



The Effect of Nutrition Education and Iron Supplementation (Iron Tablets) on Knowledge and Hemoglobin Levels in Adolescent Girls

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Abstrak

Anemia adalah masalah kesehatan umum pada remaja. Remaja putri memiliki kebutuhan yang lebih tinggi untuk penyerapan zat besi antara usia 14 dan 15 tahun. Remaja putri yang anemia lebih berisiko mengalami anemia ketika hamil. Penyuluhan dengan metode ceramah dapat meningkatkan pengetahuan dan sikap siswi mengenai anemi gizi besi untuk pencegahan dan penanggulangan anemia gizi besi dengan pembahasan lebih lengkap, lebih terperinci jelas dan edukatif. Jika asupan zat besi tidak terpenuhi maka dapat juga diberikan suplementasi zat besi secara rutin selama jangka waktu tertentu untuk meningkatkan kadar hemoglobin dan simpanan zat besi dalam tubuh secara cepat. Tujuan penelitian ini adalah mengetahui pengaruh edukasi gizi dan pemberian Tablet Tambah Darah (TTD) terhadap kadar hemoglobin pada remaja putri di MTSN 3 Kota Surabaya. Penelitian ini adalah *quasi experiment* dengan rancangan penelitian *nonrandomized pretest-posttest control group design*, dengan jumlah sampel 80 responden. Teknik pengambilan sampel dengan *propotional stratified random sampling*. Data dianalisis dengan *Kruskal Wallis*. Terdapat pengaruh Edukasi Gizi dengan hasil uji *Wilcoxon* didapatkan p value 0,002 ($p < 0,05$) maka dapat disimpulkan bahwa H_0 diterima, artinya ada pengaruh yang bermakna tingkat pengetahuan sebelum dan setelah diberikan Edukasi Gizi. Terdapat pengaruh pemberian Tablet Tambah Darah (TTD) dengan hasil uji *Wilcoxon* didapatkan p value 0,001 ($p < 0,05$) maka dapat disimpulkan bahwa H_0 diterima, artinya ada pengaruh kadar hemoglobin sebelum dan setelah diberikan Tablet Tambah Darah (TTD). Perlunya sekolah dan puskesmas perlu rutin memberikan penyuluhan yang dilakukan oleh seluruh elemen sekolah yang bekerja sama dengan Puskesmas tentang anemia dan pemilihan konsumsi makanan di rumah maupun di sekolah untuk menunjang kebutuhan gizi remaja Putri.

Article Info

Keywords:

Nutrition Education; Iron Supplementation; Knowledge; Hemoglobin; Adolescent Girls

Abstract

Anemia is a common health problem among adolescents, especially girls, due to increased iron requirements during puberty. Inadequate iron intake can lead to decreased hemoglobin levels and a higher risk of anemia during pregnancy. This study aimed to determine the effect of nutrition education and iron tablet supplementation (Tablet Tambah Darah/TTD) on knowledge and hemoglobin levels among adolescent girls at MTsN 3 Surabaya. This study used a quasi-experimental design with a nonrandomized pretest–posttest control group. A total of 80 respondents were selected using proportional stratified random

sampling. Data were analyzed using the Kruskal-Wallis and Wilcoxon tests. The findings showed a significant effect of nutrition education on knowledge improvement ($p = 0.002$) and a significant effect of iron tablet supplementation on hemoglobin levels ($p = 0.001$). Nutrition education and iron tablet supplementation significantly improved knowledge and hemoglobin levels among adolescent girls. Schools and health centers are encouraged to provide regular counseling and monitoring of iron tablet consumption to prevent anemia.

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Introduction

Anemia remains a major public health problem in Indonesia, particularly among adolescent girls who experience rapid growth and menstruation. Iron deficiency anemia (IDA) accounts for the majority of anemia cases and can cause fatigue, reduced concentration, decreased immunity, and impaired cognitive development [1]. Adolescence is a critical period where nutritional habits are established and often difficult to change later in life. Iron requirements increase significantly between ages 11–15, particularly among girls due to menstrual blood loss [2]. The Indonesian Ministry of Health has implemented iron supplementation (Tablet Tambah Darah, TTD) for adolescent girls as a preventive strategy [3]. Nutrition education is an essential component of behavior modification to improve dietary habits and awareness of anemia prevention [4]. However, knowledge alone is insufficient without concurrent interventions such as supplementation. Therefore, combining education with iron supplementation may have a synergistic effect on anemia prevention. This study aimed to determine the effect of nutrition education and iron supplementation on knowledge and hemoglobin levels among adolescent girls at MTsN 3 Surabaya.

Materials and Method

This study used a quasi-experimental design with a nonrandomized pretest–posttest control group approach. The study was conducted at MTsN 3 Surabaya in December 2024 with 80 participants selected purposively. Data collection included knowledge assessment using questionnaires and hemoglobin measurement using Easy Touch®. Statistical analysis used Wilcoxon and Kruskal-Wallis tests with a significance level of $p < 0.05$.

Results

1. Characteristics of Respondents

Table 1. Distribution of Respondent by Age

No.	Age (years)	Frequency (n)	Percent (%)
1.	11-12	38	47.5
2.	13-14	42	52.5
Total		80	100

Source: Primary Data (2024)

Most respondents were aged 13–14 years (52.5%), while 47.5% were aged 11–12 years.

2. Knowledge about Anemia among Adolescent Girls

Table 2. Distribution of Knowledge about Anemia Before and After Nutrition Education

No.	Knowledge Level	Pre-Test (n/%)	Post-Test (n/%)
1.	Good	24 (30.0%)	69 (86.2%)
2.	Poor	56 (70.0%)	11 (13.8%)
Total		80 (100%)	80 (100%)

Source: Primary Data (2024)

Before the intervention, most respondents (70%) had poor knowledge about anemia, which improved significantly after the education program (86.2% good knowledge).

3. Iron Tablet (TTD) Consumption

Table 3. Distribution of Iron Tablet (TTD) Consumption among Respondents

No.	Iron Tablet Consumption	Frequency (n)	Percent (%)
1.	Yes (1 tablet/week)	71	89.0
2.	No (1 tablet/week)	9	11.0
Total		80	100

Source: Primary Data (2024)

The majority of respondents (89%) reported consuming one iron tablet per week.

4. Hemoglobin Levels

Table 4. Distribution of Respondents by Hemoglobin Levels

No.	Hemoglobin Level	Frequency (n)	Percent (%)
1.	Normal	65	81.0
2.	Not normal	15	19.0
Total		80	100

Source: Primary Data (2024)

Most respondents (81%) had normal hemoglobin levels.

5. Effect of Nutrition Education on Knowledge

Table 5. Effect of Nutrition Education on Knowledge

Group	n	Pre-Test Mean $\pm$ SD	Post-Test Mean $\pm$ SD	p-value
Intervent ion	40	2.60 $\pm$ 0.63	3.00 $\pm$ 0.00	0.002
Control	40	2.80 $\pm$ 0.47	2.77 $\pm$ 0.43	-

Source: Primary Data (2024)

The Wilcoxon test showed a significant effect of nutrition education on knowledge ($p = 0.002$, $p < 0.05$).

6. Effect of Iron Tablet (TTD) Administration on Hemoglobin Levels

Table 6. Effect of Iron Tablet (TTD) Administration on Hemoglobin Levels

Group	n	Pre-Test Mean $\pm$ SD	Post-Test Mean $\pm$ SD	p-value
Intervent ion	40	2.78 $\pm$ 0.57	2.77 $\pm$ 0.58	0.001
Control	40	2.70 $\pm$ 0.65	2.73 $\pm$ 0.57	-

Source: Primary Data (2024)

The Wilcoxon test revealed a significant difference in hemoglobin levels before and after iron tablet administration ($p = 0.001$, $p < 0.05$).

Discussion

This study demonstrated that nutrition education effectively improved students' knowledge regarding anemia prevention. This

finding aligns with Fadhilah et al. [4], who found that visual and audiovisual educational media improved adolescent nutrition knowledge. Education provides awareness about the importance of iron-rich foods and health-promoting behaviors [5].

Iron supplementation (TTD) was also shown to increase hemoglobin levels among participants. The findings are consistent with previous research indicating that regular iron intake restores body iron reserves and corrects anemia efficiently [6], [7].

The results emphasize that combining education with supplementation yields a synergistic effect. Schools serve as an ideal setting for implementing health education programs supported by local health centers. Regular monitoring and collaboration between teachers, health officers, and parents are crucial to maintain adherence and sustain impact.

However, this study has some limitations, including the short intervention duration and limited geographic scope. Future studies could include a larger sample and longer follow-up to evaluate sustained behavior change and anemia prevention outcomes.

Conclusions

Nutrition education and iron supplementation significantly improved knowledge and hemoglobin levels among adolescent girls at MTsN 3 Surabaya. Routine school-based nutrition education combined with weekly iron supplementation is recommended to prevent anemia among adolescents.

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