

## Practices Regarding Iron Supplements and Iron Rich Foods among Adolescent Girls at Islamic Senior High School

### Perilaku Konsumsi Tablet Tambah Darah dan Makanan Tinggi Zat Besi pada Remaja Putri di Madrasah Aliyah

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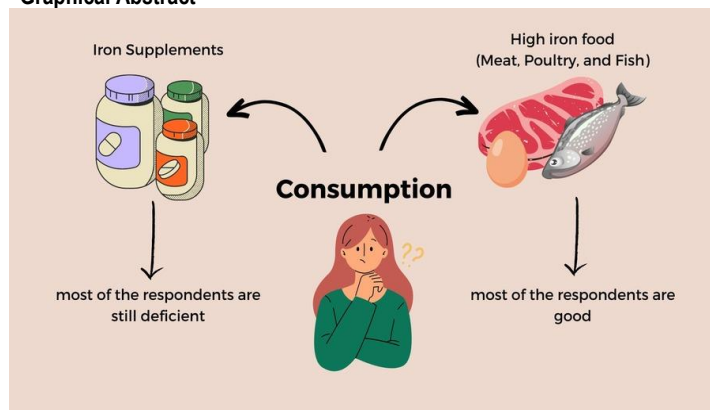
#### Abstract

The primary nutritional concern among adolescent girls is iron-deficiency anemia, which requires prompt attention to prevent complications during pregnancy. One of the strategies for prevention involves the consumption of iron supplements (IS) and high-iron foods. This study aims to delineate the menstrual history, eating patterns, and practice associated with consuming IS and high-iron foods. Employing a descriptive approach, the research was conducted at Islamic Senior High School (MAN 2) Kudus. The sample, comprising 184 individuals, was selected through purposive sampling. The research employed a questionnaire and a Food Frequency Questionnaire (FFQ) as instruments. The findings indicate that only 19.6% of the respondents reported having IS always available at home. The majority (62.0%) had consumed iron supplements at some point. However, only 8.1% consumed IS regularly during menstruation, and 4.3% consumed it regularly when not menstruating. The majority of respondents frequently consumed high-iron foods (1-5 times per week), including chicken/duck (84.8%), eggs (80.4%), fish (76.7%), and meat (60.9%). It is hoped that schools and local healthcare services can enhance educational efforts regarding the benefits of IS consumption for adolescent girls. The practice of consuming iron supplements and high-iron foods from halal sources are a part of maintaining bodily health and constitutes an obligation for every Muslim.

#### Abstrak

Masalah gizi utama pada remaja putri adalah anemia defisiensi besi yang perlu segera diatasi agar masalah tidak berlanjut saat hamil. Salah satu upaya mencegahnya adalah dengan mengonsumsi Tablet tambah darah (TTD) dan makanan tinggi zat besi. Penelitian ini bertujuan untuk menggambarkan riwayat menstruasi, pola makan dan perilaku konsumsi TTD dan makanan tinggi zat besi. Penelitian ini adalah penelitian deskriptif yang dilaksanakan di Madrasah Aliyah Negeri (MAN 2) Kudus. Sampel dipilih secara purposive sampling sebanyak 184 orang. Instrumen yang digunakan adalah kuesioner dan Food Frequency Questionnaire (FFQ). Hasil penelitian menunjukkan hanya 19,6% responden yang menyatakan selalu tersedia TTD di rumah, dan mayoritas (62,0%) menyatakan sudah pernah mengonsumsi TTD, namun hanya 8,1% yang rutin mengonsumsi TTD saat menstruasi dan 4,3% yang rutin mengonsumsi saat tidak menstruasi. Sebagian besar responden mengonsumsi makanan tinggi zat besi dengan kategori sering (1-5x/minggu) berturut-turut adalah ayam/ bebek (84,8%), telur (80,4%), ikan (76,7%) dan daging (60,9%). Diharapkan pihak sekolah dan pelayanan kesehatan setempat dapat meningkatkan upaya edukasi tentang manfaat konsumsi TTD bagi remaja putri. Perilaku mengonsumsi TTD dan makanan tinggi zat besi yang bersumber dari makanan halal merupakan bagian dari menjaga kesehatan tubuh dan menjadi kewajiban bagi setiap muslim.

#### Graphical Abstract



#### Keyword

adolescent girl; iron-deficiency; iron rich foods; iron supplements; schools

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## INTRODUCTION

Anemia is the most common problem of malnutrition, especially in developing countries. (Youssef, et al, 2020). Anemia is one of the main nutritional problems in the age group of young women in Indonesia. (Apriningsih et al., 2020). The prevalence of anemia, iron deficiency and depletion are higher in the adolescent group (Andriastuti et al., 2020). According to the results of the 2013 Riskesdas, female adolescents who experienced anemia were 37.1% and increased to 48.9% in the 2018 Riskesdas, with the proportion of anemia in the age group 15-24 years and 25-34 years (Kementerian Kesehatan RI, 2018b).

Anemia in young women is a condition in which the hemoglobin level in young women is less than 12 gr/dL (WHO, 2022). Hemoglobin functions to bind oxygen and deliver oxygen to all body tissue cells, including the muscles and brain to carry out its functions. Signs of anemia are commonly referred to as 5 L, namely lethargy, fatigue, weakness and weakness (Kementerian Kesehatan RI, 2021). Some of the conditions that cause female adolescents to experience anemia are menstruation/loss of a lot of blood (Herwandar & Soviyati, 2020; Kementerian Kesehatan RI, 2018a), lack of intake of iron-rich foods (Nasruddin et al., 2021) and protein, the tendency of young women to choose to have a vegetarian diet (Gwioździk et al., 2022), and the accelerated growth process that is not balanced with daily nutrient intake (Kementerian Kesehatan RI, 2021).

Adolescent girls who suffer from anemia are at risk of developing anemia during pregnancy. This will have a negative impact on the growth and development of the fetus in the womb and has the potential to cause complications in pregnancy and childbirth, such as giving birth to Low Birth Weight Babies (LBW) and stunting (Amir & Djokosujono, 2019) and even causing maternal and child deaths (Kementerian Kesehatan RI, 2018a; Kementerian Kesehatan RI, 2015; Upadhye & Upadhye, 2017). Adolescent girls who are healthy and not anemic will grow and develop into healthy expectant mothers and give birth to healthy babies (Kementerian Kesehatan RI, 2018a).

Anemia in young women needs to be addressed immediately so that the problem of anemia does not continue during pregnancy, one of which is by taking Blood Supplement Tablets (TTD) which contain 60 mg of elemental Fe and 0.4 mg of folic acid (Amir & Djokosujono, 2019). Adolescent girls are

particularly vulnerable to malnutrition due to higher iron requirements (Development Initiatives, 2018).

Based on the 2018 Riskesdas, it was found that the coverage of iron supplements received by young women was 76.2%, of the 76.2%, 80.9% received iron supplements at school (school children). Based on the 80.9% figure, the consumption of iron tablets for young women  $\geq 52$  items were only 1.4%, while  $< 52$  items were 98.6% (Kementerian Kesehatan RI, 2018b).

Adolescent girls and their parents have high levels of misinformation about anemia and healthy nutritional practices, which are influenced by the socio-cultural environment and local dietary habits. Both young women and their parents considered that young women were not at risk or at low risk of developing anemia. Young women said that parents' opinions about anemia influenced their desire to take iron supplements (Seminar et al., 2020).

Based on the results of a preliminary study conducted at MAN 2 Kudus, it was found that the results of an examination of hemoglobin levels carried out by the Health Service showed that more than half of class X students had anemia (Hb level  $< 12$  gr/dL), which was 58.2%. The school stated that the distribution of Blood Supplement Tablets (TTD) had not been carried out routinely. This research will dig up information about efforts to prevent anemia, especially related to consumption patterns of young women. The purpose of this study was to determine menstrual history, consumption patterns and consumption behavior of blood supplement tablets and foods high in iron.

## METHODS

This research is descriptive research that provides an overview of the consumption behavior of iron supplement tablets (TTD) and foods high in iron in young women. The research was conducted at MAN 2 Kudus, with the consideration that the students came from all regions in Indonesia, the number of students was quite large and during the study they lived in a variety of residences. The research was conducted in November 2022. The research population was young women who were students in class X MAN 2 Kudus with a total of 189 people and a total sample that met the criteria of 184 people. The sampling technique was purposive sampling. The inclusion criteria were students who were willing to be respondents (signing informed

**Table 1**  
*Characteristics of Respondent*

Characteristics	Total	
	n	%
Age (Year)		
13	1	0.5
14	5	2.7
15	156	84.7
16	21	11.4
17	1	0.5
Live at		
Boarding	58	31.5
Non Boarding, kost	4	2.2
Non Boarding, pondok	48	26.1
Non Boarding, rumah sendiri	74	40.2
Mother's Education		
Graduated from elementary school	1	0.5
Graduated from junior high school	11	6
Graduated from high school	59	32.1
Graduated from college	113	61.4
Mother's Occupation		
Housewife	64	34.8
Civil Servant/ Army/ Police	52	28.3
Private Employees	16	8.7
Entrepreneur	36	19.6
Others	16	8.7
Father's Education		
Graduated from elementary school	2	1.1
Graduated from junior high school	11	6
Graduated from high school	69	37.5
Graduated from college	102	55.4
Father's Occupation		
Civil Servant/ Army/ Police	60	32.6
Private Employees	34	18.4
Entrepreneur	73	37.7
Others	17	9.2

consent), while the exclusion criteria were students who were not present during the study.

Primary data collection was carried out, namely by conducting interviews using a questionnaire and the Food Frequency Questionnaire (FFQ) form. Data collected from respondents using a questionnaire (Zhu et al., 2021; Ekasanti et al., 2020; Regasa & Haidar, 2019) consists of 5 components, namely: 1) characteristics of young women, containing information on age and status of residence, 2) characteristics of parents, in the form of education and employment data of mothers and fathers, 3) menstrual history, in the form of information about age of menarche / age of first menstruation, menstrual frequency and duration of menstruation, 4) consumption patterns, containing questions about breakfast habits and eating frequency in a day, and 5) blood supplement consumption behavior, containing questions about the availability and consumption habits of iron supplement tablets (TTD) during menstruation and not menstruation. The Food Frequency Questionnaire

(FFQ) form is used to measure the habit of consuming foods high in iron based on frequency/ frequency of consumption within a certain period of time. The information obtained was then processed using a computer application for univariate analysis to describe consumption patterns of young women related to anemia prevention. This research has received approval from the Health Research Ethics Commission (KEPK) Faculty of Public Health, University of Muhammadiyah Semarang No: 725/KEPK-FKM/UNIMUS/2022.

## RESULTS

Table 1 shows that the ages of the respondents ranged from 13-17 years, and the majority were 15 years old (84.7%). As many as 31.5% of the respondents were boarding class students and the rest were non-boarding students who were divided into living in boarding houses, in non-school huts and in their own homes. Most of the respondents came from families with relatively high

**Table 2**

*Distribution of Respondents according to Menstrual History*

Menstrual History	Total	
	n	%
Menarche age		
Normal (11-13 years)	122	66.3
Abnormal (< 11 or >13 years)	62	33.7
Menstrual Frequency		
Routine every month	145	78.8
Not Routine	39	21.2
Menstrual Duration		
Normal (5-7 days)	107	58.2
Panjang (> 7 days)	77	41.8

educational background of their parents. The education of the respondents' parents was mostly graduates, namely 61.4% (mothers) and 55.4% (fathers). As many as 34.8% of respondents had mothers who did not work/housewives and most fathers were self-employed (37.7%) and PNS/TNI/Polri (32.6%).

Information about menstrual history begins with the age of menarche. The age of menarche is the first age when young women who have entered puberty experience menstruation. Most of the respondents experienced the age of menarche / the age when they first experienced their first menstruation in the normal category, which occurred between the ages of 11-13 years (66.3%), the frequency of menstruation was routinely 1x/month (78.8%) and the duration of menstruation in the period the normal one is between 5-7 days (58.2%). Complete results are presented in [Table 2](#).

Most of the respondents (70.1%) had a habit of having breakfast both at home and after arriving at school and the frequency of eating was 3 x/day (69.6%), as shown in [Table 3](#). [Table 4](#) shows only 19.6 % of respondents stated that iron tablets were

during menstruation, but also when not menstruating. According to the recommendations of the Ministry of Health, the frequency of taking iron tablets during menstruation is every day, while when you are not menstruating it is 1x/week. The results showed that only 8.1% consumed iron tablets regularly during menstruation and 4.3% consumed them regularly when they were not menstruating. The reasons for not taking iron tablets were dominated by ignorance of the benefits of iron tablets, no one reminded them and didn't like them. Most (85.3%) of respondents stated that no family members reminded them to take iron tablets. The majority of the family members who reminded them to take iron tablets consumption were the mothers of the respondents.

The distribution of respondents according to the frequency of consumption of foods high in iron is presented in [Table 5](#), which shows that foods high in iron such as meat, eggs, fish and chicken/duck are consumed quite frequently by the respondents. Types of food consumed daily by respondents included eggs (13.0%), chicken/duck (8.2%) and fish (3.3%). Most of the respondents consumed foods high in iron in the frequent category (1-5x/week), respectively

**Table 3**

*Distribution of Respondents by Diet*

Dietary habit	Total	
	n	%
Breakfast Habits		
Always have breakfast at home	106	57.6
Always have breakfast at school	23	12.5
Sometimes	53	28.8
Never	2	1.1
Meal frequency		
<3x a day	56	30.4
≥3x a day	128	69.6

always available at home, and the majority (62.0%) stated that they had consumed iron tablets. The habit of consuming iron tablets should not only be done

chicken/duck (84.8%), eggs (80.4%), fish (76.7%) and meat (60.9%). Liver is a food that is rarely consumed

**Table 4***Distribution of Respondents according to availability and consumption habits of Blood Supplement Tablets (TTD)*

Availability and consumption habits of TTD	Total	
	n	%
Availability of Iron Supplements at home		
Never	28	15.2
Sometimes	120	65.2
Always	36	19.6
Consumption of TTD		
Ever	114	62
Never	70	38
Consumption of TTD during menstruation		
Routine every day	15	8.1
If remember	47	25.5
Never	122	66.3
Consumption of TTD when not menstruating		
4x a month	8	4.3
2x a month	6	3.2
1x a month	29	15.7
Never	141	76.6
Remind the consumption of TTD		
There is	27	14.7
None	157	85.3

by most of the respondents, even 21.1% said they had never consumed liver.

## DISCUSSION

One of the problems faced by young women in Indonesia is the problem of micronutrient nutrition, one of which is anemia (23%), which is mostly caused by iron deficiency, which is commonly called iron deficiency anemia (Direktorat Gizi Masyarakat RI, 2020). Anemia experienced by a young woman must be addressed immediately, bearing in mind that young women are prospective mothers who will become pregnant and give birth to a baby, thus increasing the risk of maternal mortality, premature birth and low birth weight babies (LBW). Anemia can be avoided by consuming foods high in iron and administering iron supplements (Wisnubroto, 2021).

Every young woman starts at a different age of menarche / age at first menstruation, this can be influenced by heredity, nutritional factors, and other general health (Adam et al., 2022). A person is said to experience the age of menarche / the age of first menstruation in the normal category if it occurs between the ages of 11-13 years (Marmi, 2013). This study shows that only 33.7% of respondents are in the abnormal category, namely less than 11 years (fast) and more than 13 years (slow). Most of the respondents had a regular menstrual frequency of 1x/month (78.8%) and the duration of menstruation was normal, which was between 5-7 days (58.2%).

Previous studies on young women at Islamic Boarding Schools showed that there was a relationship between menstrual cycles, menstrual duration and menstrual frequency with the incidence of anemia (Pibriyanti et al., 2021). The results of the study on female students of the Unissula Semarang Midwifery Study Program showed that there was a relationship between menstrual patterns and the incidence of anemia (Suhariyati et al., 2020).

The consumption pattern that became the habit of most of the respondents was good, namely they were used to breakfast (70.1%) and the frequency of eating in one day was 3x (69.6%). This will benefit the improvement of the nutritional status of female adolescents, including preventing anemia. This is supported by the results of research showing a relationship between breakfast habits and the incidence of anemia as the results of research on young women (Deivita et al., 2021), as well as the results of research on young women at SMP 20 Pekanbaru (Afrityeni et al., 2019).

Most of the respondents in this study (91.9%) had not regularly consumed iron tablets during menstruation and 76.6% had never consumed iron tablets when they were not menstruating, so

**Table 5**

*Distribution of Respondents by Frequency of Consumption of Foods High in Iron*

Frequency of Consumption of Foods High in Iron	Every day (1-4x/day)		Often (1-5x/week)		Rarely (2-24x/year)		Never		Total	
	n	%	n	%	n	%	n	%	n	%
Meat	0	0	112	60,9	66	35,9	6	3,3	184	100,0
Fish	6	3,3	141	76,7	22	11,9	6	3,3	184	100,0
Egg	24	13,0	148	80,4	10	5,4	2	1,1	184	100,0
Chicken/duck	15	8,2	156	84,8	13	7,1	0	0	184	100,0
Liver	0	0	58	31,5	87	4,3	39	21,1	184	100,0

education was needed about the benefits of taking iron tablets. Access to getting iron tablets does not need to wait for distribution from the school, but young women can buy them at drug stores/pharmacies around their residence.

The behavior of respondents consuming high-iron foods was better than their consumption behavior of iron tablets, where most of the respondents consumed high-iron foods frequently (1-5x/week), but there were still respondents who said they had never consumed liver (21.1%). Prevention of anemia can be done by consuming iron tablets regularly, in accordance with the Republic of Indonesia Ministry of Health Circular Letter. HK.03/03/V/0595/2016 concerning Administration of Blood Supplement Tablets (TTD) to Young Women and Women of Reproductive Age (WUS) (Kementerian Kesehatan RI, 2020). In general, administration of Blood Supplement Tablets (TTD) is carried out for school children such as junior high and high school (Rahayuningtyas et al., 2021).

The behavior of consuming iron tablets and foods high in iron is part of maintaining a healthy body. Maintaining a healthy body by consuming halal and *thoyyib* food and beverages is an obligation for every Muslim. Halal food and *thoyyib* are food and drinks that are permissible for consumption by every Muslim, according to the type of food and how to obtain it. What is meant by halal is halal in terms of its substance content and the manufacturing process. Food is called *thoyyib* if the food consumed is food that is safe, good, and does not cause any problems if consumed, both short and long term and can provide benefits to the body (Salim & Rusmana, 2022). In accordance with the word of God in QS. Al Baqarah/ 2:168, which translates:

*“O mankind, eat from whatever is on earth [that is] lawful and good...”*

This verse conveys an invitation to all humans to consume halal and nutritious (good) food. This can

provide benefits for the body and support various daily activities of humans in the world. God conveys the recommendation to consume halal and nutritious food because not everything in this world is automatically halal for consumption. God created venomous snakes not to be consumed, but to use venom as medicine. Birds were created by God to eat insects that damage plants (Shihab, 2002).

Provisions regarding consuming sufficient food and drink are also explained in the QS. Al A'raf/ 7:31, whose translation is:

*“...eat and drink, but be not excessive. Indeed, He likes not those who commit excess”*

The verse means that eating and drinking enough, explained not to overdo it. A Muslim is only allowed to consume *halal* and *thoyyib* food, so that unclean food must be avoided. Examples of foods that are unclean in terms of substance, so they cannot be consumed are carrion or meat of animals slaughtered without mentioning the name of God (except carcasses of fish and grasshoppers), alcohol, pork, wild animals with fangs, animals that eat dung, blood, and so on. Food that is unlawful in terms of processing, such as food that is not permitted by the owner to be consumed or obtained by illegal means.

In connection with the prevention of iron deficiency anemia, the main foods consumed are foods derived from meat, poultry and fish which are commonly referred to as the Meat Poultry Fish Factor (MPF Factor) (Nutrition Consultants, 2018). As the word of God in QS. An Nahl/ 16:5 which translates:

*“And the grazing livestock He has created for you; in them is warmth and [numerous] benefits, and from them you eat.”*

Consuming meat-based foods has a fairly high nutritional content, such as protein, iron, phosphorus, vitamins B and C and parts of the liver that are rich in vitamin A and iron (Nutrition Consultants, 2018).

## CONCLUSIONS

The findings obtained from this study were that most of the respondents had not consumed Blood Supplement Tablets (TTD) routinely according to the Ministry of Health's circular, both during menstruation and not. Respondents' ignorance about the benefits of iron tablets was the main reason for not consuming iron tablets regularly. It is hoped that the school can establish cooperation with tertiary institutions and local health services to increase knowledge and consumption behavior of iron tablets in young women as an effort to prevent iron deficiency anemia. This study has limitations because it does not examine other factors that may be related to low hemoglobin levels, such as measuring the amount of daily nutrient intake quantitatively and the respondent's medical history. Future researchers need to develop this study by conducting experimental research in the form of an intervention in giving iron tablets over a certain period of time to analyze its effect on hemoglobin levels.

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## AUTHORS' CONTRIBUTIONS

Wulandari Meikawati designed the study, wrote manuscript, analyzed and acquired the data. Wahyu Handoyo designed the study. Rahayu Astuti collected and analyzed the data, Ulfa Nurullita wrote manuscript and analyzed the data, Siti Aminah designed and formulated the concept. All authors collected data, revised the manuscript, and performed the field work.

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## COMPETING INTERESTS

The author(s) declare no potential conflict of interest with respect to the research, authorship, and/or publication of this article.

## REFERENCES

- Adam, F. I., Kadir, S., & Abudi, R. (2022). Relationship Between Body Mass Index (BMI) And Age of Menarche in Adolescent Girls at MTs Negeri 3 Gorontalo Regency. *Journal Health & Science : Gorontalo Journal Health and Science Community*, 6(3), 272–283. <https://doi.org/10.35971/gojhes.v6i3.16117>
- Afritayeni, Ritawani, E., & Liwanti, L. (2019). Hubungan Kebiasaan Sarapan Pagi dengan Kejadian Anemia pada Remaja Putri di SMP Negeri 20 Pekanbaru. *Al-Insyirah Midwifery*, 8(1).
- Amir, N., & Djokosujono, K. (2019). Faktor-Faktor yang Berhubungan dengan Konsumsi Tablet Tambah Darah (TTD) pada Remaja Putri di Indonesia: Literatur Review. *Jurnal Kedokteran Dan Kesehatan*, 15(2), 119. <https://doi.org/10.24853/jkk.15.2.119-129>
- Andriastuti, M., Ilmana, G., Nawangwulan, S. A., & Kosasih, K. A. (2020). Prevalence of anemia and iron profile among children and adolescent with low socio-economic status. *International Journal of Pediatrics and Adolescent Medicine*, 7(2), 88–92. <https://doi.org/10.1016/j.ijpam.2019.11.001>
- Apringsih, Madanijah, S., Dwiriani, C. M., & Kolopaking, R. (2020). Determinant of highschool girl adolescent adherence to consume iron folic acid supplementation in Kota Depok. *Journal of Nutritional Science and Vitaminology*, 66, S369–S375. <https://doi.org/10.3177/jnsv.66.S369>
- Deivita, Y., Syafruddin, S., Nilawati, U. A., Aminuddin, A., Burhanuddin, B., & Zahir, Z. (2021). Overview of Anemia; risk factors and solution offering. *Gaceta Sanitaria*, 35, S235–S241. <https://doi.org/10.1016/j.gaceta.2021.07.034>
- Development Initiatives, 2018. (2018). Global Nutrition Report: Shining a light to spur action on nutrition. In *Global Nutrition Report* (Issue June). [http://www.segeplan.gob.gt/2.0/index.php?option=com\\_content&view=article&id=472&Itemid=472](http://www.segeplan.gob.gt/2.0/index.php?option=com_content&view=article&id=472&Itemid=472)
- Direktorat Gizi Masyarakat RI. (2020). Kenali Masalah Gizi yang Ancam Remaja Indonesia – Sehat Negeriku. In *Kementerian Kesehatan* (pp. 21–22).
- Ekasanti, I., Adi, A. C., Yono, M., Nirmala G, F., & Isfandiari, M. A. (2020). Determinants of Anemia among Early Adolescent Girls in Kendari City. *Amerta Nutrition*, 4(4), 271. <https://doi.org/10.20473/amnt.v4i4.2020.271-279>
- Gwioździk, W., Krupa-Kotara, K., Całyniuk, B., Helisz, P., Grajek, M., & Głogowska-Ligus, J. (2022). Traditional, Vegetarian, or Low FODMAP Diets and Their Relation to Symptoms of Eating Disorders: A Cross-Sectional Study among Young Women in Poland. *Nutrients*, 14(19), 4125. <https://doi.org/10.3390/nu14194125>
- Herwardar, F. R., & Soviyati, E. (2020). Perbandingan Kadar Hemoglobin Pada Remaja Premenarche Dan Postmenarche Di Desa Ragawacana Kecamatan Kramatmulya Kabupaten Kuningan Tahun 2018. *Jurnal Ilmu Kesehatan Bhakti Husada: Health Sciences Journal*, 11(1), 71–82. <https://doi.org/10.34305/jikbh.v11i1.154>
- Kementerian Kesehatan RI. (2020). Pedoman pemberian Tablet Tambah Darah (TTD) bagi remaja putri pada masa pandemi COVID-19. *Kementrian Kesehatan RI*, 22. <http://appx.alus.co/direktoratgiziweb/katalog/ttd-rematri->

[ok2.pdf](#)

- Kementerian Kesehatan RI. (2018a). *Pedoman Pencegahan dan Penanggulangan Anemia Pada Remaja Putri dan Wanita Usia Subur (WUS)*.
- Kementerian Kesehatan RI. (2018b). Hasil Utama Riset Kesehatan Dasar. *Kementrian Kesehatan Republik Indonesia*, 1–100.
- Kementerian Kesehatan RI. (2015). Buku Saku Bagi Bidan/Perawat dan Kader Kesehatan Untuk Mendukung Pengembangan Desa dan Kelurahan Siaga Aktif. In *Kementerian Kesehatan RI Pusat Promosi Kesehatan*. [http://promkes.depkes.go.id/wp-content/uploads/pdf/buku\\_pedoman/Buku\\_Saku\\_Kader\\_Desa\\_Siaga.pdf](http://promkes.depkes.go.id/wp-content/uploads/pdf/buku_pedoman/Buku_Saku_Kader_Desa_Siaga.pdf)
- Kementrian Kesehatan RI. (2021). *Remaja Putri Sehat Bebas Anemia di Masa Pandemi Covid-19*.
- Marmi. (2013). *Gizi Dalam Kesehatan Reproduksi*. Pustaka Pelajar.
- Nasruddin, H., Faisal Syamsu, R., & Permatasari, D. (2021). Angka Kejadian Anemia Pada Remaja di Indonesia. *Cerdika: Jurnal Ilmiah Indonesia*, 1(4), 357–364. <https://doi.org/10.59141/cerdika.v1i4.66>
- Pibriyanti, K., Nufus, N. T., & Luthfiya, L. (2021). The Relationship of Menstrual Cycle, Menstrual Length, Frequency of Menstruation, and Physical Activities With The Incident of Anemia in Adolescent Girls at Islamic Boarding School. *Journal Of Nutrition College*, 10(2), 112–119. <https://doi.org/10.14710/jnc.v10i2.29855>
- Rahayuningtyas, D., Indraswari, R., & Musthofa, S. B. (2021). Faktor-Faktor Yang Berhubungan Dengan Praktik Konsumsi Tablet Tambah Darah (Ttd) Remaja Putri Di Wilayah Kerja Puskesmas Gilingan Kota Surakarta. *Jurnal Kesehatan Masyarakat (Undip)*, 9(3), 310–318. <https://doi.org/10.14710/jkm.v9i3.29231>
- Regasa, R. T., & Haidar, J. A. (2019). Anemia and its determinant of in-school adolescent girls from rural Ethiopia: A school based cross-sectional study. *BMC Women's Health*, 19(1), 1–7. <https://doi.org/10.1186/s12905-019-0791-5>
- Salim, M. N. N., & Rusmana, D. (2022). Konsep Pola Makan menurut Al-Qur'an dalam Kajian Tafsir Tematik. *Islamic Review: Jurnal Riset Dan Kajian Keislaman*, 11(1), 73–94. <https://doi.org/10.35878/islamicreview.v11i1.334>
- Shihab, M. Q. (2002). *Tafsir al-misbah*. Jakarta: lentera hati.
- Seminar, A. U., Briawan, D., Khomsan, A., Dewi, M., Ekayanti, I., Mardewi, Raut, M. K., Zakaria, A., & Roche, M. L. (2020). Awareness about anaemia and weekly iron-folic acid supplementation (Wifas) among school-going adolescent girls and parents in east java and east nusa tenggara, indonesia. *Journal of Nutritional Science and Vitaminology*, 66, S111–S117. <https://doi.org/10.3177/jnsv.66.S111>
- Suhariyati, S., Rahmawati, A., & Realita, F. (2020). Hubungan antara Pola Menstruasi dengan Kejadian Anemia pada Mahasiswi Prodi Sarjana Kebidanan Unissula Semarang. *Jurnal Akademika Baiturrahim Jambi*, 9(2), 195. <https://doi.org/10.36565/jab.v9i2.214>
- Upadhye, J. V., & Upadhye, J. J. (2017). Assessment of anaemia in adolescent girls. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*, 6(7), 3113. <https://doi.org/10.18203/2320-1770.ijrcog20172944>
- Nutrition Consultants (2018). *Update on Iron*. <https://www.nutritionconsultants.co.nz/health/update-on-iron-2/>
- WHO. (2022). *Anaemia*. <https://www.who.int/health-topics/anaemia>
- Wisnubroto, K. (2021). *Remaja Sehat Bebas Anemia*.
- Youssef, M. A. M., Hassan, E. S., & Yasien, D. G. (2020). Effect of iron deficiency anemia on language development in preschool Egyptian children. *International Journal of Pediatric Otorhinolaryngology*, 135. <https://doi.org/10.1016/j.ijporl.2020.110114>
- Zhu, Z., Sudfeld, C. R., Cheng, Y., Qi, Q., Li, S., Elhoumed, M., Yang, W., Chang, S., Dibley, M. J., Zeng, L., & Fawzi, W. W. (2021). Anemia and associated factors among adolescent girls and boys at 10–14 years in rural western China. *BMC Public Health*, 21(1), 1–14. <https://doi.org/10.1186/s12889-021-10268-z>