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# BEHAVIORAL COUNSELING MODEL FOR IMPROVING HEMOGLOBIN LEVELS IN ADOLESCENT GIRLS WITH ANEMIA

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**ABSTRACT**

This study aims to analyze the impact of Behavioral Counseling on haemoglobin improvement in adolescents with anaemia in Palopo City. The research employed a pre-experimental method with a one-group design (pretest-posttest) approach, where haemoglobin levels were measured before the intervention (P1), followed by four intervention sessions over four weeks. After the intervention, haemoglobin levels were measured again (P2). The study was conducted at SMAN 05 Palopo City. The population and sample consisted of 60 female adolescents with anaemia. Research instruments included observation sheets and questionnaires. Data collection involved two measurements, before and after the intervention. Data analysis was performed using the Wilcoxon test with a 95% significance level. The results showed that the mean haemoglobin level before the intervention was 10.3 g/dL, which increased to 11.6 g/dL after the intervention, indicating an improvement of 1.3 g/dL. Based on statistical testing using the Wilcoxon test, a value of $\rho = 0.000 < \alpha = 0.05$ was obtained. It means that the behavioural counselling model significantly improved haemoglobin levels in adolescent girls with anaemia. In conclusion, behavioural counselling can serve as a practical and effective strategy to help adolescents change unproductive behaviours into more positive ones and improve health, particularly in treating and preventing anaemia.

**Keywords**

***Behavioral Counseling; Hemoglobin; Adolescent Anemia***

## INTRODUCTION

Adolescent health is a critical indicator in determining the success of national health development, particularly in preparing future generations. This aligns with the Sustainable Development Goals (SDG), which aim to end hunger, including addressing the nutritional needs of adolescent girls. The government has implemented cross-sectoral and cross-

program policies to support healthy and productive adolescent growth, covering sexual and reproductive health, mental health, child protection, and youth development. These efforts are following the National Medium-Term Development Plan (RPJMN) 2020–2024 and the National Priority in the 2021 Government Work Plan (RKP) to improve the quality and competitiveness of human resources (Taufiqa et al., 2020).

One of the significant health challenges faced by adolescents is the high prevalence of anaemia, a global health issue. It is reported that 1 in 4 adolescent girls suffers from anaemia (Taufiqa et al., 2020). Globally, the prevalence of anaemia among females aged 15 years is 28%, while in Indonesia, it is 48.9% (Ministry of Health, Indonesia, 2019, 2020). In certain regions, such as Java, the prevalence of anaemia among adolescent girls is 45.1%, while in South Sulawesi, it is 26.1% (Nasaruddin et al., 2021). These figures are closely linked to the coverage of iron supplement (Tablet Tambah Darah, TTD) distribution among adolescent girls. Over the past two years, the coverage has decreased from 46.56% in 2019 to 39.1% in 2020. In South Sulawesi, the coverage declined slightly from 58.41% in 2019 to 58.9% in 2020 (Kementerian Kesehatan RI, 2019, 2020). In Palopo City, the TTD coverage was 58.5% in 2019, dropping to 56.5% in 2020. The World Health Organization (WHO), during the 65th World Health Assembly (WHA), set a global action plan and target to reduce anaemia prevalence among women of reproductive age by 50%, including adolescent girls aged 15 years and older.

Anaemia occurs when haemoglobin levels fall below the average threshold of 12 g/dL (Pramestiyani, 2023). Haemoglobin, a key component of red blood cells, is crucial in transporting oxygen to all body tissues and supporting organ growth and development. Adolescents, especially girls, are particularly vulnerable to anaemia due to puberty and menstruation, which result in significant blood loss and iron depletion. This condition is further exacerbated by poor dietary habits, as adolescents often fail to meet their daily iron requireme (Gita et al., 2019).

Anaemia has long-term detrimental effects on the quality of human resources in Indonesia and poses a significant global challenge in the health, social, and economic sectors. Adolescent girls with anaemia are at risk of becoming anaemic mothers in the future (Kementerian Kesehatan RI, 2018; Taufiqa et al., 2020). Since adolescent girls are the future mothers who will raise the next generation, addressing anaemia is vital. Anaemia can be diagnosed through blood tests and is often associated with symptoms such as weakness, fatigue, and difficulty concentrating, collectively referred to as the "5 Ls" (lethargy, listlessness, weakness, fatigue, and carelessness), along with dizziness, blurred vision, and drowsiness due to inadequate oxygen supply to the brain and muscles.

The government has implemented the distribution of iron supplements (TTD) to combat anaemia in adolescent girls. This initiative aims to meet the iron needs of adolescent girls, ensuring that future mothers receive sufficient iron from an early age. Adequate iron intake is expected to reduce the incidence of anaemia in pregnant women, minimize the risk of haemorrhage during childbirth, and prevent low birth weight (LBW) and stunted growth in children (Kementerian Kesehatan RI, 2019). However, this measure has yet to reduce the prevalence and significantly prevent anaemia among adolescents, indicating the need for additional efforts to address the problem. Despite the implementation of the TTD program in 2016, the prevalence of anaemia among adolescents in Palopo City

remains high. Moreover, preliminary surveys conducted by the researchers revealed that many adolescents had never received nutritional counselling, and their health education was limited to mass lectures conducted by health workers in schools.

A more targeted approach focused on promotional and preventive activities, such as adolescent behavioural counselling, is needed to address this issue. Behavioural counselling involves a process where counsellors guide clients using behavioural approaches to improve iron intake, supplementation, and fortify food with iron and folic acid (Juffrie et al., 2020). Adolescent counselling is a face-to-face process in which a counsellor helps adolescents address issues related to their nutritional and reproductive health (Suryani & Sulastri, 2021). It encourages adolescent behaviour and influences them to improve their health and achieve optimal well-being (Kementerian Kesehatan RI, 2018).

This research's novelty (state of the art) builds upon previous studies, which have demonstrated the effectiveness of leaflets and counselling in increasing adherence to iron supplement intake among pregnant women with anaemia. Increased adherence to medication and daily consumption of protein-rich foods significantly improved haemoglobin levels ($P < 0.05$) (Vernissa et al., 2017). Additionally, nutritional education for adolescents with anaemia led to improved dietary choices (Margawati & Iriantika, 2017). and there was a significant difference in knowledge and attitudes before and after nutritional counselling ($P < 0.05$) (Ravin, 2019).

Previous studies show that no research has focused explicitly on adolescent behavioural counselling to improve haemoglobin levels as a strategy to reduce and prevent anaemia among adolescent girls, particularly in Palopo City. The research question addressed in this study is whether nutritional counselling can improve haemoglobin levels in adolescents with anaemia in Palopo City. The objectives of this study are (1) to identify haemoglobin levels in adolescents with anaemia in Palopo City before and after the intervention and (2) to analyze the impact of nutritional counselling on improving haemoglobin levels in adolescents with anaemia in Palopo City. This research aims to provide guidance for interventions to address anaemia among adolescents and to contribute to the prevention of anaemia, ultimately improving the quality of human resources (Healthy Adolescents, Anemia-Free).

## METHOD

This study utilized a pre-experimental design with a one-group pretest-posttest approach. The respondents' haemoglobin levels were measured before the intervention (pre-test) and again after the intervention (post-test).

The population and sample of this study consisted of adolescent girls with anaemia from SMAN 05 Palopo City. The sample was selected using simple random sampling. The sample size, calculated using the Lemeshow formula, included 60 adolescent girls. The sample criteria were: (1) adolescent girls aged 15-17 years with anaemia; (2) no chronic illnesses; (3) not undergoing any medical treatment; and (4) willing to participate as respondents. The research instruments included an observation sheet to record haemoglobin measurements before (pre-test) and after (post-test) the intervention and materials used during the behavioural counselling intervention at each meeting with the respondents. Additionally, a questionnaire was prepared to assess respondents' dietary patterns as an intermediate variable. The questionnaire underwent validity and reliability testing. Counselling media

consisted of flipcharts developed based on literature studies and adapted from tools used in health facilities like community health centres (puskesmas) or clinics. The media were reviewed for feasibility by experts in midwifery and nutrition.

Data collection involved both primary and secondary data. Primary data were obtained from haemoglobin (Hb) measurements before and after the intervention, and in-depth interviews with selected respondents were conducted to reinforce the findings. Secondary data were gathered from related data on the prevalence of anaemia among adolescents. Data analysis included univariate analysis to assess the normality of each variable and bivariate analysis to explore the relationships between variables. Paired t-tests were used, with a significance level of 95%. Data was analyzed using the Statistical Product and Service Solutions (SPSS) software.

## RESULTS

**Table 1. Average Weight and Height of Respondents**

| Anthropometric Measurements | Mean | Minimum - Maximum |
|---|---|---|
| Weight | 41,4 kg | 38 – 46 kg |
| Height | 142,2 cm | 136 – 146 cm |

*Sumber: data primer*

Table 1 shows the average anthropometric measurements, specifically the indicators of weight and height. The respondents' mean weight was 41.4 kg, while their average height was 142.2 cm.

**Table 2. Data Normality Test**

| Hemoglobin Levels | Rerata (gr/dl) | Minimum - Maksimum | Nilai ρ |
|---|---|---|---|
| Before intervention (Measurement I) | 10,3 | 9,50 – 11,1 | 0,004 * |
| After intervention (Measurement II) | 11,5 | 10,10 – 12,6 | 0,000 * |

***Analitik Shapiro-Wilk**

According to Table 2, the normality test results indicate that the mean haemoglobin level before the intervention was 10.3 g/dl with a ρ-value of 0.004, less than α (0.05). After the intervention, the mean haemoglobin level increased to 11.5 g/dl with a ρ-value of 0.000, less than α (0.05). It indicates that the data were not normally distributed, making a paired t-test inappropriate.

**Table 3. Frequency Distribution of Eating Patterns, Snacking Habits, and Physical Activity Before and After the Intervention**

| Indicator | Before Intervention (Frequency/Percentage) | Setelah intervensi (Frekuensi/ Persentase) |
|---|---|---|
| **Frequency of meals per day** | | |
| 2 times | 5 (10,0%) | 3 (5,0%) |
| 3 times | 45 (75,0%) | 40 (66,7%) |
| > 3 kali | 9 (15,0%) | 17 (28,3%) |
| **Iron-rich food consumption (per week)** | | |
| 1 times | 4 (6,7%) | 0 (0,0%) |
| 2 times | 12 (20,0%) | 5 (8,3%) |
| 3 times | 37 (61,7%) | 20 (33,3%) |
| > 3 time | 7 (11,7%) | 35 (58,4%) |
| **Vitamin C consumption habits** | | |
| Never | 11 (18,3%) | 3 (5,0%) |
| Sometimes | 40 (66,7%) | 19 (31,6%) |

| Indicator | Before Intervention (Frequency/Percentage) | Setelah intervensi (Frekuensi/ Persentase) |
|---|---|---|
| Always | 9 (15,0%) | 38 (63,4%) |
| **Fast food consumption (per week)** | | |
| 1times | 7 (11,7%) | 7 (11,7%) |
| 2 times | 4 (6,7%) | 4 (6,7%) |
| 3 times | 7 (11,7%) | 30 (50,0%) |
| 4 times | 39 (65,0%) | 19 (31,6%) |
| 5 times | 3 (5,0%) | 0 (0,0%) |
| **Fried food consumption (per week)** | | |
| 5 times | 19 (31,6%) | 22 (36,6%) |
| > 5 times | 41 (68,4%) | 38 (63,4%) |
| **Green vegetable consumption (per week)** | | |
| Never | 15 (25,0%) | 5 (8,3%) |
| 1 time | 35 (58,3%) | 20 (33,3%) |
| 2 times | 10 (16,7%) | 35 (58,4%) |
| **Tea/coffee consumption with meals** | | |
| Never | 12 (20,0%) | 35 (58,4%) |
| Sometimes | 33 (55,0%) | 20 (33,3%) |
| Always | 15 (25,0%) | 5 (8,3%) |
| **Water consumption** | | |
| < 1 liter | 15 (25%) | 10 (16,7%) |
| 1 liter | 35 (58,3%) | 15 (25%) |
| 2 liters | 10 (16,7%) | 35 (58,3%) |
| **Snack consumption (per week)** | | |
| < 3 times | 10 (16,7%) | 20 (33,3%) |
| 3 – 4 times | 38 (63,3%) | 35 (58,4%) |
| 5 – 6 times | 12 (20,0%) | 5 (8,3%) |
| **Sweet food/drink consumption** | | |
| < 3 times | 8 (13,3%) | 21 (35%) |
| 3 – 4 times | 39 (65,0%) | 30 (50%) |
| 5 – 6 times | 13 (21,7%) | 9 (15%) |
| **Physical activity (per week)** | | |
| Never | 35 (58,3%) | 10 (16,6%) |
| 1 time | 19 (31,7%) | 37 (61,7%) |
| 2 times | 6 (10,0%) | 13 (21,7%) |
| **Fatigue/weakness complaints** | | |
| None | 0 (0,0%) | 35 (58,4%) |
| Sometimes | 47 (78,3%) | 20 (33,3%) |
| Often | 13 (11,7%) | 5 (8,3%) |

*Sumber: data primer*

Based on Table 3, it shows that there was an improvement after the intervention, which included the following: regular meal frequency (≥ 3 times per day), consumption of iron-rich foods ≥ 3 times per week, an increased habit of consuming vitamin C, reduced weekly consumption of fast food (to 3 times per week), reduced frequency of eating fried foods, an increase in the consumption of green vegetables to 2 times per week, a decrease in the habit of drinking tea/coffee with main meals to occasionally or never, an increase in the habit of drinking water to 2 liters per day, a reduction in snacking frequency (to 4 times per week), a decrease in the consumption of sweet foods and drinks to 3 times per week, increased physical activity and other habits (to 1-2 times per week), and a reduction in frequent complaints of fatigue and lethargy,

to the point where such complaints were no longer felt.

**Table 4. Effect of Behavioral Counseling Model on Hemoglobin Increase in Anemic Adolescent Girls**

| Hemoglobin Level (gr/dl) | Media n | Difference (SD) | Min-Max | ρ-value |
|---|---|---|---|---|
| Before intervention (n=60) | 10,3 | 1,3 | 9,50 – 11,1 | 0,000* |
| After intervention (n=60) | 11,6 | | 10,10 12,6 | |

*Uji wilcoxon (negative ranks (3[a]); positive ranks (55[b]); ties (2[c]))

Based on Table 4, it shows that the average hemoglobin level before the intervention was 10.3 g/dl, and after the intervention, it increased to 11.6 g/dl. This indicates an increase in hemoglobin levels after the intervention of 1.3 g/dl. According to the results of the statistical test using the Wilcoxon test, the obtained value is $\rho = 0.000 < \alpha = 0.05$. Additionally, from the positive ranks, 55 respondents experienced an increase in hemoglobin levels after the intervention, with 2 respondents having stable values (ties) and 3 respondents showing a decrease in hemoglobin levels (negative ranks). This means that there is an effect of the behavioral counseling model on the increase of hemoglobin in adolescent girls with anemia. Similarly, from a clinical perspective, the behavioral counseling model has a significant effect on increasing hemoglobin in adolescent girls with anemia, as evidenced by the significant increase of 1.3 g/dl, bringing the average hemoglobin level closer to the normal value of 12 g/dl.

## DISCUSSION

Based on the research findings, the mean haemoglobin level before the intervention was 10.3 g/dL. After the intervention, the haemoglobin level increased to 11.6 g/dL, showing an increase of 1.3 g/dL. The statistical test results using the Wilcoxon test produced a ρ-value = 0.000, which is less than $\alpha = 0.05$. Of the 60 respondents, 55 experienced increased haemoglobin levels, 2 had no change (ties), and 3 experienced a decrease (hostile ranks). It indicates that the behavioural counselling model increased haemoglobin levels in adolescent girls with anaemia. From a clinical perspective, the behavioural counselling model also had a significant impact, as haemoglobin levels increased by 1.3 g/dL, approaching the average value of 12 g/dL.

This finding is supported by the Behavioral Change Theory developed by Prochaska and DiClemente (1983), which suggests that behaviour can be learned, modified, and improved through structured interventions. Behaviour change occurs through stages: pre-contemplation, contemplation, preparation, action, and maintenance (Refnandes, 2023). In the pre-contemplation stage, individuals are unaware that their behaviour is problematic. In the contemplation stage, individuals begin to consider the need for change. In the preparation stage, individuals decide to make changes. The action stage is when individuals start implementing the changes. Finally, in the maintenance stage, the changes are sustained (Agung et al., 2023; Lesmana, 2019; Ulfiah, 2020). In this study, the counsellor first identified behaviours that caused or worsened anaemia. Adolescent girls who initially were unaware of the importance of a healthy diet might be in the pre-contemplation stage. Through behavioural counselling, they moved into the action stage, where they began adopting healthier eating habits and increasing physical activity. Next, individuals were taught self-monitoring, or self-observation of eating patterns and related habits (Agung et al., 2023). The adolescent girls were

encouraged to record the food they consumed and their energy levels over time. With the counsellor's support, they could evaluate whether the changes led to the desired outcomes, namely an increase in haemoglobin levels. Counselling aimed to help them maintain these changes, as reflected by the increase in haemoglobin.

These findings are consistent with previous research by (Rahman et al., 2023) which demonstrated that counselling through e-health effectively increased haemoglobin levels in adolescent girls to a point where they no longer experienced anaemia, meaning their haemoglobin levels returned to normal. Similarly, a study by (Nagamitsu et al., 2022) found that the behavioural counselling approach as a health promotion intervention effectively reduced adolescent depression (Cohen & Powers, 2024).

The behavioural counselling used in this study focused on increasing awareness and motivation for individuals to change daily habits. This approach included education on the importance of iron intake, a healthy diet, and lifestyle habits that support blood health. Through this approach, counselling encouraged participants to address harmful behaviours, such as consuming fast food and beverages that inhibit iron absorption. It is consistent with the findings showing improvements after the intervention, including more regular eating patterns (≥ 3 times daily). Regular eating improves calorie and nutrient intake, which is necessary for red blood cell and haemoglobin production (Hariyanto et al., 2022). The consumption of iron-rich foods ≥ 3 times per week also increased. Iron is essential in haemoglobin production, and a higher intake of foods like red meat, green vegetables, and grains directly helps increase haemoglobin levels (Cohen & Powers, 2024). The habit of consuming vitamin C became more frequent. Vitamin C aids in the body's absorption of non-heme iron (plant-based iron). Increased vitamin C consumption contributed to the effectiveness of iron absorption (Riccioni et al., 2003). The frequency of fast-food consumption decreased to 3 times per week. Fast and fried foods are often low in nutrients, especially iron and vitamins needed for haemoglobin production. Reducing the consumption of such foods allowed the body to focus on getting quality nutrition (Rahmawati et al., 2020). The frequency of green vegetable consumption increased to 2 times per week. Vegetables such as spinach, moringa, and mustard greens are rich in iron and other vitamins that support red blood cell production (Hariyanto et al., 2022), The habit of drinking tea/coffee with main meals also decreased, sometimes even stopping altogether. The habit of drinking water increased to 2 litres per day for most participants. Adequate hydration helps organs, including those responsible for blood production, function properly (Dutra-De-Oliveira et al., 2011). The frequency of snack consumption per week largely decreased to 4 times per week, and the frequency of consuming sugary foods and beverages decreased to 3 times per week. Excessive sugar intake can interfere with iron and vitamin absorption. Reducing sugar consumption allows the body to utilize essential nutrients better to increase haemoglobin levels (Fitripancari et al., 2023). Physical activity and other habits increased to 1-2 times per week. Light to moderate physical activity stimulates red blood cell production by improving blood circulation, which impacts haemoglobin production; therefore, adolescents are encouraged to engage in physical activity (Nam et al., 2023) Finally, complaints of fatigue and lethargy decreased or disappeared altogether.

The application of the behavioural counselling model in this study is based on various health psychology theories that emphasize the importance of awareness, motivation, habit change, and social support. Through this process, adolescent girls with anaemia could change their daily habits, such as improving their healthy eating patterns and leading more active lifestyles, ultimately impacting the increase in haemoglobin levels. The 1.3 g/dL increase in haemoglobin found in this study shows that behaviour change, when supported by appropriate counselling, can significantly improve the health status of adolescent girls with anaemia.

## CONCLUSIONS

Behavioural counselling can be an effective and practical strategy to help adolescents transform unproductive behaviours into more positive ones and improve health, particularly in the management and prevention of anaemia. This approach encourages adolescents to modify their eating behaviours to be healthier, enhance treatment adherence, and adopt lifestyles that support increased haemoglobin levels. Therefore, behavioural counselling has the potential to create a generation of adolescents who are more aware of the importance of health and nutrition and can manage their health independently.

## REFERENCES


Agung, F. H., Sekartini, R., Sudarsono, N., Hendarto, A., Werdhani, R. A., Dhamayanti, M., Pudjiati, R., Hanum, L., Naufal, A., & Sawyer, S. M. (2023). Development of an internet-based intervention to improve health professionals' counseling skills around adolescent weight management in Indonesia. *PLoS ONE, 18*(12 December 2023), 1–13. https://doi.org/10.1371/journal.pone.0294986

Cohen, C. T., & Powers, J. M. (2024). Nutritional Strategies for Managing Iron Deficiency in Adolescents: Approaches to a Challenging but Common Problem. *Advances in Nutrition*, *15*(5), 100215. https://doi.org/10.1016/j.advnut.2024.100215

Dutra-De-Oliveira, J. E., Marchini, J. S., Lamounier, J., & Almeida, C. A. N. (2011). Iron-fortified drinking water studies for the prevention of children's anemia in developing countries. *Anemia*, *2011*. https://doi.org/10.1155/2011/815194

Fitripancari, A. D., Arini, F. A., Imrar, I. F., & Maryusman, T. (2023). The Relationship between Iron and Vitamin C Intake, Risk Beverage Consumption Frequency, and Dietary Behavior with Anemia Adolescent Girls in Depok City. *Amerta Nutrition*, *7*(2SP), 100–106. https://doi.org/10.20473/amnt.v7i2SP.2023.100-106

Gita, S., Prihanti, Fadli, N., P., G. H. S., I., P. S. D., & Hidayati, F. D. (2019). Factors Analysis of Anaemia in Adolescent Girl. *In Proceedings of the 2nd Health Science International Conference*, 113–118.

Hariyanto, N., Fatimawati, I., Hastuti, P., Budiarti, A., & Poddar, S. (2022). Relationship between Diet Patterns and the Incidence of Anemia among Adolescent Girls at SMA Giki 1 Surabaya. *Malaysian Journal of Nursing*, *14*(2), 14–19. https://doi.org/10.31674/mjn.2022.v14i02.003

Juffrie, M., Helmyati, S., & Hakimi, M. (2020). Nutritional anemia in Indonesia children and adolescents: Diagnostic reliability for appropriate management. *Asia Pacific Journal of Clinical Nutrition*, *29*(December), 18–31. https://doi.org/10.6133/APJCN.202012_29(S1).03

Kementerian Kesehatan RI. (2018). Pedoman Pencegahan dan Penanggulangan Anemia PAda Remaja Putri dan Wanita Usia Subur (WUS). In *Kementerian Kesehatan RI*. Kementerian Kesehatan RI.

Kementerian Kesehatan RI. (2019). *Profil Kesehatan Indonesia*. Kementerian Kesehatan RI.

Kementerian Kesehatan RI. (2020). *Profil Kesehatan Indonesia*. Kementerian Kesehatan RI.

Lesmana, G. (2019). Teori dan Pendekatan Konseling. In *UMSU Press*. umsu press.

Margawati, A., & Iriantika, K. A. (2017). Studi Kualitatif Pengaruh Pemberian Konseling Gizi Terhadap Perubahan Sikap Dan Pemilihan Makan Pada Remaja Putri Overwight. *Journal of Nutrition College*, *6*(1), 19–27.

Nagamitsu, S., Kanie, A., Sakashita, K., Sakuta, R., Okada, A., Matsuura, K., Ito, M., Katayanagi, A., Katayama, T., Otani, R., Kitajima, T., Matsubara, N., Inoue, T., Tanaka, C., Fujii, C., Shigeyasu, Y., Ishii, R., Sakai, S., Matsuoka, M., … Horikoshi, M. (2022). Adolescent Health Promotion Interventions Using Well-Care Visits and a Smartphone Cognitive Behavioral Therapy App: Randomized Controlled Trial. *JMIR MHealth and UHealth*, *10*(5), e34154. https://doi.org/10.2196/34154

Nam, H. kyoung, Park, J., & Cho, S. il. (2023). Association between depression, anemia and physical activity using isotemporal substitution analysis. *BMC Public Health*, *23*(1), 1–10. https://doi.org/10.1186/s12889-023-17117-1

Nasaruddin, H., Syamsu, R. F., & Permatasari, D. (2021). Angka Kejadian Anemia Pada Remaja Di Indonesia. *Jurnal Ilmiah Indonesia*, *62*(2), 165–171. https://doi.org/10.1016/j.pedneo.2020.11.002

Pramestiyani, M. (2023). Kegunaan Madu Dalam Atasi Anemia Pada Remaja Putri. In *Rena Cipta Mandiri*. Rena Cipta Mandiri.

Rahman, M. J., Rahman, M. M., Kakehashi, M., Matsuyama, R., Sarker, M. H. R., Ali, M., & Promitee, S. K. (2023). Impact of eHealth education to reduce anemia among school-going adolescent girls in rural Bangladesh: Study protocol of a randomized controlled trial. *Journal of Family Medicine and Primary Care*, *12*(11), 2569–2575. https://doi.org/10.4103/jfmpc.jfmpc

Rahmawati, D. P., Indarto, D., & Hanim, D. (2020). Fast Food Consumption and Snacking in Female Adolescents and Their Correlation With Hemoglobin Levels. *Proceedings of the International Conference on Health and Medical Sciences (AHMS 2020) Fast*, *34*(Ahms 2020), 113–116. https://doi.org/10.2991/ahsr.k.210127.025

Ravin, D. A. (2019). Perbandingan Efektifitas Penyuluhan Metode Ceramah Dan Role Playing Terhadap

Pengetahuan Dan Sikap Siswi Tentang Anemia Gizi Di Smpn 12 Padang Tahun 2019. In *Universitas Perintis Indonesia*. Universitas Perintis Indonesia.

Refnandes, M. N. R. (2023). Enam Teori Perubahan Perilaku (Berbasis Bukti). In *Penerbit Adab*. Penerbit Adab.

Riccioni, G., D'Orazio, N., Menna, V., & De Lorenzo, A. (2003). Fat Soluble Vitamins and Immune System: An Overview. *European Journal of Inflammation*, *1*(2), 59–64. https://doi.org/10.1177/1721727x0300100202

Suryani, S., & Sulastri, M. (2021). *Konseling Anemia Remaja*. Edupublisher.

Taufiqa, Z., Ekawidayani, K., & Sari, T. P. (2020). Aku Sehat Tanpa Anemia. In *Wonderland Publisher*. Wonderland Publisher.

Ulfiah. (2020). *Psikologi Konseling Teori dan Impelementasi*. Prenada Media.

Vernissa, V., Andrajati, R., & Supardi, S. (2017). Efektivitas Leaflet dan Konseling terhadap Kepatuhan Minum Tablet Besi dan Kadar Hemoglobin Ibu Hamil dengan Anemia di Puskesmas di Kabupaten Bogor. *Media Penelitian Dan Pengembangan Kesehatan*, *27*(4), 229–236. https://doi.org/10.22435/mpk.v27i4.6628.229-236