

How to Cite:

Ullah, Z., Shah, W., Hidayat, R., Riaz, U., Naseer, A., & Khan, H. (2023). Frequency of anemia in patients presenting with ulcerative colitis. *International Journal of Health Sciences*, 6(S10), 1559–1566. <https://doi.org/10.53730/ijhs.v6nS10.14097>

Frequency of anemia in patients presenting with ulcerative colitis

Zabih Ullah

Assist Prof Gastroenterology Ward Ayub Medical College & Teaching Hospital Abbottabad, Pakistan

Waqar Shah

Medical Officer Gastroenterology Ward Ayub Teaching Hospital Abbottabad, Pakistan

Rania Hidayat

Consultant Gastroenterology Ward Ayub Teaching Hospital Abbottabad, Pakistan

Ummarah Riaz

Registrar Gastroenterology Ward Ayub Teaching Hospital Abbottabad, Pakistan

Adil Naseer

Prof Gastroenterology Ward Ayub Medical College & Teaching Hospital Abbottabad, Pakistan

Hafizullah Khan

Medical officer Gastroenterology Ward Ayub Medical College & Teaching Hospital Abbottabad, Pakistan

Corresponding author email: drhafeezkhan@yahoo.com

Abstract--Introduction: Anemia appears to be the most common extra intestinal manifestation of inflammatory bowel disease and has been associated with a wide range of complications such as impaired quality of life, an increased rate of hospital admissions and even mortality. Objective: To determine the frequency of anemia in patients presenting with ulcerative colitis. Material and methods; This Cross-Sectional Study was conducted in the Department of Gastroenterology, ATH, Abbottabad from 20th September 2020 to 20th March 2021. A total of 109 patients of both gender with ulcerative colitis were included in the study. Venous blood was collected from all patients in sodium EDTA tube by a 3rd year resident and was immediately sent to hospital laboratory. Hemoglobin < 11 g/dL was recorded as anemia and noted. Results: Age range in this study was from 18 to 60 years with mean age of 41.550±6.56 years, mean duration of complain was 9.862±2.57 months and mean weight was

80.091±7.60 Kg. Male patients were 63.3% and females were 36.7%. Anemia was observed in 14.7% Patients presenting with ulcerative colitis. Conclusion: In conclusion, we found a high incidence and prevalence of anaemia in patients presenting with ulcerative colitis.

Keywords---ulcerative colitis, anemia, frequency.

Introduction

Ulcerative colitis is the most common form of inflammatory bowel disease, characterized by infiltration of inflammatory cells into the mucosa and sub mucosa of the colon leading to ulceration and erosions.¹ Rectum is usually affected first, therefore if left untreated, the disease progress proximally to involve the ascending colon and so on.² Ulcerative colitis is a major health hazard, accounting for more than 2.5 million hospital visits per year in United States alone. Similarly, according to one estimate, more than 4 billion dollars are paid by the health care companies in managing the costs directly related to ulcerative colitis in one year.³ The exact etiology of ulcerative colitis is not known, however multiple genetic and environmental factors have been implicated to have direct or indirect casual association with the disease. For instance, 8 – 14% of patients with ulcerative colitis have positive family history for the disease.⁴ Epidemiological studies have observed that the risk of disease increase by 4 fold if the disease is present in any 1st degree relative.

Similarly, the changes in gut microbiota and defects in mucosal immune system has also been proposed to cause ulcerative colitis. Moreover, the disease is more common in patients with other autoimmune disease implicating its role.⁵ Ulcerative colitis being the disease of the colon is associated with numerous intestinal and extraintestination complications. Anemia is one of these extra intestinal complications and has been observed to affect not only the disease related quality of life but also frequency of hospitalization and 5 years prognosis.⁶ Multiple studies have been performed to estimate the frequency of anemia in ulcerative colitis but most of these studies had limitations. For instance, In a study by Eriksson C, et al. has shown that frequency of anemia was 16.5% in patients presenting with ulcerative colitis.⁷ In another study by Woźniak M, et al. has shown that frequency of anemia was 57.3% in patients presenting with ulcerative colitis.⁸ However, most of the data has been collected from the hospitalized patient indicating their frequency in only seriously ill patients. Therefore, the purpose of this study was to determine the frequency of anemia in ulcerative colitis patients.

Material and Methods

This Cross Sectional Study was conducted in the Department of Gastroenterology Ayub Teaching Hospital, Abbotabad from 20th September 2020 to 20th March 2021. A total of 109 patients were enrolled in the study through non probability consecutive sampling. Sample size was calculated using WHO sample size software with 95% confidence level, 7% margin of error and expected prevalence of anemia of 16.5% in patients presenting with ulcerative colitis.⁷ Patients with

Age 18 to 60 years ,both gender and patients with Ulcerative colitis as per operational definition for > 6 months were included in the study. Similarly those with history of bleeding disorder, trauma in last 3 months, surgery in last 6 months and those with blood transfusion history were excluded from the study. Ulcerative colitis was defined as patient with any three or more of following and Ulcerative Colitis Endoscopic Index of Severity score > 6 on endoscopy.

- Diarrhea (more than 3 stools per day)
- Abdominal pain (VAS>3).
- Rectal pain (VAS>3).
- Rectal bleeding — passing small amount of blood with stool.
- Urgency to defecate.
- Inability to defecate despite urgency.

Anemia was defined as haemoglobin less than 11 g/dl in both sexes by laboratory test. After getting approval from the hospital ethics' committee to conduct the study, data was collected from all those patients with Ulcerative colitis presenting to the Out-patient Department of Gastroenterology, ATH, Abbotabad. An informed written consent was taken from those patients fulfilling the inclusion criteria. Basic demographics like age, gender, duration of complain, poor family status (family monthly income < 20,000) and weight on weighing machine were noted.

Venous blood was collected from all patients in sodium EDTA tube by a 3rd year resident and was immediately sent to hospital laboratory. Hemoglobin < 11 g/dL was recorded as anemia and noted on especially designed proforma. Data was analyzed by the statistical program SPSS Version 22. All the quantitative variables like age, duration of complain and weight were analyzed for mean \pm standard deviation. Frequencies and percentages were calculated for qualitative variables like gender, poor family status and anemia. Anemia was stratified among age, gender, duration of complain, poor family status and weight. Post stratification was done through Chi square test and p-value less than 0.05 was considered as significant.

Results

Age range in this study was from 18 to 60 years with mean age of 41.550 \pm 6.56 years, mean duration of complain was 9.862 \pm 2.57 months and mean weight was 80.091 \pm 7.60 Kg as shown in Table-I. Male patients were 63.3% and females were 36.7% as shown in Table-II. Frequency and %age of patients according to poor family status are shown in Table-III. Anemia was observed in 14.7% patients presenting with ulcerative colitis as shown in Table-IV. Stratification of anemia with respect to age, gender, duration of complain, poor family status and weight are shown in Tables-V, VI, VII, VIII and IX respectively.

Table I
Mean±SD of patients according to age, duration of complain
and weight n=109

	Demographics	Mean±SD
1	Age (years)	41.550±6.56
2	Duration of complain (hours)	9.862±2.57
3	Weight (Kg)	80.091±7.60

Table II
Frequency and %age of patients according to gender n=109

	Gender	Frequency	%age
	Male	69	63.3%
	Female	40	36.7%
	Total	109	100%

Table III
Frequency and %age of patients according to Poor Family Status n=109

	Poor Family Status	Frequency	%age
	Yes	20	18.3%
	No	89	81.7%
	Total	109	100%

Table IV
Frequency and %age of patients according to Anemia n=109

	Anemia	Frequency	%age
	Yes	16	14.7%
	No	93	85.3%
	Total	109	100%

Table V
Stratification of Anemia with respect to age

Age (years)	Anemia		p-value
	Yes	No	
18-40	4(8.5%)	43(91.5%)	0.113
41-60	12(19.4%)	50(80.6%)	
Total	16(14.7%)	93(85.3%)	

Table VI
Stratification of Anemia with respect to gender

Gender	Anemia		p-value
	Yes	No	
Male	9(13%)	60(87%)	0.528
Female	7(17.5%)	33(82.5%)	
Total	16(14.7%)	93(85.3%)	

Table VII
Stratification of Anemia with respect to duration of complain

Duration of Complain (months)	Anemia		p-value
	Yes	No	
6-12	1(1.1%)	86(98.9%)	0.000
>12	15(68.2%)	7(31.8%)	
Total	16(14.7%)	93(85.3%)	

Table VIII
Stratification of Anemia with respect to Poor Family Status

Poor Family Status	Anemia		p-value
	Yes	No	
Yes	15(75%)	5(25%)	0.000
No	1(1.1%)	88(98.9%)	
Total	16(14.7%)	93(85.3%)	

Table IX
Stratification of Anemia with respect to weight

Weight (Kg)	Anemia		p-value
	Yes	No	
≤80	6(10.7%)	50(89.3%)	0.229
>80	10(18.9%)	43(81.1%)	
Total	16(14.7%)	93(85.3%)	

Discussion

Numerous studies have been performed worldwide to determine the frequency of anemia in patients with ulcerative colitis, and their results showed wide variation depending on the study population and on the definition of anaemia.^[9-12] We have used the WHO definition for anaemia in our study.^[13] We found that anemia was present in 14.7% of patients with ulcerative colitis. Our findings slightly varied from IBSEN study, which reported that 7.5% of ulcerative colitis patients were anemic.^[14] Similarly, in another study conducted in Sweden, it was observed that 5% of patients with ulcerative colitis had anemia.^[15] Results of both of these studies were different from ours due to the reason that hemoglobin levels were checked at the outpatient clinic while we collected data from in-patients. Our

results were more in accordance with Eriksson C, et al. who reported a 16.5% frequency of anemia in ulcerative colitis patients.⁷ In another study by Woźniak M, et al. the reported frequency observed was 57.3%⁸ which was very high compared to our study. With regards treatment, intravenous iron was found to be more effective compared to oral in some studies^{[11][16][17]} while in another study they observed no difference between oral or IV regimen for managing anemia in patients with ulcerative colitis.^{[18][19]}

It has been observed that anaemia is more frequent and more severe in patients with high disease activity.^{[14][20][21]} One reason described for this is that patients with high disease activity tend to have higher inflammatory cytokines and chemokines that has a direct inhibitory effect on erythropoiesis, in addition to increased blood loss with the disease. It is due to this inhibitory effect that more ill patients with anemia are usually refractory to iron therapy.^[22] In our study we did not take into account the disease severity and therefore did not try to confirm this hypothesis. However a recent multicenter study in Europe has observed that patients with more extensive disease were found to have more anaemia with regards to frequency and severity in patients with ulcerative colitis.^{[23][24]} Voegtlin et al in their study observed that only 40% and 43% of patients with inflammatory bowel disease had anemia.^[25] However they included both crohns disease and ulcerative colitis in their study. Moreover, since it has been described in literature that anemic patients in inflammatory bowel disease have poor quality of life, hospitalization and higher mortality, therefore these factors presence make the results of Voegtlin et al surprising.^{[26][27]} One reason for these surprising results may be because pregnancy was not taken into account. The WHO definition of anaemia in pregnant women is haemoglobin <110 mg/L, as compared to <120 mg/L in women who are not pregnant. Moreover, those patients included in the study sample were not properly investigated for the type of anaemia. Similarly, another study conducted in Scandinavia observed that in addition to iron deficiency anemia, a significant minority of patients also developed folic acid and vitamin B12 deficiency which also contributes to anemia, giving a mixed picture on Peripheral smear.^[28] We on one hand did not look into the cause of anemia and did not look for iron, folic acid or vitamin B12 deficiency, while on the other hand did not have a control group.

Conclusion:

In conclusion, we found a high incidence and prevalence of anaemia in patients presenting with ulcerative colitis. Considering the long median disease duration of ulcerative colitis, our data indicate that the magnitude of anaemia in patients with established inflammatory bowel disease previously has been underestimated. The risk factors for anaemia, that is extensive disease in ulcerative colitis, should be recognized and current evidence_based guidelines on the management of anaemia in inflammatory bowel disease should be better implemented in clinical practice.

Authors' Contributions

Zabih ullah: Literature Review, manuscript drafting.

Waqar shah: Data collection & statistical analysis

Rania hadayat: Data Interpretation

Ummarah riaz : Proof reading

Adil Naseer: Manuscript drafting,

Hafiz ullah: Expert opinion and manuscript revision.

References

1. Gisbert JP, Chaparro M. Clinical usefulness of proteomics in inflammatory bowel disease: a comprehensive review. *J Crohns Colitis*. 2019;13(3):374-84.
2. Jackson B, De Cruz P. Algorithms to facilitate shared decision-making for the management of mild-to-moderate ulcerative colitis. *Expert Rev Gastroenterol Hepatol*. 2018;12(11):1079-100.
3. Spiceland CM, Lodhia N. Endoscopy in inflammatory bowel disease: role in diagnosis, management, and treatment. *World J Gastroenterol*. 2018;24(35):4014-20.
4. Ashton JJ, Ennis S, Beattie RM. Early-onset paediatric inflammatory bowel disease. *Lancet Child Adolesc Health*. 2017;1(2):147-58.
5. Liu CY, Polk DB. Microbiomes through the looking glass: what do UC? *Cell Host Microbe*. 2018;24(4):472-4.
6. Tulewicz-Marti E, Moniuszko A, Rydzewska G. Management of anemia in inflammatory bowel disease: a challenge in everyday clinical practice. *Prz Gastroenterol*. 2017;12(4):239-43.
7. Eriksson C, Henriksson I, Brus O. Incidence, prevalence and clinical outcome of anaemia in inflammatory bowel disease: a population-based cohort study. *Aliment Pharmacol Ther*. 2018;48(6):638-45.
8. Woźniak M, Barańska M, Małecka-Panas E, Talar-Wojnarowska R. The prevalence, characteristics, and determinants of anaemia in newly diagnosed patients with inflammatory bowel disease. *Prz Gastroenterol*. 2019;14(1):39-47.
9. Wilson A, Reyes E, Ofman J. Prevalence and outcomes of anemia in inflammatory bowel disease: a systematic review of the literature. *Am J Med*. 2004;116(Suppl 7A):44-49.
10. Kulnigg S, Gasche C. Systematic review: managing anaemia in Crohn's disease. *Aliment Pharmacol Ther*. 2006;24:1507_1523
11. Stein J, Bager P, Befrits R, et al. Anaemia management in patients with inflammatory bowel disease: routine practice across nine European countries. *Eur J Gastroenterol Hepatol*. 2013;25:1456_1463
12. Filmann N, Rey J, Schneeweiss S, et al. Prevalence of anemia in inflammatory bowel diseases in European countries: a systematic review and individual patient data meta_analysis. *Inflamm Bowel Dis*. 2014;20:936_945.
13. Nutritional anaemias. Report of a WHO scientific group. *World Health Organ Tech Rep Ser*. 1968;405:5_37
14. Hoivik ML, Reinisch W, Cvančarova M, Moum B. Anaemia in inflammatory bowel disease: a population_based 10_year follow_up. *Aliment Pharmacol Ther*. 2014;39:69_76.
15. Rejler M, Tholstrup J, Andersson_Gare B, Spangeus A. Low prevalence of anemia in inflammatory bowel disease: a population_based study in Sweden. *Scand J Gastroenterol*. 2012;47:937-942
16. Lindgren S, Wikman O, Befrits R, et al. Intravenous iron sucrose is superior to oral iron sulphate for correcting anaemia and restoring iron stores in IBD

- patients: a randomized, controlled, evaluator-blind, multicentre study. *Scand J Gastroenterol.* 2009;44:838_845.
17. Schroder O, Mickisch O, Seidler U, et al. Intravenous iron sucrose versus oral iron supplementation for the treatment of iron deficiency anemia in patients with inflammatory bowel disease—a randomized, controlled, open-label, multicenter study. *Am J Gastroenterol.* 2005;100:2503_2509
 18. Rampton DS, Goodhand JR, Joshi NM, et al. Oral iron treatment response and predictors in anaemic adolescents and adults with IBD: a prospective controlled open-label trial. *Journal of Crohn's & colitis.* 2017;11:706_715.
 19. de Silva AD, Tsironi E, Feakins RM, et al. Efficacy and tolerability of oral iron therapy in inflammatory bowel disease: a prospective, comparative trial. *Aliment Pharmacol Ther.* 2005;22:1097_1105.
 20. Bager P, Befrits R, Wikman O, et al. High burden of iron deficiency and different types of anemia in inflammatory bowel disease outpatients in Scandinavia: a longitudinal 2_year follow-up study. *Scand J Gastroenterol.* 2013;48:1286_1293.
 21. Weiss G, Gasche C. Pathogenesis and treatment of anemia in inflammatory bowel disease. *Haematologica.* 2010;95:175_178.
 22. Bergamaschi G, Di Sabatino A, Albertini R, et al. Prevalence and pathogenesis of anemia in inflammatory bowel disease. Influence of anti-tumor necrosis factor-alpha treatment. *Haematologica.* 2010;95:199_205.
 23. Burisch J, Vegh Z, Katsanos KH, et al. Occurrence of Anaemia in the First Year of Inflammatory Bowel Disease in a European Population-based Inception Cohort-An ECCO-EpiCom Study. *Journal of Crohn's & colitis.* 2017;11:1213_1222.
 24. Sjöberg D, Holmström T, Larsson M, Nielsen AL, Holmquist L, Rönnblom A. Anemia in a population-based IBD cohort (ICURE): still high prevalence after 1 year, especially among pediatric patients. *Inflamm Bowel Dis.* 2014;20:2266_2270.
 25. Voegtlin M, Vavricka SR, Schoepfer AM, et al. Prevalence of anaemia in inflammatory bowel disease in Switzerland: a cross-sectional study in patients from private practices and university hospitals. *Journal of Crohn's & colitis.* 2010;4:642_648.
 26. Danese S, Hoffman C, Vel S, et al. Anaemia from a patient perspective in inflammatory bowel disease: results from the European Federation of Crohn's and Ulcerative Colitis Association's online survey. *Eur J Gastroenterol Hepatol.* 2014;26:1385_1391.
 27. Gasche C, Lomer MC, Cavill I, Weiss G. Iron, anaemia, and inflammatory bowel diseases. *Gut.* 2004;53:1190-1197.
 28. Bager P, Befrits R, Wikman O, et al. The prevalence of anemia and iron deficiency in IBD outpatients in Scandinavia. *Scand J Gastroenterol.* 2011;46:304_309.