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# ENHANCING ADOLESCENT GIRLS ANEMIA PREVENTION KNOWLEDGE AND ATTITUDES THROUGH NUTRITIONAL CONSULTATIONS

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## ABSTRACT

Anemia is a public health problem in Indonesia that can affect all age groups, from toddlers to the elderly, and primarily affects adolescents. One way to prevent anemia among them is by increasing knowledge and attitudes through nutritional consultation to achieve promotive and preventive efforts. In 2018, anemia in women was higher (27.2%) than in men (20.3%). This study aimed to determine the effect of nutritional consultations on the knowledge and attitudes of young women in preventing anemia in Bengkulu City. A quasi-experimental study with a non-randomized control group design, pre-test, and post-test design was conducted from October to November 2021 at SMP N 8 Bengkulu City. The intervention group subjects are 30 respondents, and at control group are 30 respondents; all were purposively selected. A paired T-test was used to analyse the effect of the intervention. The results showed a significant difference in the pre-test and post-test knowledge in the treatment group (p=0.002). At the same time, there was no significant difference between the pre-test and post-test knowledge of the control group (p=0.095). In comparison, the mean attitude before treatment did not differ between groups (p=0.048); each group showed differences after treatment. Intervention and control groups influence knowledge and attitudes before and after treatment (p=0.013).

**Keywords:** anemia, knowledge, attitude, young women

## INTRODUCTION

Anemia is one of the health problems in Indonesia that can occur in groups of toddlers to elderly. Adolescence is at risk of anemia due to menstruation, so there is a lot of blood loss, and puberty is at risk of iron deficiency anemia. Besides menstrual factors, iron intake is essential in accelerating growth and development (Ministry of Health Republic Indonesia, 2018). Anemia generally occurs worldwide, especially in developing countries. It affects 13% of women and 45% in developed countries among women aged 15-49 year (Department of Nutrition and Public Health, 2014). Whereas in Asia, the prevalence of anemia among adolescent girls reached 191 million people aged 10-19 years, the prevalence of anemia was 7.5 million. Indonesia is positioned in the 8th out of 11 countries. Iron deficiency anemia among pregnant women in Indonesia is 50.5%; among postpartum women is 45.1%; among adolescent girls aged 10-18 years is 57.1%; and among women aged 19-45 years, 39.5% (Indonesian Ministry of Health, 2012). The results of Riskesdas showed that anemia in women was 27.2% and in men was 20.3%; based on these data, anemia in women was higher than in men aged 15-24 years by 32% (Indonesian Ministry of Health, 2018).

Adolescence is a transition from childhood to adulthood; during this period of growth and development, physiological, psychological, and social changes occur. Nutritional fulfilment in adolescents must be higher because adolescents need adequate nutrition to fulfil their needs (Almatsier, et al. 2011). Increased physiological needs because adolescents are experiencing a period of growth can also be one of the causes of iron deficiency anemia. Iron deficiency or anemia is mainly caused by insufficient nutritional intake; irregular food consumption patterns influence the lack of iron nutrient intake. In addition, iron deficiency in adolescent girls can also be caused by menstruation and infectious diseases. (Ely, Laksono, Dyah, 2017). Studies found that as many as 63.4% of adolescents experienced anemia caused by low knowledge, which is a dominant factor in adolescent girls. Knowledge of foods high in iron is also still low (Sintha, 2019). Knowledge of anemia is still low in adolescents,

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which will cause them not to care about their daily food intake.

One way to increase nutrition knowledge is through nutrition education and nutrition consultations. Information is provided in the form of nutritional consultation to prevent anemia. Avoiding anemia in adolescent girls can be done by increasing knowledge and attitudes through nutrition consultation so that promotive and preventive efforts can be achieved. Education in the form of consultation is an approach used to help individuals gain better knowledge (PERSAGI PAGI, 2013). Nutrition education is critical for adolescent girls to create awareness and disseminate knowledge about anemia control and prevention (Priyanka & Asfia, 2015). Individuals who have better nutritional knowledge have attitudes toward eating healthier foods (Heaney, et al. 2011)

Effective and efficient media can be used to support nutrition counselling so the target will receive that information. The media can be mobile devices or mobile phones because one of the most widely accessed media in adolescents is the primary way to get digital information quickly and can reach many targets that are not limited to space and time. Social media can be used as an Android-based mobile phone application. The use of smartphones is increasingly growing among teenagers, causing various changes in their attitudes and behaviour so that they can quickly get information (Firmansyah et al., 2019).

Teenagers are the age group that uses the internet the most to fulfil their information needs. 91% of the population aged 15-19 use the internet, and the main reason someone uses the internet is to communicate (Gabrielli, et al. 2017). Based on Faza research at SMAN 2 Padang, nutrition education provided to adolescent girls using Instagram and WhatsApp can increase respondents knowledge about balanced nutrition. This is because the information on Instagram is more effective. After all, it is accompanied by images and videos that can support information delivery (Rusdi, et al. 2021). The purpose of this study was to find out whether nutrition consultation can improve the knowledge and attitudes of adolescent girls in anemia prevention in Bengkulu City.

## METHODS

This research uses a quasi-experimental study with a non-randomized control group pre-test, post-test, and pre-test design. Study conducted in October - November 2021 at SMPN 8 Bengkulu City. At the beginning of the study, the two groups were given pre-test questions of knowledge and attitudes. After that, the treatment group was given nutritional consultation about anemia using self-designed Android application media, and the control group was not given nutrition consultation. However, respondents read their Android application media in the PlayStore. After three weeks, both groups were given post-test questions about nutritional anemia. The study subjects were 30 intervention group respondents and 30 control group respondents, using a purposive sampling technique with inclusion criteria included adolescent girls, coming at the time of nutrition consultation. Meanwhile the exclusion criteria were respondents sick during the study. Primary data was collected through interviews using knowledge and attitude questionnaires.

The univariate analysis describes the characteristics of each research variable; this analysis only produces the distribution and percentage of each variable. The variables to be analysed are knowledge and attitude. Bivariate analysis is carried out on two variables suspected to be related; the data obtained is then processed, analysed, and presented as a table. First, the normality test is carried out on the results of the pretest-posttest behaviour in the treatment group using the Kolmogorov-Smirnov test. Differences in knowledge and attitudes before and after nutrition consultation in each group using the Paired T-test statistical test of normally distributed data, but for data that is not normally distributed using the Wilcoxon Signed Ranks Test. Differences in knowledge and attitudes between the treatment and control groups using the independent sample t-test statistical test of customarily distributed data, including expertise and perspectives. Non-normally distributed data used the Mann Whitney Test statistical test (12).

## RESULTS AND DISCUSSION

### Respondent Characteristics

The frequency distribution of respondents based on age 12-13 years mainly was 49.1% in the treatment group and 50.9% in the control group. For the education level of the father and mother, most of the high school/tertiary level is more than 50% of the treatment and control groups. While father occupation in the treatment group was 47.2% and the control group was 54.1% more private, the mother occupation mainly was housewives in the treatment group 49.0% and the control group 51.0%.

Based on the results of statistical tests obtained p>0.05, it can be concluded that there is no difference between the treatment group and the control group; there is homogeneity in the variables of respondents' age, education, and occupation.

### Description Level of knowledge and attitudes

Table 2 shows that the average knowledge of treated respondents was 56.9, with a standard

**Table 1.** Characteristics of Respondents in the Treatment Group and Control Group

| Characteristics Respondents | Treatment | | Control | | p |
|---|---|---|---|---|---|
| | f | % | f | % | |
| **Age of respondent** | | | | | |
| 12- 13 Years | 27 | 49.1 | 28 | 50.9 | 0.640 |
| 14-15 Years | 3 | 60.0 | 2 | 40.0 | |
| **Father education** | | | | | |
| High (high school, university) | 19 | 51.4 | 18 | 48.6 | 0.791 |
| Low (SD, SMP) | 11 | 47.8 | 12 | 52.2 | |
| **Mother education** | | | | | |
| High (high school, university) | 13 | 56.5 | 10 | 43.5 | 0.426 |
| Low (SD, SMP) | 17 | 45.9 | 20 | 54.1 | |
| **Father occupation** | | | | | |
| Civil servant | 5 | 71.4 | 2 | 28.6 | 0.228 |
| Private worker | 25 | 47.2 | 28 | 52.8 | |
| **Mother occupation** | | | | | |
| Not working | 24 | 49.0 | 25 | 51.0 | 0.739 |
| Working | 6 | 54.5 | 5 | 45.5 | |

**Table 2.** Description of knowledge and attitude levels before treatment in each group

| Variables | Group | | | | | | |
|---|---|---|---|---|---|---|---|
| | Treatment | | | Control | | | |
| | Before Treatment | | | Before Treatment | | | |
| | Min | Max | Mean ± SD | Min | Max | Mean ± SD | p |
| Knowledge | 20 | 80 | 56,9 ± 18,5 | 10 | 80 | 51,0 ± 18,6 | 0,219[e] |
| Attitude | 4 | 46 | 35,6 ± 8,21 | 28 | 44 | 37,4 ± 4,0 | 0,048[e] |

e = Independent T – test

**Table 3.** Description of knowledge level and attitude after treatment of each group

| Variables | Group | | | | | | |
|---|---|---|---|---|---|---|---|
| | Treatment | | | Control | | | |
| | After Treatment | | | After Treatment | | | |
| | Min | Max | Mean ± SD | Min | Max | Mean ± SD | p |
| Knowledge | 30 | 90 | 71.5[a] ± 18.3 | 10 | 80 | 53.5[a] ± 17.4 | 0.001[e] |
| Attitude | 4 | 48 | 39.2[b] ± 7.5 | 28 | 43 | 37.0[b] ± 4.1 | 0.080[f] |

a = Mean ± Standard Deviation b = Median ± Standard Deviation
e = Independent T-test f= Mann-Whitney

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deviation of 18.5, while the control group had an intermediate knowledge level of 51.0, with a standard deviation of 18.6. The moderate attitude of the treated had a 35.6 standard deviation of 8.21, and the perspective of the control group was 37.4, with a standard deviation of 4.0.

The statistical test results obtained the values of knowledge (p=0.219) and mood (p=0.048), meaning that both the group treated with the modified media Android application and the control group had the same understanding before the study (p>0.05). Based on the results of statistical tests on the level of knowledge and attitudes towards anemia after treatment, the mean score of understanding between the treatment group and the control group was different, as shown in Table 3.

The average knowledge of the treatment and control groups had different scores, higher in the treatment group, 71.5 with a standard deviation of 18.3, while the control group's knowledge score was 53.5 with a standard deviation of 17.4. The post-test attitude between the treatment group and the control group can be seen from the average value; the post-test philosophy in the treatment group is 39.2 with a standard deviation of 7.5, and the control group attitude value is 37.0 with a standard deviation of 4.1. The difference test results obtained the values of knowledge (p=0.219) and attitude (p=0.048) after the post-test between the treatment group and the control group. A knowledge p-value of 0.001 and an attitude of p-value 0.080 mean a significant difference in the level of knowledge after being consulted.

## Differences in Knowledge and Attitudes Before and After in the Treatment Group and Control Group

Table 4 shows the difference in knowledge and attitude scores in the treatment and control groups before and after treatment. The results of the difference test showed that the average knowledge before treatment was 50.0, with a standard deviation of 18.5; in the measurement after treatment, the average ability was 64.6, with a standard deviation of 18.3, while the moderate attitude in the treatment group was 32.5, with a standard deviation of 8.2. The attitude obtained in the first post-test measurement was 36.4, with a standard deviation 7.5.

The results of the statistical test of knowledge (p=0.002) and attitude (p=0.001) obtained a value of p<0.05; it can be concluded that there is a significant difference in ability and philosophy before and after treatment in the treatment group.

The difference in knowledge and attitude scores of the control group was only assessed once. The average pre-test knowledge result in the control group was 44.0 with a standard deviation of 18.8; in the post-test measurement, the intermediate ability was 47.0 with a standard deviation 17.4. The attitude of the control group showed the average pre-test was 35.9 with a standard deviation of 4.0; in the post-test measurement, the moderate attitude was 35.3 with a standard deviation of 4.1. The results of the difference test Knowledge (p=0.0095) and Attitude (p=0.581) show no significant difference between the pre-test and post-test knowledge and attitude.

## Change in Score (Knowledge, Attitude, and Practice) in Both Groups

The assessment of changes in knowledge and attitude scores in both groups can be seen in Table 5. The statistical test results showed that the increase in knowledge score for the treatment group was 16.0 with standard deviation of 20.7, while for the control group, the change in

**Table 4.** Differences in Knowledge and Attitude Scores Before and After Training for Treatment Group and Control Group

| Variables | Group | | | | | |
|---|---|---|---|---|---|---|
| | Treatment | | | Control | | |
| | Before treatment | After treatment | p | Before treatment | After treatment | p |
| | Average | Average | | Average | Average | |
| Knowledge | 50.0[a] + 18.5 | 64.6[a] + 18.3 | 0,002[c] | 44.0[a] + 18.8 | 47.0[a] + 17.4 | 0,095[c] |
| Attitude | 32.5[b] + 8.2 | 36.4[b] + 7.5 | 0,001[c] | 35.9[a] + 4.03 | 35.3[a] + 4.1 | 0,581[c] |

a = mean + Standar Deviasi
e = Independent T – test
f= Mann-Whitney
b = Median + Standar Deviasi

**Table 5.** Changes in Knowledge Score, Attitude of Treatment Group and Control Group

| Variables and Groups | n | Average | SD | p |
|---|---|---|---|---|
| Knowledge | | | | |
| Treatment | 30 | 16.0 | 20.7 | 0.138f |
| Control | 30 | 8.6 | 16.7 | |
| Attitude | | | | |
| Treatment | 30 | 14.6 | 23.0 | 0.013f |
| Control | 30 | 3.03 | 9.5 | |

f= Mann-Whitney

knowledge score was 8.6 with standard deviation of 16.7. Likewise, the attitude results in the treatment group were 14 with standard deviation of 23.0; the control group increased the attitude score by 3.03 with standard deviation of 9.5. As for the practice of the treatment group, it showed 3.80 with standard deviation of 1.835; for the control group, the median of change in practice score was 2.00 with a standard deviation of 2.334.

The results of the difference test on knowledge ($p = 0.138$) and attitude ($p = 0.013$) show a non-significant change in the knowledge and attitude scores. There is a significant change between the treatment group and the control group. Although there was no significant difference in knowledge between the two groups before and after treatment, the changes in the treatment group were more important than in the control group.

## Knowledge Level

The study results showed a significant difference in pre-test and post-test knowledge in the treatment group. At the same time, there was no significant difference between the pre-test and post-test knowledge of the control group. The knowledge of adolescent girls before being given the intervention averaged 56.9 in the treatment group and 51.0 in the control group; after the intervention, the treatment group was 71.5, and the control group was 53.5. However, there are still schoolgirls whose knowledge still needs to be improved; the less understood material is the signs and symptoms of anemia 78%, the impact of anemia on adolescent girls 85%, and prevention of anemia 80%. After the intervention, there was an increase in knowledge of 16-8 points, significantly different between the treatment and control groups. The results of Putu (2018) showed that the level of knowledge before and after counselling was given to each group was the level of knowledge less than nine samples (81.8%), the good category was two samples (18.2%) and increased after the intervention was carried out, namely the good category as many as six samples (54.5%), while the control group knowledge level did not experience significant changes, namely the category less before nutritional counselling as many as four samples (40%), after the intervention, there were less than five samples (50%). This is because the intervention provided is in nutritional counselling, where pregnant women raise the problems faced intensively (Need, 2018).

The group that was given nutrition consultation using Android media increased significantly. The control group was assigned nutrition consultation without using Android media, and the increase in knowledge was still low. The treatment group showed a better knowledge of anemia incidence than the control. We know consultation is a structured process as a form of intervention on behaviour that aims to influence a person's knowledge to achieve efforts to increase nutritional knowledge, especially about the incidence of anemia. Knowledge is a process of finding out, from previously not knowing to knowing, through education consultation or experience (Notoatmodjo, 2007).

The results of this study align with Fertimah (2018), where the results show that the provision of audiovisual media and meditation applications has an effect in increasing knowledge about anemia and compliance with taking iron tablets for pregnant women. This is influenced by the increase in smartphone users, which is said to be a new type of media because it can access information quickly through internet facilities, one of which is smartphone-based media, namely Android applications. Likewise, Wilarsih (2022) states that there is an increase in the knowledge of premarital women before and after being given nutritional counselling. One of the efforts that can increase the knowledge and abilities of individuals or families about nutrition can be made through counselling. Counselling is a way to fulfil food to help individuals and families better understand. Research by Hestuningtyas (2014) also states that there are differences in knowledge before and after

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being given nutritional counselling, increasing the behaviour and knowledge of mothers regarding child feeding, making nutritional intake increase; this shows that nutritional counselling conducted once a week has proven to be quite effective in changing feeding. Sofiyana (2013) also stated that there was an increase in the knowledge of mothers of toddlers; before the nutritional counselling was done, mothers of toddlers had sufficient knowledge, and after being given counselling, mothers of toddlers had good knowledge, especially in terms of food forms and frequency of feeding.

Knowledge is the result of sensing a particular object. Sensing occurs through the five human senses, namely the senses of sight, hearing, smell, taste, and touch. Most human knowledge is acquired through the eyes and ears (Notoatmodjo S, 2007). In the knowledge difference test in the two groups, although there was a very significant difference, the change in the treatment group was much more critical than in the control group; the average answer increased in the post-test knowledge of respondents. According to expert research, the senses that channel the most knowledge into the brain are the eyes (approximately 75% to 87%), while the other 13% to 25% are conducted through other senses. Good knowledge will support behaviour in implementing nutrition, especially Fe intake; nutrition knowledge is essential and can influence individuals (Notoadmojo, 2014). According to Aini (2019), the adolescent phase is an essential period for shaping behaviour and changing mindsets, so they are crucial to influencing (education and health), both from direct education and information technology media, such as smartphones. Nowadays, information technology is developing rapidly. Many people are helped by various facilities produced by the seduction of technology. One of the developing technologies is Android-based smartphones. Because it provides convenience and benefits to its users, many practitioners and academics are developing its application (Kamel et al. 2014).

Innovations in Information Technology (IT) have brought about various changes and improvements in other fields, such as healthcare. Health Information Technology (HIT) apps or projects provide more data or comprehensive information on health-related topics. It provides on-the-go access to health-related information (Ceniza, Angie, 2020). According to Muhson (2010) and Sinta et al. (2019), Advances in science and technology significantly influence various fields of human life, such as education. Education is an inseparable part of the human maturation process, which undoubtedly contributes to the development of science and technology. However, education also needs to utilise advances in science and technology to achieve its goals effectively and efficiently. In the era of globalisation, technology is progressing, and there are many smartphone users, especially teenagers. People or teenagers find it easier to access information from these devices because they are easy to carry around and access at any time. So, researchers created a health education innovation based on the Android application studio (Muhson, 2010). Research conducted by Hendryani (2020). on the creation of Android mobile health applications to monitor and evaluate stunting, from the results of system testing, mobile health applications to monitor and assess stunting can work well.

The nutrition consultation process in the treatment group is information conveyed to participants through knowledge, skills, and experience. The process of nutrition consultation conducted in the treatment group is information conveyed to participants in the form of knowledge, skills, and experience (Alo, 2011), as well as explaining and explaining an idea, understanding, or message verbally to the target group who obtain information and knowledge obtained is a significant factor because respondents can apply the information received to prevent the incidence of anemia (Sudjana, 2000).

Nutrition consultation is one of the essential activities that respondents are willing and able to apply when consuming food ingredients containing iron. The results of measurements in the post-test treatment group after the nutrition consultation was carried out increased; this could be due to the treatment group using android media that has been developed not only given media but the question and answer method in this way (seeing, hearing) makes it easier for respondents to receive information. In contrast to the knowledge of the control group, respondents did not show too

much improvement. This was because, during the consultation, they only understood what they had experienced; the material obtained by the respondents was only sourced from experience and existing media, so they were less able to explore the respondents' knowledge and did not know what the respondents wanted.

**Attitude**

Attitude is a stage towards the process of behaviour change; with a positive change in attitude, it is expected that there will be a change in behaviour from the subject as expected. The mean attitude before treatment was no different, while each group showed a difference after treatment. These results align with research conducted by Fachruddin (2017), before being given an intervention, 72.9% of children knowledge level was good, 78.5% of attitudes were positive, and children with well-balanced nutrition practices were 54.9%. After being given the intervention, good knowledge, positive attitudes, and well-balanced nutrition practices increased by 11.8%, 5.5%, and 15.9%, respectively. Android-based nutrition education media is better than other media. Nutrition education interventions improve balanced nutrition behaviour. Likewise, Sofiyana and Noer (2013) states that there are differences before and after nutritional counselling, where there is an increase in knowledge and attitude changes after conducting nutritional counselling four times in 1 month during the intervention.

Rahmawati research (2017) states that providing health education through nutritional counselling can affect the improvement of respondents' attitudes regarding balanced nutrition in toddlers in preventing malnutrition. Based on Azzahra (2015), there was an increase in attitudes that were categorised as good before and after being given counselling in the treatment group about growth and feeding. Still, in the control group, there was no increase in attitudes before and after being given nutritional counselling using leaflet media. Likewise, Rizqi (2019) increased the attitude score of female students by being given nutrition education about anemia. There was an increase in scores of students who were not given nutrition education; this could be because students who received nutrition education get an additional picture of anemia nutrition that they previously did not know to know better. In addition, the language used in providing nutrition education is easy to understand, with messages conveyed briefly and clearly so that students who receive nutrition education understand more about anemia nutrition. According to WHO, attitude describes a person likes and dislikes towards action; a person perspective is often obtained from his own experience or other people; someone with a positive attitude does not always manifest in real action (Notoadmojo, 2014). Counselling is a two-way relationship between the counsellor and the client that helps the client achieve better changes. Nutrition counselling is essential to identify or change a person habits that may interfere with nutritional status. Nutrition counselling aims to assist clients in changing nutrition-related behaviours to improve the quality of nutrition (PERSAGI PAGI, 2013).

## CONCLUSION

The results showed that nutrition consultation increased knowledge by 16% of the intervention group, while the control group increased knowledge by 8.6%. For the intervention group, attitudes increased by 14.6%, and the control group increased attitudes by 3.03%. The provision of nutrition consultation can improve the knowledge and attitude of adolescent girls in preventing anemia in Bengkulu City. It is necessary to improve the provision of nutritional counselling to adolescents by health workers in the working area of the West Lingkar Health Center, not only about the prevention of anemia but also about the importance of consuming Fe tablets and nutrients needed by adolescents to prevent one of them is anemia.

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