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Relationship Between Erythrocyte Index Values And Serum Ferritin Levels In Anemia At The Pathological Laboratory

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Abstract

Anemia is a medical condition characterized by low levels of hemoglobin in the blood, which can lead to symptoms such as fatigue, dizziness, pale skin, and the body's inability to transport oxygen efficiently enough. Anemia can be caused by various factors, including iron deficiency, vitamin B12 deficiency, genetic disorders, and chronic diseases. Recent research and data are also presented to provide a better understanding of the prevalence and impact of anemia in the global population. This study was conducted on 94 people suffering from anemia who were treated at Dr. Tadjuddin Chalid Hospital based on patient medical records for the period January 2022 - June 2023. This study is a retrospective observational descriptive study on anemia patients from medical records treated at Dr. Tadjuddin Chalid Hospital. Data analysis was processed using SPSS software. The results of this study indicate the distribution of anemia patients treated at Dr. Tadjuddin Chalid Hospital Makassar for the period January 2022 - June 2023, namely. Of the total sample of 94 people who suffered from anemia, there were 47 male patients (50%) and 47 female patients (50%). The results and conclusions that were obtained in patients with iron deficiency anemia with low MCV and MCH erythrocyte levels, while the MCHC erythrocyte levels cannot be used as a measure of someone affected by iron deficiency anemia and low serum ferritin levels are a strong sign of iron deficiency anemia.

Keywords: Relationship, Erythrocyte Index Value, Serum Ferritin Level, Anemia Disease, Laboratory

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1. Introduction

Anemia is a nutritional disorder that requires careful management. Although the problem is still common, its prevalence has declined somewhat due to government efforts to eradicate it. The incidence of anemia in pregnant women has been steadily declining over the past two decades. According to WHO data, anemia affects 52% of pregnant women in underdeveloped countries and the percentage of pregnant women with iron deficiency was highest in the Philippines at about 55% in 2007, while it was lowest in Thailand at 45%, Malaysia at 30%, and Singapore at 7%. Anemia was reported to affect 45.7% of women in Southeast Asia in 2008, and 47.5% of women in Africa, according to statistics from the World Health Organization. Anemia and postpartum hemorrhage are also cited as contributing factors to 26% of maternal deaths in Bangladesh. Riskesdas data in 2013 using SKRT figures showed that the anemia rate in 1992 was 63.5%, in 1995 it was 50.9%, and in 2000 it was 40%. Pregnant women have an anemia prevalence of 37.1%. In Indonesia, anemia in pregnant women is still a public health problem because its prevalence is above 20%, greater than the average prevalence of anemia in industrialized countries. According to the South Sulawesi Health Profile, the rate of anemia in pregnant women fell from 28.1% in 2013 to 24.1% in 2015. According to 2016 figures from the South Sulawesi Provincial Health Office, 1.15% of pregnant women had hemoglobin levels below 8 mg. /dl, while 98.49% of pregnant women had hemoglobin levels between 8 and 11 mg/dl. Anemia affected 13.4% of the population in South Sulawesi last year. Anemia is the leading cause of maternal death, according to a 2019 report from the South Sulawesi Provincial Health Office iron deficiency, vitamin B12 deficiency, folic acid deficiency, viral infections, heredity and bleeding are just some of the many potential causes of anemia. 40% of anemia cases in underdeveloped countries can be attributed to iron deficiency anemia due to iron deficiency (World Bank, 2006). High rates of iron deficiency are usually associated with a low iron diet, the presence of helminths and living in malaria endemic areas.

2. Research Methods

This study is a retrospective observational descriptive study using secondary data on anemia patients from medical records treated at Dr. Tajuddin Chalid Hospital

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Makassar in 2022-2023.

3. Results and Discussion

The research data were taken from the Medical Records Section of Dr. Tadjuddin Chalid Hospital Makassar on patients recorded from January 2022 to June 2023 who met the criteria. How to determine the inclusion criteria, namely the medical record used is the Total Sampling method is a medical record based on a computer system, where there is a lot of information that can be obtained. To screen the inclusion and exclusion criteria using the Patient History and Patient Data options. This study was conducted non-randomly using total sampling. From the total population of medical records January 2022 - June 2023 as many as 124 samples, which entered the inclusion criteria as many as 94 samples.

a) Variable Distribution of Research Subjects

Table 1.
Distribution of Patient Age Groups Based on Anemia History

Variables		N	%
Age	Infants (0-1 year)	23	24,5
	Toddlers (1-5 years)	17	18,1
	Child (6-10 years)	9	9,6
	Teenagers (10-19 years old)	17	18,1
	Adults (19-44 years old)	12	12,8
	Pre-Elderly (45-59 years old)	4	4,3
	Elderly (>60 years old)	12	12,8
Total		94	100

Table 1. shows that of the total sample age of 94 samples, those aged 0-5 years (Infants / Toddlers) were 39 people (41.4%), those aged 6-11 years (Children) were 11 people (11.7%), those aged <60 years were 33 people (35.2%), and those aged >60 years (Elderly / Old) were 11 people (11.7%).

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Table 2.
Distribution of Anemia Patients Based on Total Serum Ferritin

Variables		N	%
Serum ferritin levels	Normal	42	44,6
	Not Normal	52	55,4
Total		94	100

Table 2. shows from a total sample of 94 anemia patients, the number of patients with normal ferritin levels was 42 patients (44.6%) and the number of patients with abnormal ferritin levels was 52 patients (55.4%).

Table 3.
Chi-Square statistical test results of Gender with
Patients with a History of Iron Deficiency Anemia

Gender	Incidence of Iron Deficiency Anemia		Total		*p-value*
	Yes	No	n	%	
Male	29	18	47	50	0.384
Female	33	14	47	50	
Total	62	32	94	100	

Table 3. This study shows that the incidence of iron deficiency anemia is most prevalent in the female sex as many as 33 people compared to the incidence of iron deficiency anemia in men as many as 29 people. The results of the Chi-Square statistical test showed a p-value of 0.384> 0.05, which means “There is no significant relationship between gender and the incidence of anemia”. Iron deficiency anemia can affect individuals of all genders, factors such as menstruation and pregnancy make women more susceptible to this condition.

The results of this study are in line with the results of the 2013 Riskesdas study, where anemia was more prevalent among toddlers with female gender (Ministry of Health, 2013). When pregnant, anemia causes suboptimal fetal growth and development, complications of pregnancy and childbirth, and results in maternal and child mortality.

The results of the study by Ramin Tabibi and colleagues are similar to the

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study by Kadivar and colleagues who stated that there was no statistically significant relationship between iron deficiency anemia and gender in hemoglobin levels and other iron hematological indices in infancy.

4. Conclusion

Based on the results of research on matters related to the incidence of iron deficiency anemia in patients treated at Dr. Tadjuddin Chalid Hospital Makassar from January 2022 - June 2023, it was found that patients with iron deficiency anemia with low MCV and MCH erythrocyte levels, while their MCHC erythrocyte levels cannot be used as a measure of someone affected by iron deficiency anemia and low serum ferritin levels are a strong sign of iron deficiency anemia, because they reflect the amount of iron storage available in the body. There was no specific association with gender and age variables.

5. Compliance with ethical standards

Acknowledgments

The researcher would like to thank the Head of the Laboratory and his staff, as well as all parties who have helped carry out this research. Therefore, it is expected to conduct further research specifically such as adding several variables that can be associated with erythrocyte levels and serum ferritin levels and regarding matters related to anemia sufferers with erythrocyte levels and serum ferritin levels in a wide range of data and based on time stratification, so that the results of the findings can be compared with the results of this study.

Disclosure of conflict of interest

Research is a positive thing for all researchers so that conflicts, problems and others are not at all a problem for all subsequent authors. Due to the limitations of the study, it is expected for subsequent researchers to conduct further research directly on patients diagnosed with iron deficiency anemia.

Statement of informed consent

Every action we take as researchers is something that is very useful so that scientific development is very much needed by future researchers.

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Daftar Pustaka

1. Amalia, A., & Tjiptaningrum, A. (2016). Diagnosis and Management of Iron Deficiency Anemia Diagnosis and Management of Iron Deficiency Anemia. Majority, 5, 166-169.
2. Aparajita, S., Manas, T., & Santasmita, P. (2022). Red Blood Cell Indices and Hypothyroidism. JK Science, 24(3), 177-182.
3. Ardyantilova, K., & Lidiana, E. H. (2023). Application of Hypertension Gymnastics Against High Blood Pressure For The Elderly In Bendungan Village, Sragen.
4. Arisman. (2014). Nutrition in the Life Cycle: Textbook of Nutrition Science, Ed.2. Jakarta: EGC Medical Books.
5. Barve, S., Patel, D., K K, S., & Jawarkar, A. (2015). Role of Rbc Count and Rbc Indices in Diagnosing and Differentiating Anemias Caused Due To Various Clinical Situations in a Tertiary Care Hospital in Vadodara, Gujarat. Journal of Evidence Based Medicine and Healthcare,2(45),8146-8148.
6. Chaparro, CM, & Suchdev, PS (2019). Anemia epidemiology, pathophysiology, and etiology in low- and middle-income countries. Annals of the New York Academy of Sciences, 1450(1), 15-31.
7. Cotter, J., Baldaia, C., Ferreira, M., Macedo, G., & Pedroto, I. (2020). Diagnosis and treatment of iron deficiency anemia in gastrointestinal bleeding: A systematic review. World Journal of Gastroenterology, 26(45), 7242 - 7257.
8. Dulmovits, B.M., Hom, J., Narla, A., Mohandas, N., & Blanc, L. (2017). Characterization, regulation, and targeting of erythroid progenitors in normal and impaired human erythropoiesis. Current Opinion in Hematology, 24(3)159166.
9. Faiqah, S., Ristrini, R., & Irmayani, I. (2019). The Relationship of Age, Sex and Birth Weight with the Incidence of Anemia in Toddlers in Indonesia. Health System Research Bulletin, 21(4), 281-289.
10. Febriani, A. Y. U., & Sijid, S. T. A. (2021). Review: Iron Deficiency Anemia. November, 137-142.
11. Fitriani, J., & Saputri, A.I. (2018). Iron Deficiency Anemia. Journal. Public Health, 4 (1202005126), 1-30.
12. Gallagher, PG (2022). Anemia in the pediatric patient. Blood , 140 (6), 571-593.
13. Hendarto, A., Febriyanto, R., & Kaban, R. K. (2018). Iron Deficiency and Iron Deficiency Anemia in Obese Adolescent Children. Sari Pediatri, 20(1), 1.
14. Jaelani, M., Simanjuntak, B. Y., & Yuliantini, E. (2015). Risk Factors Associated with the Incidence of Anemia in Adolescent Girls.
15. Jimenez, K., Kulnigg-Dabsch, S., & Gasche, C. (2015).Management of Iron Deficiency Anemia. Gastroenterology and Hepatology, 11 (4), 241-250.
16. Kumar, A., Sharma, E., Marley, A., Samaan, M.A., & Brookes, M.J. (2022). Iron deficiency anemia: Pathophysiology, assessment, practical management. Open Gastroenterology BMJ,9 (1),19.
17. Killip, S., Bennett, J.M., & Chambers, M.D. (2007). Iron deficiency anemia. American Family Physician, 75(5), 671-678.
18. Kurniati, I. (2020). Iron Deficiency Anemia (Fe). Journal of Medicine, University of Lampung, 4 (1), 18-33.
19. Ministry of Health, R. (2018). Guidelines for the Management of Blood Addition Tablet

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International Journal of Health Sciences (IJHS)
Journal Homepage: https://jurnal.agdosi.com/index.php/IJHS/index
Volume 2 | Number 3 | September 2024 |

Administration. Ministry of Health, 46. https://promkes.kemkes.go.id/download/fpck/files51888

20. Ministry of Health, R. (2018). Guidelines for the Administration of Blood Supplement Tablets. Ministry of Health, R.46. Blood Supplement Tablet Book 100415.pdf https://promkes.kemkes.go.id/download/fpck/files51888
21. Knovich, MA, Level, A, Coffman, LG, Torti, SV, & Torti, FM (2009). Ferritin for clinicians.Blood Reviews,23(3),95104. https://doi.org/10.1016/j.blre.2008.08.001
22. Lira, A., Pannyiwi, R., Sima, Y., kurniawati, K., & Rahmat, R. A. (2022). PKM Blood Donation. Friends of Social: Journal of Community Service, 1(1), 1-4. https://doi.org/10.59585/sosisabdimas.v1i1.3
23. Margina, DS, Herawati, S., & Yasa, IWPS (2014). Laboratory Diagnosis of Iron Deficiency Anemia. Udayana Medika E-Journal, 3 (1), 58-69.
24. Magne, J., Guy, J., & Maynadié, M. (2015). Hematologi. Dalam Revue Francophone des Laboratoires (Vol. 2015, Edisi 471).
25. Mustopa, I. I. (2023). Pica as a Manifestation of Iron Deficiency Anemia: A Case Report. Indonesian Journal of Internal Medicine, 10(2). https://doi.org/10.7454/jpdi.v10i2.1101
26. Ma, L., Luo, J., Hiramoto, T., Onumata, Y., Manabe, Y., Takaba, H., Corporation, E., Energy, A., Flory, P. J., Æ, Ì., Sato, T., Geometry, R., Analysis, G., Muraki, M., Nakamura, K., Geometry, R., & Analysis, G. (2019).Title. Proceedings of the Institution of Mechanical Engineers, Part J: Journal of Engineering Tribology, 224(11), 122–130.
27. Nugraha, P. A. (2022). Iron Deficiency Anemia: Diagnosis and Management. Ganesha Medicina Journal, 2(1), 49-56.
28. Newhall, DA, Oliver, R., & Lugthart, S. (2020). Anemia: Disease or symptom? Journal.
29. Novianus, C. (2016). The Relationship between Characteristics and Consumption of Cariogenic Foods with the Incidence of Dental Caries in Students Aged 11-12 Years at Selected Public Elementary Schools in the Working Area of the Taktakan Health Center, Serang City. journal of Research Volume 1, Number 2.
30. Putri, AAA, Salwa, A., & Wahyuningsih, U. (2021). Iron Deficiency Anemia Education for Adolescent Girls Using Leaflets. Proceedings of SENAPENMAS, 279. https://doi.org/10.24912/psenapenmas.v0i0.15000
31. Rahayu, A., Yulidasari, F., Putri, AO, & Anggraini, L. (2019). The Orkes-Ku (my health report card) method in identifying potential nutritional anemia in adolescent girls. In CV Tambang.
32. Rahayu, S., Said, M. S. M., & Sansuwito, T. B. (2023). Factors Affecting Adherence To Consumption Of Fe Tablets In The Prevention Of Anemia In High School Students: A Literature Review. International Journal of Health Sciences, 1(4), 724-739. https://doi.org/10.59585/ijhs.v1i4.196
33. Rezky, I. Z., Ringoringo, H. P., Panghiyangani, R., Hartoyo, E., & Rahmiati, R. (2022). Prevalence of Iron Deficiency Anemia and Influencing Factors in Malnourished Toddlers. Homeostasis, 5(2), 255. https://doi.org/10.20527/ht.v5i2.6269
34. Suryadinata, P. Y. A., Suega, K., Wayan, I., & Dharmayuda, T. G. (2022). Risk Factors Affecting the Incidence of Iron Deficiency Anemia: A Systematic Review. Medika Udayana Journal, 11(2), 6-12.
35. Santosa, B. (2009). Hematopoiesis Activity Due to Alum and Zinc Supplementation in Rats (Rattus norvegicus). Unimus Health Journal, 2 (1), 41-49.

Publish: Association of Indonesian Teachers and Lecturers
International Journal of Health Sciences (IJHS)
Journal Homepage: https://jurnal.agdosi.com/index.php/IJHS/index
Volume 2 | Number 3 | September 2024 |

36. Silalahi, V., Aritonang, E., & Ashar, T. (2016). Potential of Nutrition Education in Improving Nutrition Intake of Anemic Adolescent Girls in Medan City. Journal of Public Health, 11 (2), 295. https://doi.org/10.15294/kemas.v11i2.4113
37. Syarfaini, Alam, S., Aeni, S., Habibi, & Noviani, NA (2019). Risk Factors for Anemia in Pregnant Women in the Sudiang Raya Health Center Working Area, Makassar City. Al-Sihah: Journal of Public Health Sciences, 11(2), 143155. http://103.55.216.56/index.php/AlSihah/article/view/11923/7755
38. Srianingsih, S., Wijaya, A., Pannyiwi, R., Anto, S., Muhajrin, M., & Rauf, N. I. (2022). Nursing care for families with environmental health problems. Barongko: Journal of Health Sciences, 1(1),53-56. https://doi.org/10.59585/bajik.v1i1.41
39. Susanti, R., Imran, A., Briliannita, A., Akbar, A., Yermi, Y., B, M., Pannyiwi, R., & Rasyid, D. (2023). Counseling on clean and healthy living behavior in Minasatene District, Pangkajene Islands Regency. Sahabat Sosial: Journal of Community Service, 1(3), 92-98. https://doi.org/10.59585/sosisabdimas.v1i3.70
40. Tanziha, I., Utama, LJ, & Rosmiati, R. (2016). Risk Factors for Anemia in Pregnant Women in Indonesia. Journal of Nutrition and Food, 11(2), 143-152. https://doi.org/10.25182/jgp.2016.11.2.%p
41. Wiknjosastro, 2018. Science of Midwifery Ed III. Jakarta: Sarwono Prawirohardjo Library foundationWulandari, S., Jamila, S., Rabiah, R., Mardini, R. S., Magelo, W. G., & Pratiwi, A. (2023). Smoking Hazard Education Counseling at SMP Negeri 11 Sigi. Sahabat Sosial: Journal of Community Service, 1(4), 152-159. https://doi.org/10.59585/sosisabdimas.v1i4.127
42. Zhang, Z., Gao, S., Dong, M., Luo, J., Xu, C., Wen, W., Huang, Y., Wu, Y., Zhou, J., & Yuan, Z. (2022). Relationship between Red Blood Cell Indices (MCV, MCH, and MCHC) and Major Adverse Cardiovascular Events in Anemic and Nonanemic Patients with Acute Coronary Syndrome. Disease Markers, 2022 (Mcv). https://doi.org/10.1155/2022/2193343

Sumber Buku:

1. Ali Imran ; Dr. A. Nursinah ; Verawati ; Rusnita Textbook of Health Communication (Key to Successful Hospital Administration). ISBN: 978-623-10-0088-0. https://agdosi.com/2024/04/04/buku-ajar-komunikasi-kesehatan-kunci-sukses-administrasi-rumah-sakit/
2. Donny Aditia ; Fransina Tubalawony ; Putra ; Mochamad Robby Fajar Cahya ; Nur Febrianti ; Risca Hamdanesti ; Dewi Kokmesa ; Islaeli ; Kurniati Nawangwulan ; Yusnita Yusfik. Perawatan Dan Pengobatan Luka Untuk Kesehatan. No. ISBN: 978-623-09-8231-6. https://agdosi.com/2024/01/10/wound-care-and-treatment-for-health/
3. Tri Ayu ; Devin Mahendika ; Nurul Aini Suria Saputri ; Dr. M. Risal Tawil ; Suratno Kaluku ; Cut Mutia Tatisina ; Egy Sunanda Putra ;Lili Amaliah ; Dr. Dwi Moerjoedianto ; Dr. Djusmadi Rasyid ; Lina yunita. Sociocultural Dynamics Of Health. No. ISBN: 978-623-09-8156-2. https://agdosi.com/2024/01/30/sociocultural-dynamics-of-health/