Burden of Anemia: A profile of a tertiary care hospital

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ABSTRACT

Introduction : Globally, anemia is the burning health problem with significant disability associated with it. Iron deficiency anemia (IDA) is the commonest cause of anemia more so in developing and underdeveloped part of world. Normocytic anemia is the common finding following microcytic hypochromic and macrocytic in peripheral blood film study. To understand more about the type of anemia among anemic patients in our setting this study was carried out.

Objectives : This study aims to see the prevalence and aetiology of anemia among Nepal army personnel and their families in a Kathmandu based tertiary level hospital.

Methods : This cross-sectional study was conducted over a six months period through June 30th to December 31st 2017 among 342 anemic patients presented to hematology clinic of Shree Birendra Hospital in Kathmandu with the help of data collection tool. Etiology of anemia was worked out. The study was conducted after approval from local IRC. Collected data were entered in SPSS version 22 and analyzed.

Result : Mean hemoglobin value was 8.45±1.61 gm/dL and the mean age of the patient was 52.04±18.32 years. Among the patients of anemia, generalized weakness was the commonest (159, 46.5%) presenting complaint followed by per vaginal bleeding and upper gastrointestinal bleeding. Moderately severe anemia was the commonest (159, 46.5%) laboratory finding. In peripheral blood film study, microcytic hypochromic picture was the commonest finding (169, 49.4%) favoring commonest cause of anemia as iron deficiency followed by anemia of chronic disease.70 % of the participants were female.

Conclusion: The study identified nonspecific complaints like generalized weakness as the predominant presenting complaints of anemia which is commonly neglected. Further, noninvasive tests like peripheral blood film are an important diagnostic tool which can guide us to the possible aetiology of anemia. This study showed iron deficiency anemia and anemia of chronic disease as important differential diagnosis of anemia in our context.

This was a small scale study conducted to access the prevalence of anemia among Nepal army personnel and their families. Hence a larger multicentric study is needed to make it more applicable.

Key-words: *Anemia, microcytic hypochromic, peripheral blood film*

INTRODUCTION

Anemia is considered the most prevalent nutritional deficiency globally, affecting about a quarter of the world population, especially children and women of reproductive age[1, 2].According to WHO, iron deficiency is thought to be the most common cause of anaemia globally, although other conditions, such as folate, vitamin B12 and vitamin A deficiencies, chronic inflammation, parasitic infections, and inherited disorders can all cause anemia.

Iron deficiency refers to the reduction of iron stores that precedes overt iron deficiency anemia[3].Iron deficiency anemia (IDA) is the commonest nutritional deficiency and is major cause of anemia worldwide[4-8]. More so in developing and underdeveloped world[3,4].Though IDA has several etiological factors; inadequate intake, impaired absorption or transport, physiologic losses, or chronic blood loss secondary to disease are its causative factors[4-8].Even in older age group it is equally common with more than 20% by 85 years. With advanced age group etiology of anemia shift towards anemia of chronic disease than iron deficiency in young[9].A study done in adolescent group in Terai region of Nepal also had a similar outcome where Iron Deficiency Anemia was the most common

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cause[10].In elderly population, prevalence of anemia may even exceed 70% with normocytic picture being the dominant type with microcytic hypochromic and macrocytic being other type in peripheral film which can be improved with definitive managemnt[11]. Likewise, another hospital based study done in elderly population at Kashmir also had female predominance with most prevalent age group being 60-69 years and the commonest etiology to be normocytic anemia, which is comparable to our study[12].There are few studies done in Nepal on anemia. One study from eastern Nepal shows high burden of IDA accounting 65.6% in adolescent population. Similarly, in reproductive age group female, its prevalence is 20% while in young breastfeeding infant it is more than double[13].To fill the gap of understanding about the type of anemia among anemic patients in our context this study was carried out.

METHODS AND MATERIALS

Selection and Description of Participants

This cross-sectional study was conducted among all consecutive anemic patients presented to a hematology clinic of at Shree Birendra Hospital, Kathmandu over a period of six months from June 30th to December 31st 2017. With the help of semi-structured questionnaire demographic variables, presenting complaints, baseline laboratory parameters were evaluated. Etiologies of anemia wereclinched with the help of laboratory parameters on top of clinical profile. Among the cases evaluated, peripheral blood film was studied in all cases and specific tests were performed as per the need of the cases. The study proposal was approved by ethical review committee (IRC) of Nepalese army institute of health sciences (NAIHS) prior of conducting the study. Informed verbal consent was taken while enrolling the individual in the study.

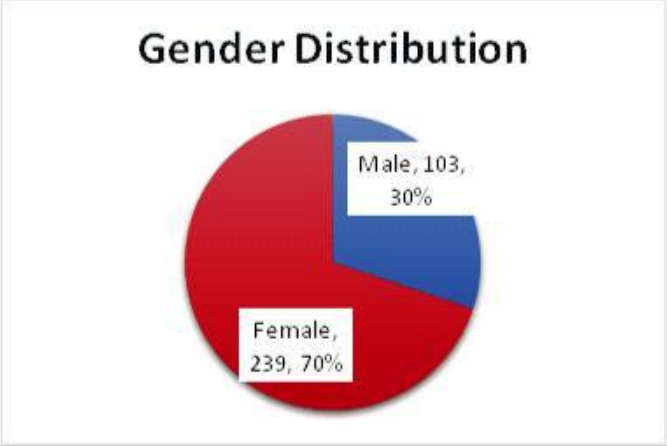
Statistics

The collected were entered in SPSS version 22 and analyzed. Chi-square test was used to see association between important determinant of anemia with the help of p value based on 95% confidence interval and 5% standard error.

RESULT

Total 342 cases were enrolled in this study. Mean age of the participants was 52.04±18.32 years, with minimum being 2 years and maximum being 103 years. Mean hemoglobin value was 8.45±1.61 gm/dl. There were 70% females while rest were males. (Figure 1.)

Figure 1. Gender distribution



Among the patients enrolled, generalized weakness was the commonest (159, 46.5%) presenting complaint followed by per vaginal bleeding, upper gastrointestinal bleeding. While other complaints included shortness of breath, body swelling, paleness, per rectal bleeding, myalgia, malar rashes and other modality of bleeding like acute traumatic blood loss and hemoptysis in descending order. (Table 1.)

Table1. Presenting complaints

Presenting complaints	Frequency	Percent
Weakness	159	46.5
PV Bleeding	45	13.2
UGI bleeding	41	12.0
SOB	28	8.2
Body swelling	19	5.6
Paleness	11	3.2
Myalgia	7	2.0
Malar Rashes	7	2.0
Other cause of Blood Loss	25	7.3
Total	342	100.0

Moderately severe anemia was the commonest (159, 46.5%) laboratory finding among anemic patients followed severe, mild and life threatening in the descending order (Table 2.).

Table 2. Severity of Anemia according to WHO anaemia categories (haemoglobin cut-offs in g/dl).

Anemia Severity	Frequency	Percent
Mild Anemia (above 10g/dL)	66	19.3
Moderate Anemia (8-10 g/dL)	159	46.5
Severe Anemia(6.5-8 g/dL)	77	22.5
Life threatening (less than 6.5g/dL)	40	11.7
Total	342	100.0

In the peripheral blood film study, microcytic hypochromic type was the commonest finding followed by MHA with Anisopoikilocytosis and Polychromasia. Normocytic normochromic picture was the second commonest finding which included anemia of chronic disease.

Table 3. PBF finding

PBF	Frequency	Percentage
MHA with Low Mentzer index	10	2.9
MHA	169	49.4
MHA with PC and AP	35	10.2
MHA with AP	24	7.0
Sickle cells	2	0.6
Normocytic Normochromic	56	16.4
Macrocytic Anemia	16	4.7
Pancytopenia	15	4.4
Blast Cells	9	2.6
Fragments of RBCS	2	0.6
Spherocytes	3	0.9
TG TV	1	0.3
Total	342	100.0

MHA-Microcytic hypochromic anemia TG-Toxic granulation
PC- Polychromasia TV-Toxic vacuolation
AP-Anisopoikilocytosis

Table 5. Relation of gender, etiology, total count and platelets with severity of anemia

Variables		Anemia Severity				Total	p-value
		Mild Anemia (above 10)	Moderate Anemia (8-10)	Severe Anemia (6.5-8)	Life-threatening (<6.5)		
Gender	Male	15	45	24	19	103	.052
	Female	51	114	53	21	239	
Etiology of anemia	IDA	31	91	43	14	179	.000
	Malignancies, both hematological and non hematological	5	18	9	14	46	
	Hemolytic Anemia	8	7	9	0	24	
	Anemia of Chronic diseases	13	34	16	5	68	
	Other causes	9	9	0	7	25	
TC	<4000	10	32	15	11	68	.000
	Normal (4-11000)	52	118	59	18	247	
	>11000	4	9	3	11	27	
Platelets	<150000	18	49	21	16	104	.003
	Normal (150-450000)	47	109	51	19	226	
	>450000	1	1	5	5	12	

DISCUSSION

Nonspecific symptoms like weakness, fatigue, are one of the commonest modesof presentation of anemia which can also be seen in conditions other than anemia causing diagnostic difficulties to the clinicians.In our study, generalized weaknesswas the most commoncomplaint with a frequency 159, 46.5%. Iron deficiency was the leading cause of anemia (179, 52.3%). The other detected etiologies in descending orders were anemia of chronic disease (68, 19.8%), malignancies, including both hematological and non hematological (46, 13.4%).Whereas, a study done by Chernetsky et al., revealed chronic diseases (65%)as a leading cause of anemia, followed by idiopathic etiologies (15.9%),chronic liver disease (13.2%), and nutritional deficiency (iron, vitamin B12, folate) (4%)[14].

Similarly, anotherstudy done by Joosten et al., also showed the commonest etiologic factors for anemia in elderly population to be chronic disease anemia (34%),followed byidiopathic anemia (17%), iron deficiency anemia (15%), post hemorrhagic anemia (7.3%), vitamin B12 and folate deficiency anemia (5.6%), chronic leukemia or lymphoma (5.1%) and myelodysplastic syndrome and acute leukemia (5.6%)[15].

Low dietary intake of ironand loss due to parasitic infections are the main cause of iron deficiency anemia in our context[16].Several pro- and anti-inflammatory cytokines and hormones produce the suppression of erythropoiesisin chronic disease. Alterations in the metabolism of iron via the molecule hepcidin and ferritin are largely responsible for the consequent anaemia[17].

The peripheral blood smear may be considered as an important and simple diagnostic tool, even in the era of genetic and molecular diagnostic techniques. In our study, 169,49.4% of patients had microcytic hypochromic anemia favoring iron deficiency anemia as the aetiology of anemia which was confirmed with iron profile test andother possible causes of microcytic hypochromic anemia were also ruled out.

A study done by Kumar A et al concluded that manual parameters like microcytosis, macrocytosis and hypochromia expressed as a percentage, have shown significant correlation, with their corresponding automated parameters[18].

CONCLUSION

The most common aetiology of anemia in patients enrolledwas iron deficiency, followed by anemia of chronic disease and malignancy, both hematological and non hematological. The most commonly encountered complaints on presentation in general were subjective non specific ones such as weakness, fatigue and lassitude whereas in females it was per vaginal

bleeding. Most of the patients belonged to moderate anemia group. Severity of anemia was not related with total leukocyte counts and platelet counts. This was a small study conducted among army personnel and their family at a tertiary level of Army Hospital, further big scale study might be needed to may it more applicable.

REFERENCES

1. *Bernoist B, McLean E, Egli I, Cogswell M: Worldwide Prevalence of Anaemia 1993–2005: WHO Global Database on Anaemia. 2008, Geneva: World Health Organization*Google Scholar
2. *Milman N: Anemia – still a major health problem in many parts of the world!. Ann Hematol. 2011, 90: 369-377. 10.1007/s00277-010-1144-5.*View ArticlePubMedGoogle Scholar
3. Camaschella C. Iron-deficiency anemia. New England Journal of Medicine. 2015 May 7; 372(19):1832-43. DOI: https://doi.org/10.1056/NEJMra1401038PMid:25946282
4. Killip S, Bennett JM, Chambers MD. Iron deficiency anemia. American family physician. 2007; 75.
5. Clark SF. Iron deficiency anemia. Nutrition in clinical practice. 2008 Apr; 23(2):128-41. https://doi.org/10.1177/0884533608314536PMid:18390780
6. Johnson-Wimbley TD, Graham DY. Diagnosis and management of iron deficiency anemia in the 21st century. Therapeutic advances in Gastroenterology. 2011 May; 4(3):177-84. https://doi.org/10.1177/1756283X11398736PMid:21694802 PMCid:PMC3105608
7. Pasricha SR, Flecknoe-Brown SC, Allen KJ, Gibson PR, McMahon LP, Olynyk JK, Roger SD, Savoia HF, Tampi R, Thomson AR, Wood EM. Diagnosis and management of iron deficiency anaemia: a clinical update. Med J Aust. 2010 Nov 1; 193(9):525-32. PMid:21034387
8. Miller JL. Iron deficiency anemia: a common and curable disease. Cold Spring Harbor perspectives in medicine. 2013 Jul 1;3(7):a011866. https://doi.org/10.1101/cshperspect.a011866PMid:23613366 PMCid:PMC3685880
9. Guralnik JM, Eisenstaedt RS, Ferrucci L, Klein HG, Woodman RC. Prevalence of anemia in persons 65 years and older in the United States: evidence for a high rate of unexplained anemia. Blood. 2004 Oct 15; 104(8):2263-8. https://doi.org/10.1182/blood-2004-05-1812PMid:15238427
10. Baral KP, Onta SR. Prevalence of anemia amongst adolescents in Nepal: a community based study in rural and urban areas of Morang District. Nepal Med Coll J. 2009 Sep; 11(3):179-82.
11. Cherian M, Varghese RG. Factors contributing to geriatric anemia. Journal of Current Research in Scientific Medicine. 2016 Jul 1; 2(2):98. DOI: 10.4103/2455-3069.19837
12. Hilal N, Mushtaq A. Prevalence of anemia in geriatric population of Kashmir: A hospital based study. Annals of Medical Physiology. 2017 Apr 14; 1(1):26-30. DOI: https://doi.org/10.23921/amp.2017v1i1.262231
13. Chandyo RK, Henjum S, Ulak M, Thorne-Lyman AL, Ulvik RJ, Shrestha PS, Locks L, Fawzi W, Strand TA. The prevalence of anemia and iron deficiency is more common in breastfed infants than their mothers in Bhaktapur, Nepal. European journal of clinical nutrition. 2016 Apr 1;70(4):456-62. doi:10.1038/ejcn.2015.199.
14. Chernetsky A, Sofer O, Rafael C, Ben-Israel J. Prevalence and etiology of anemia in an institutionalized geriatric population. [Article in Hebrew] Harefuah. 2002;141:591–4. 667. [Abstract][PubMed].
15. Joosten E, Pelemans W, Hiele M, Noyen J, Verhaeghe R, Boogaerts MA. Prevalence and causes of anaemia in a geriatric hospitalized population. Gerontology. 1992; 38:111–7. [PubMed].
16. Prevalence and significance of iron deficiency of anaemia among people of Morang District of Nepal. Sinha AK, Majumdar B, Yadav SK. DOI: http://dx.doi.org/10.3126/jonmc.v1i1.7286Journal of Nobel Medical College Vol.1 (1) 2011 40-44.
17. Anaemia of Chronic Disease: An In-Depth Review.Madu A.J, Ughasoro M.D. Med PrincPract 2017; 26:1-9 https://doi.org/10.1159/000452104 .
18. Kumar A,KushwahaR,GuptaC,Singh US. An analytical study on peripheral blood smears in anemia and correlation with cell counter generated red cell parameters.JApplHematol 2013;4:137-44.DOI: 10.4103/1658-5127.127896