The effect of counseling on hemoglobin on the knowledge of Islamic boarding school students

Chalies Diah Pratiwi [a,1,*], Andyanita Hanif Hermawati [a,2], Nosa Ika Cahyariza [a,3]

[a] STIKes Hutama Abdi Husada Tulungagung, Jl. Dr. Wahidin Sudiro No. 1, Tulungagung, East Java 66224, Indonesia
[1] diahchalies@gmail.com*; [2] andya.nita@yahoo.com; [3] nosaika91@gmail.com
* Corresponding author

ARTICLE INFO

ABSTRACT

Anemia is a condition where the mass of erythrocytes or hemoglobin in circulation cannot fulfill its function to provide oxygen to body tissues. Anemia in adolescent girls is still quite high; the world prevalence of anemia ranges from 40 to 88%. Community service activities aim to screen (check) hemoglobin levels as early detection of anemia using the Point of Care Testing (POCT) method to determine the relationship between age and education to the incidence of anemia and as a preventive effort to minimize anemia. This activity was carried out through counseling about hemoglobin using the lecture method at the Islamic Boarding School Roudlotul Musthofa in May 2023 with 23 female students as respondents, which were then analyzed using the Wilcoxon statistical test. The results of the questionnaire before counseling (pre-test) obtained an average of 80, then counseling was carried out, and the average results of the questionnaire (post-test) were 94. The results of the Wilcoxon Test analysis showed p (Asymp.Sig. (2-tailed)) = 0.000 < α (0.05), which means that there is a significant influence between the knowledge of junior high school students of Raudlatul Mustofa Islamic Boarding School Tulungagung Regency and hemoglobin counseling conducted.

Pengaruh penyuluhan hemoglobin terhadap pengetahuan santri. Anemia adalah keadaan dimana massa eritrosit dan atau massa hemoglobin yang beredar tidak dapat memenuhi fungsinya untuk menyediakan oksigen bagi jaringan tubuh. Anemia pada remaja putri sampai saat ini masih cukup tinggi, prevalensi anemia dunia berkisar 40-88%. Kegiatan pengabdian masyarakat bertujuan untuk skrining (pemeriksaan) kadar hemoglobin sebagai deteksi dini penyakit anemia dengan menggunakan metode Point of Care Testing (POCT) untuk mengetahui hubungan antara umur, pendidikan terhadap kejadian anemia dan sebagai upaya preventif (pencegahan) untuk meminimalisir penyakit anemia. Kegiatan ini dilakukan melalui penyuluhan mengenai hemoglobin dengan metode ceramah di Pondok Pesantren Roudlotul Musthofa pada bulan Mei 2023 dengan banyak responden 23 siswi, yang kemudian dianalisa menggunakan uji statistic Wilcoxon. Hasil kuisioner sebelum penyuluhan (pre-test) didapatkan rata-rata 80, kemudian dilakukan penyuluhan, dan didapatkan rata-rata hasil kuisioner (post-tes) yaitu 94. Hasil analisa Uji Wilcoxon menunjukkan p(Asymp.Sig. (2-tailed)) = 0,000 < α (0.05), yang artinya terdapat pengaruh signifikan anatara pengetahuan siswi SMP Pondok Pesantren Raudlatul Mustofa Kabupaten Tulungagung terhadap penyuluhan hemoglobin yang dilakukan.*

INTRODUCTION

Anemia in adolescents is a prevalent condition primarily caused by insufficient intake of essential nutrients necessary for hemoglobin formation, namely iron (Fe), vitamin C, and copper. This condition highlights the importance of a balanced diet rich in these nutrients to support healthy hemoglobin levels. Further research and awareness campaigns are crucial to addressing this nutritional deficiency and promoting overall adolescent health (Astuti & Kulsum, 2020). According to Indartanti & Kartini (2014) Iron is essential for the formation of the heme component in hemoglobin, while vitamin C is a crucial element in hemoglobin synthesis. Additionally, copper plays a vital role in the absorption of iron from the

gastrointestinal tract. Anemia is characterized by symptoms such as fatigue, weakness, paleness, lack of energy, decreased appetite, and cold hands and feet. Understanding these interconnections between nutrients and the symptoms of anemia is essential for developing effective prevention and treatment strategies, emphasizing the significance of a well-balanced diet rich in iron, vitamin C, and copper for overall health and well-being (Subratha, 2020). The symptoms mentioned should be promptly addressed to prevent more serious consequences for the quality of human resources (Zulqifni & Suandika, 2022). Anemia in adolescents has various detrimental effects, including a decline in learning ability and concentration, hindrance to growth, reduced physical capabilities, a weakened immune system, diminished work productivity, and decreased overall fitness. These consequences underline the critical importance of addressing anemia in young individuals promptly. By implementing comprehensive awareness programs, ensuring proper nutrition, and providing timely medical interventions, we can mitigate these impacts, allowing adolescents to reach their full potential both academically and physically. Investing in the health and well-being of young individuals is essential for fostering a productive and thriving society (Savitri et al., 2015).

Anemia among adolescent girls remains significantly high to this day, with a global prevalence ranging from 40% to 88% (Nurjannah & Putri, 2021). The prevalence of anemia among adolescent girls is alarmingly high, with a rate of 75.9%. According to Martini (2015) anemia affects 50.5% of adolescent girls aged 10–18 years. Anemia can lead to persistent fatigue, decreased learning concentration, low academic achievements, and diminished work productivity. Additionally, it weakens the body's immune system, making individuals more susceptible to infections. The high prevalence of anemia among adolescents, if left untreated, can persist into adulthood and significantly contribute to maternal mortality, premature births, and low birth-weight babies. Effective interventions, including nutritional education, accessible healthcare services, and public health campaigns, are essential to address this issue and improve the overall health outcomes of adolescent girls, ensuring a healthier future generation (Indriani, 2017).

According Barus (2022) anemia is a condition where the circulating mass of red blood cells and/or hemoglobin cannot fulfill its function of providing oxygen to the body tissues. Hemoglobin (Hb) is a protein that serves as an oxygen carrier. Factors influencing hemoglobin (Hb) levels include the adequacy and metabolism of iron in the body. Iron is necessary for the production of hemoglobin (Hb), and iron-deficiency anemia leads to the formation of smaller red blood cells and low hemoglobin content. Proper understanding and management of iron intake and metabolism are crucial in preventing and addressing iron-deficiency anemia, ensuring the production of healthy red blood cells and adequate oxygen supply to body tissues (Hermawati, 2013). The hemoglobin (Hb) levels are greatly influenced by various factors such as age, gender, altitude above sea level, dietary patterns, and others (Gunawan et al., 2021). Low hemoglobin (Hb) levels are associated with clinical issues such as anemia (Hermawati et al., 2021). According to the World Health Organization (WHO), the criteria for anemia in non-pregnant adult women is a hemoglobin (Hb) level less than 12 g/dL (Pramartha, 2016).

Early detection through anemia diagnosis can be achieved by measuring hemoglobin (Hb) levels using Point of Care Testing (POCT) equipment (Suryati et al., 2021). The point-of testing (POCT) method involves simple examination procedures using small sample quantities. It is easy, fast, and effective, making it suitable for areas with limited healthcare facilities, such as community health centers and smaller hospitals. This method is particularly valuable in locations like the community service area at Islamic Boarding School (IBS) Raudhlotul Musthofa in Rejotangan Subdistrict, Tulungagung Regency, East Java Province. The assessment of hemoglobin levels is based on the standard normal range for anemia: 12–15 mg/dL for females and 13.5–17 mg/dL for males (Faatih, 2017).

The point-of testing (POCT) method operates on the principle of measuring hemoglobin levels in a sample based on electrical potential changes. This brief electrical potential, influenced by the chemical interaction between the blood sample and the electrodes within the test strip, allows for the accurate determination of hemoglobin levels (Lailla et al., 2021). The hemoglobin level examination using the Point of Care Testing (POCT) method involves using a small sample of capillary blood. This method is convenient because it requires only a small amount of blood, easily collected from a fingertip (Widianti et al., 2021). However, the use of capillary blood samples has a drawback—it may lead to sample dilution due to shallow punctures. When the skin is not pierced deeply enough, it can dilute the sample, potentially affecting the accuracy of the results (Puspitasari et al., 2020).

The community service activity aims to screen hemoglobin levels early through the Point of Care Testing (POCT) method, enabling the detection of anemia. The objective is to understand the relationship between age, education, and anemia incidence. Additionally, this initiative serves as a preventive measure to minimize the occurrence of anemia, aligning with the efforts of the government and the World Health Organization (WHO) to reduce anemia prevalence by 50% by the year 2025 (Quraini et al., 2020). The hemoglobin level (Hb) examination is conducted using strip tests, with primary data obtained through questionnaires and interviews. Preventive activities aimed at minimizing anemia are carried out by providing information to the positive (+) anemia students at IBS Raudhlotul Musthofa. This information focuses on improving nutritional intake, promoting healthy lifestyle choices, and maintaining cleanliness (Nidianti et al., 2019). Based on these activities, the initiative plays a role in contributing to the achievement of the third Sustainable Development Goal (SDG). This goal aims to ensure health and well-being for people of all ages by promoting preventive measures and enhancing the overall health and welfare of the community (Wisudanto et al., 2022)

METHOD

The implementation involved educational sessions on hemoglobin tailored to address the specific issues and conditions of IBS Roudlotul Musthofa (Figure 1). These activities were carried out from May 8 to May 19, 2023, with the main awareness session conducted on May 15, 2023. The events took place at Pondok Pesantren Roudlotul Musthofa in Pundensari Hamlet, Rejotangan Village, Rejotangan Subdistrict, Tulungagung Regency.

Figure 1. **Students of** IBS Roudlotul Musthofa

The data was collected using a questionnaire from a total of 23 female students. Initially, the respondents were asked to complete the questionnaire to measure their knowledge about hemoglobin (pre-test) before the educational sessions. Subsequently, an awareness campaign was conducted through lectures and the distribution of leaflets. After the session, the students were asked to fill out the questionnaire again to assess their knowledge levels (post-test). A comparison between the respondents' knowledge levels before and after the awareness campaign was made to evaluate the impact of the intervention. The significance of this impact was analyzed using the Wilcoxon signed-rank test, a statistical method used to determine if there was a significant difference in respondents' knowledge levels before and after the hemoglobin awareness campaign.

RESULTS AND DISCUSSION

This analysis was conducted to determine the impact of the intervention, which involved an educational lecture on hemoglobin, on the knowledge of female students at IBS Roudlatul Musthofa. The Figure 2 was collected during the educational session.

Figure 2. Educational session

The analysis employed a non-parametric test, specifically the Wilcoxon test, due to the non-normal distribution of the data. The Wilcoxon test was conducted to examine the difference in knowledge scores of respondents before and after the educational intervention. The statistical test was performed at a significance level of 95% (alpha 0.05), and the results are in the Table 1.

Table 1. Wilcoxon Test Ranks Results for Respondents' Knowledge

Wilcoxon Signed Ranks		
Variable	*Ranks*	**N**
Posttest Score - Pretest Score	*Negative Ranks*	0
	Positive Ranks	19
	Ties	4
	Total	23

Based on Table 1, the results of the pre- and post-tests using counseling interventions with lecture methods on hemoglobin show a negative rank value of 0. This value of 0 indicates no decrease from the pretest value to the posttest value in the results of the knowledge of counseling respondents.

Positive Ranks between the results of knowledge of hemoglobin counseling respondents for pretest and posttest values: N 19 positive data, which means 19 respondents have increased knowledge of hemoglobin from pretest to posttest values. Ties is the similarity of pretest and posttest values; the result of the ties value is 4, so there is the same value between the pretest and posttest values of hemoglobin counseling respondents on the knowledge variable.

Table 2. Results of the Wilcoxon Test Analysis of Knowledge Variables

Variable	N	p-value
Knowledge before and after	23	0.000

Based on Table 2, after the Wilcoxon test, it was found that 23 respondents experienced an increase in value. The results of testing the data above show the results of p (Asymp.Sig. (2-tailed)) = 0.000 < α (0.05), and it can be concluded that there is a significant influence between the knowledge of junior high school students of the IBS Raudhlatul Musthofa and the intervention provided, namely counseling on hemoglobin, in the pretest and posttest results.

Activities have been carried out according to the planned schedule. In this implementation, there are several fields of activity, namely health and education. Activities that have been carried out include data collection, discussion, and counseling on anemia.

This activity was carried out because the SDGs have goals that are more universal. The SDG concept indirectly replaces the MDGs with goals that better meet future challenges. SGDs have three important pillars, and the main target of this counseling activity is human development, which includes education and health (Wahyuningsih, 2017). In addition, this activity aims to achieve the 3rd SGD goal of good health and well-being to ensure healthy lives and promote well-being for all people at all ages (Irhamsyah, 2019). Efforts to counsel hemoglobin levels need to be increased early on with the aim of increasing the knowledge of participants. So that it can change the lifestyle to be healthy and the goals of the 3rd SDGs can be achieved (Dewi et al., 2022).

The development of the role of the community makes pesantren the center of the healthy living community movement. The large number of students who live in pesantren dormitories and carry out activities together results in a lack of adequate nutritional intake and can cause anemia (Indriani, 2017). Adolescent girls who are still growing and are in their menstrual period every month cause iron loss. This menstrual blood loss also causes an iron deficiency. Inadequate iron intake in adolescent girls is a common cause of anemia (Sholicha & Muniroh, 2019).

After observation, STIKes Hutama Abdi Husada Tulungagung students conducted counseling on anemia for IBS Raudlatul Musthofa students in Rejotangan Village, Rejotangan District, Tulungagung Regency. After counseling was carried out, the results showed that before counseling, the average pretest score was 80, and after counseling, the average posttest score was 94. Where the results of the pretest and posttest scores have increased, so that it can be a benchmark for increasing student knowledge about hemoglobin. This is in line with the counseling conducted by Arifah et al (2022) which shows if there is an increase in posttest scores after receiving counseling.

Based on the results of the analysis using the Wilcoxon test, it is known that the results of p (Asymp.Sig. (2-tailed)) = 0.000 < α (0.05), it can be concluded that there is a significant influence between the knowledge of junior high school students of the IBS Raudhlatul Musthofa on the intervention provided, namely counseling on hemoglobin in the pretest and posttest results and for behavior levels such as consuming dietary restrictions, namely sea fish, eggs, papaya, nuts that can affect iron intake, and not taking blood-enhancing supplements for female students to be reduced (Hidayati, 2021). From the resultant data, it can be seen that 24 students of Raudlatul Musthofa Junior High School can understand the material about anemia delivered so that later they can improve individual health in order to avoid anemia.

CONCLUSION

From the results of activities that have been carried out at IBS Roudlatul Musthofa regarding the examination of hemoglobin levels, we can conclude as follows: (1) From the results of the quiz given before counseling to students of the IBS Raudlatul Mustofa, the average pretest score was 80; (2) Counseling activities regarding hemoglobin were carried out at ibs Raudlatul Mustofa Tulungagung Regency on May 15, 2023; (3) From the results of the quiz given after counseling to students of IBS Raudlatul Mustofa Tulungagung Regency, the average posttest score was 94; and (4) The results of the analysis show that p (Asymp.Sig. (2-tailed)) = 0.000 < α (0.05), which means that there is a significant influence between the knowledge of students at IBS Raudlatul Mustofa Tulungagung Regency and hemoglobin counseling conducted.

ACKNOWLEDGEMENT

REFERENCES

Arifah, N., Anjalina, I., Febriana, A. I., Khairunnisa, E., Amir, N. P., Aprilisa, W., Muzhaffar, Z., & Manyullei, S. (2022). Penyuluhan Kesehatan tentang Anemia pada Siswa di SMPN 2 Galesong Selatan Kabupaten Takalar. *Jurnal Altifani*, *2*(2), 176–182. https://doi.org/10.25008/altifani.v2i2.222

Astuti, D., & Kulsum, U. (2020). Pola Menstruasi dengan Terjadinya Anemia pada Remaja Putri. *Jurnal Ilmu Keperawatan Dan Kebidanan*, *11*(2), 314–327.

Barus, E. (2022). Hubungan Kadar Hemoglobin dengan Siklus Menstruasi Remaja Putri. *Jurnal Mutiara Kebidanan*, *8*(2), 36–47.

Dewi, R. D. C., Utami, C. D., & Cahyaningrum, D. G. (2022). Sosialisasi Informasi Gizi Remaja Dalam Meningkatkan Kesehatan di Masa Pandemi Covid-19 terkait Anemia dan Diet Rendah Serat Di Kelompok Pengajian Al-Falah Desa Kemuning Lor Kecamatan Arjasa. *Jurnal Altifani*, *2*(5), 460–466. https://doi.org/10.25008/altifani.v2i5.260

Faatih, M. (2017). Penggunaan Alat Pengukur Hemoglobin di Puskesmas, Polindes dan Putu. *Jurnal Penelitian Dan Pengembangan Pelayanan Kesehatan*, *1*(1), 32–39. https://doi.org/10.22435/jpppk.v1i1.424

Gunawan, I. D. G. A., Padmiari, I. A. E., & Kayanaya, A. A. G. R. (2021). Hubungan Ketersediaan Pangan dan Konsumsi Zat Gizi dengan Status Anemia Siswi SMK Negeri di Kecamtan Tabanan Kabupaten Tabanan. *Jurnal Ilmu Gizi*, *10*(2), 102–110. https://doi.org/10.33992/jig.v10i2.1127

Hermawati, A. H. (2013). *Perbedan Kadar Hemoglobin pada Ibu Hamil Trimester III pada Persalinan Normal dan Prematur di RSUD Dr Soedarsono Pasuruan*. Skripsi. Fakultas Ilmu Kesehatan: Universitas Muhammadiyah Malang.

Hermawati, A. H., Puspitasari, Ek., & Milasari, D. Y. (2021). Review: Perbedaan Kadar Hemoglobin Menggunakan Hematology Analyzer dan Spektrofotometer pada Ibu Hamil. *Borneo Journal of Medical Laboratory Technology*, *3*(2), 206–212. https://doi.org/10.33084/bjmlt.v3i2.2388

Hidayati, R. (2021). *Pengaruh Pemberian Telur Ayam Kampung Rebus dan Buah Pepaya terhadap Peningkatan Kadar Hemoglobin pada Remaja Putri di Pondok Pesantren Tahfizh Alquds Putri Kota Pekanbaru*. KTI. Jurusan Kebidanan: Politeknik Kesehatan Kemenkes Riau.

Indartanti, D., & Kartini, A. (2014). Hubungan Status Gizi dengan Kejadian Anemia pada Remaja Putri. *Journal of Nutrition College*, *3*(2), 310–316. https://doi.org/10.14710/jnc.v3i2.5438

Indriani, T. (2017). *Efektivitas Penyuluhan Kesehatan "Sadari" dengan Media Video Terhadap Pengetahuan pada Remaja Putri di SMK YMJ Ciputat*. Skrispi. Fakultas Kedokteran dan Ilmu Kesehatan: UIN Syarif Hidayatullah Jakarta.

Irhamsyah, F. (2019). Sustainable Development Goals (SDGs) dan Dampaknya Bagi Ketahanan Nasional. *Jurnal Lemhamnnas RI*, *7*(2), 45–54. https://doi.org/10.55960/jlri.v7i2.71

Lailla, M., Zainiar, & Fitri, A. (2021). Perbandingan Hasil Pemeriksaan Hemoglobin Secara Digital Terhadap Hasil Pemeriksaan Hemoglobin Secara Cyanmethemoglobin. *Jurnal Pengelolaan Laboratorium Pendidikan*, *3*(2), 63–68. https://doi.org/10.14710/jplp.3.2.63-68

Martini. (2015). Faktor-Faktor yang Berhubungan dengan Kejadian Anemia pada Remaja Putri di MAN 1 Metro. *Jurnal Kesehatan Metro Sai Wawai*, *8*(1), 1–7. https://doi.org/10.26630/jkm.v8i1.162

Nidianti, E., Nugraha, G., Aulia, I. A. N., Syadzila, S. K., & Suciati, S. S. (2019). Pemeriksaan Kadar Hemoglobin dengan Metode POCT (Point of Care Testing) sebagai Deteksi Dini Penyakit Anemia Bagi Masyarakat Desa Sumberseno, Mojokerto. *Jurnal Surya Masyarakat*, *2*(1), 29–34. https://doi.org/10.26714/jsm.2.1.2019.29-34

Nurjannah, S. N., & Putri, E. A. (2021). Hubungan Statsu Gizi dengan Kejadian Anemia pada Remaja Putri di SMP Negeri 2 Garawangi Kabupaten Kuningan. *Journal of Midwifery Care*, *1*(2), 125–131.

https://doi.org/10.34305/jmc.v1i02.266

Pramartha, A. A. A. (2016). Perbedaan Kadar Hemoglobin pada Kelompok Wanita Vegetarian dengan Non Vegetarian. *Intisari Sains Medis*, *7*(1), 1–5. https://doi.org/10.15562/ism.v7i1.5

Puspitasari, Aliviameita, A., Rinata, E., Yasmin, R. A. Y., & Saidah, S. N. (2020). Perbedaan Hasil Pemeriksaan Hemoglobin Antara Metode Point of Care Testing dengan Metode Sianmethemoglobin pada Ibu Hamil. *Jurnal Analis Kesehatan*, *9*(1), 24–28. https://doi.org/10.26630/jak.v9i1.2113

Quraini, D. F., Ningtyias, F. W., & Rohmawati, N. (2020). Perilaku Kepatuhan Konsumsi Tablet Tambah Darah Remaja Putri di Jember, Indonesia. *Journal of Health Promotion and Health Education*, *8*(2), 154–162. https://doi.org/10.20463/jpk.V8.I2.2020.154-162

Savitri, E. N., Fatmawati, & Christianto, E. (2015). Hubungan Asupan Zat Besi, Vitamin C dan Tembaga dengan Kadar Hemoglobin pada Mahasiswa Angkatan 2014 Fakultas Kedokteran Universitas Riau. *Jurnal Online Mahasiswa Fakultas Kedokteran*, *2*(2), 1–16.

Sholicha, C. A., & Muniroh, L. (2019). Hubungan Asupan Zat Besi, Protein, Vitamin C dan Pola Menstruasi dengan Kadar Hemoglobin pada Remaja Putri di SMAN 1 Manyar Gresik. *Media Gizi Indonesia*, *14*(2), 147–153. https://doi.org/10.204736/mgi.v14i2.147-153

Subratha, H. F. A. (2020). Gambaran Tingkat Pengetahuan Remaja Putri Tentang Anemia di Tabanan. *Jurnal Medika Usada*, *3*(2), 48–53. https://doi.org/10.54107/medikausada.v3i2.75

Suryati, E., Bastian, & Sari, I. (2021). Perbedaan Kadar Hemoglobin Menggunakan Metode Cyanide-Free dan POCT pada Ibu Hamil. *Anakes: Jurnal Ilmiah Analis Kesehatan*, *7*(2), 123–132. https://doi.org/10.37012/anakes.v7i2.597

Wahyuningsih. (2017). Millenium Development Goals (MDGs) dan Sustainable Development Goals (SDGs) dalam Kesejahteraan Sosial. *Bisma: Jurnal Bisnis Dan Manajemen*, *11*(3), 390–399. https://doi.org/10.19184/bisma.v11i3.6479

Widianti, R., Purbayanti, D., & Ardina, R. (2021). Perbedaan Hasil Pemeriksaan Hemoglobin dengan Point of Care Testing (POCT) pada Sampel Darah Vena dan Kapiler. *Borneo Journal of Medical Laboratory Technology*, *4*(1), 267–271. https://doi.org/10.33084/bjmlt.v4i1.2956

Wisudanto, Thalib, P., Diana, E., & Kholiq, M. N. (2022). Pemeriksaan Kesehatan Gratis GeNose C19 pada Santru Pondok Pesantren Nurul Khidmah Surabaya Oleh Pusat Pengelolaan Dana Sosial Universitas Airlangga. *Janaloka*, *1*(1), 28–38.

Zulqifni, F., & Suandika, M. (2022). Pemberian Transfusi Darah sebagai Upaya Peningkatan Perfusi Jaringan pada Pasien Anemia. *Jurnal Indonesia Penelitian*, *3*(5), 6151–6156. https://doi.org/10.47492/jip.v3i5.2055