sup>

### Attitude

A significant difference in the mean value of the posttest means that education through video and packaging modification shows greater changes in attitudes of female adolescents to consume iron tablets compared to educated videos only. Attitude is a readiness or willingness to act and is not an implementation of certain.<sup>22</sup> In the study on the impact of combination audio-visual media in the form of educational videos about the importance of iron tablets and the modification of iron tablet packaging which is a print media, simultaneously, contribute a more significant influence of attitude changes.<sup>10</sup>

The iron tablet packaging modification included is a print media that is no less interesting in delivering Health messages in the form of print media.<sup>2</sup> Those contain information, images, and at the same time checklist that can easily be carried and read at any time by young women.<sup>13</sup> This iron tablet packaging modification is an

interesting print media as well as completing education through audio-visual, which can increase the stimulation of the sense of sight. So, it can more easily receive information about the importance of consuming iron Tablets in young women.<sup>5</sup>

In line with the research conducted by the previous research that results of the study reveal that there are differences in attitude after the intervention.<sup>17,19</sup> Those are based on the categories of attitude both before and after through the media Poster. Likewise, the attitude before and after counselling with media booklets has.<sup>21</sup>

### Intention

The difference of mean values at the posttest showed a significant difference in the intervention and control groups on the intention variable. This is undoubtedly influenced by interventions that involve education in the form of audio-visual and print (packaging modifications) that can increase the intentions of young women in the consumption of iron Tablets.<sup>3</sup>

In a study with the advertisement of iron, tablet conducted, there is a difference in intention between the experimental and the control groups.<sup>3,7</sup> Factors that increase the effectiveness of the iron tablet consumption program are the intentions of female adolescents. Syima's study explains the relationship between intention and adherence to the consumption of added tablets of iron in young women.<sup>23</sup>

### Development of educational media

The use of two educational media together has a stronger influence on behaviour change. In this study, it was shown by the significant difference in the mean value in the posttest variables of knowledge, attitudes, and intentions. Provision of education both through video and modification of the Iron tablet, as well as education only by video, does affect the change in knowledge, but significant differences occur in the attitude and intention variables when using two educational media at the same time.<sup>3,4</sup> If education is carried out periodically and continuously with two educational media at the same time, the behavioural changes formed by female adolescents towards the consumption of iron supplementation will become sustainable and sustainable behaviour.<sup>15</sup>

A study conducted by the previous research revealed that audio-visual information and leaflets have a significant effect on increasing knowledge about cervical cancer.<sup>9,14</sup> Education may improve adherence to the consumption of Supplement as research conducted by WHO (2016), it is found that the group of a female adolescent who received counselling on the level of adherence in iron tablet intake.<sup>6</sup> The percentage was higher than that of young women in the group who did not get advice. Following the results of the study in 2018. The results of the study revealed that health education provided for 2 × 60 min with audio-visual and booklet media in the intervention group together could improve caregiver attitudes in preventing tuberculosis in family members. Health Education can change behaviour such as about contraception usage.<sup>12,24</sup>

## Conclusion

The development of educational media for iron supplementation in the form of video and modification of iron tablet packaging together has an effect on the knowledge, attitudes, and intentions of the female adolescents in iron supplement intake. The combination of the two educational media can be used to optimally increase the knowledge, attitudes, and intentions of young women in the behaviour of iron tablets intake. Combining these two methods of education can be conducted sustainable and continuously for

behavioural change in female adolescents for long-term consumption of iron tablets.

### Conflict of interest

The authors declare no conflict of interest.

### References

- Nur R, Demak IPK, Radhiah S, et al. The effect of moringa leaf extract on increasing hemoglobin and bodyweight in post-disaster pregnant women. *Enferm Clin.* 2020;30:79–82.
- Waliyo E, Agusanty SF. The trial of the monitoring card for taking blood added tablets (Fe) to the compliance of consumption of pregnant women. *J Vokasi Kesehatan.* 2016;2:84–8.
- Noverina D, Dewanti LP, Sitoayu L. The effects of explanation video of knowledge and compliance the consumption of Iron supplement at SMPN 65 North Jakarta. *Darussalam Nutr J.* 2020;4:35–43.
- Nur R, Dwitama MA, Fadly M, et al. The culture and age of first marriage on female teenagers in west Marawola. *Medico-Legal Updat.* 2020;20:1335–40.
- Cooke AG, McCavit TL, Buchanan G.R., et al. Iron deficiency anemia in adolescents who present with heavy menstrual bleeding. *J Pediatr Adolesc Gynecol.* 2017;30:247–50.
- World Health Organization (WHO). Guideline: daily iron supplementation in adult women and adolescent. Geneva: World Health Organization; 2016. p. 44.
- Amir N, Djokosujono K. Factors associated with the consumption of blood-added tablets in adolescent girls in Indonesia: Literature review. *J Kedokt dan Kesehatan.* 2019;15:119–29.
- Department of Health of Central Sulawesi Province. Profile of health in Central Sulawesi Province. Palu; 2018.
- Tussing-Humphreys LM, Liang H, Nemeth E, et al. Excess adiposity, inflammation, and iron-deficiency in female adolescents. *J Am Diet Assoc.* 2009;109:297–302.
- Nur R, Mallongi A, Kiyai Demak IP, et al. Early-age marriage and the impact of health reproduction women. *J Eng Appl Sci.* 2019;14:981–6.
- Nur R, Patui N, Demak IK, et al. The smart book effect of pregnancy–postpartum care towards the husband's knowledge and reduction of reproductive health problems. *Fam Med Prim Care Rev.* 2020;22:133–9.
- Sekhar DL, Murray-Kolb LE, Kunselman AR, et al. Identifying factors predicting iron deficiency in United States adolescent females using the ferritin and the body iron models. *Clin Nutr ESPEN.* 2015;10:e118–23.
- Kamau MW, Mirie W, Kimani ST. Maternal knowledge on iron and folic acid supplementation and associated factors among pregnant women in a rural County in Kenya. *Int J Africa Nurs Sci.* 2019;10:74–80.
- Doom JR, Richards B, Caballero G, et al. Infant iron deficiency and iron supplementation predict adolescent internalizing, externalizing, and social problems. *J Pediatr.* 2018;195:199–205, e2.
- Andriastuti M, Ilmana G, Nawangwulan SA, et al. Prevalence of anemia and iron profile among children and adolescent with low socio-economic status. *Int J Pediatr Adolesc Med.* 2019.
- Zaddana C, Indriani L, Nurdin NM, et al. The effect of nutritional education and provision of blood-supplemented tablets (sign) on the increase in hemoglobin levels in adolescent girls (Pengaruh edukasi gizi dan pemberian tablet tambah darah (tt) terhadap kenaikan kadar hemoglobin remaja putri). *FITOFARMAKA J Ilm Farm.* 2019;9:131–7.
- Nur R, Sese RGC, Patui NS, et al. Early-age marriage and the impact of health reproduction women. *J Eng Appl Sci.* 2019;4:981–6.
- Nur R, Myles PR, Fogarty AW, et al. Detection mapping of women with high-risk pregnancy in antenatal care in Kamonji Public Health Center, Palu City, Indonesia. *Syst Rev Pharm.* 2020;11:642–7.
- Ahankari AS, Fitriyah SI, Mallongi A, et al. Prevalence of iron-deficiency anaemia and risk factors in 1010 adolescent girls from rural Maharashtra, India: a cross-sectional survey. *Public Health.* 2017;142:159–66.
- Nur R, Fitriyah SI, Mallongi A. Women's reactions and health disorders caused by abuse during the pregnancy-postpartum period. *Med Leg Updat.* 2020;20:1329–34.
- Hartiningsing SN. The effect of health education using audio visual media and booklet media on caregiver attitudes in preventing transmission of tuberculosis to family members. *J Perpektif Pendidik.* 2018;12:54–67.
- Kora FT, Dasuki D, Ismail D. Knowledge of sexually transmitted infections with unsafe sexual behavior in West Southeast Maluku Girls in Yogyakarta Special Region. *J Kesehatan Reproduksi.* 2016;3:50–9.
- World Health Organization (WHO). Sexually Transmitted Infections (Stis). Geneva; 2016.
- Sulistiawati E, Sirait AM. Knowledge about risk factors, behavior and early detection of cervical cancer with visual inspection acetic acid (Iva) In women in Central Bogor Sub-district, Bogor City. *Bul Penelit Kesehatan.* 2014;42:193–202.