

Incidence and Morphological Patterns of Anemia in Northern Province of Kashmir: A Study at Tertiary Care Hospital

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Abstract: Anemia is one of the leading morbidity cause in subjects attending OPD in both the urban and rural tertiary care hospitals across the whole of India, Deficiency of various micronutrients i.e. Iron, VitB, proteins, indirectly reflects the health, education, pharmaceutical economy and productivity of the entire nation. Anemia is like any other clinical signs it does not give a diagnosis intrinsically. Defined as low hemoglobin levels below threshold levels, set for specific age and gender groups by the World Health Organization [WHO] various classification have been floating in medical education on anemia by different quarters of medical sciences i.e., pathology, medicine, while the treatment depends mostly on cause. Global Data's epidemiological analysis found the burden of anemia is shared significantly by developed countries also. A large variety of ailments i.e., nutritional disorders, menstrual disorders, is also an important preoperative investigation etc. Prevailing from infancy throughout the whole life up to and include geriatrics age group. India leads all the nations of world with 39.86% affected, the other end of spectrum is Canada with 3%, evening America and leading five countries of Europe [UK, Spain, Italy, Germany and France] it ranges from 5.6–10.74%, making the disease a heavenly market for the pharmaceutical company. **Subjects/Methods:** A prospective study was carried out on subjects attending OPD in Northern Province of Kashmir [A Study at Tertiary Care Hospital]. **Results:** A total of 2011 individuals [789 men and 1222 women] were included in this study, incidence of anemia was 21% among men and 32% among women [P<0.05]. **Conclusion:** As the prevalence is rising across the globe, it can be easily tackled on a large scale. Our study concluded as there is no epidemiological data available from this area, the incidence is far greater than depicted in rest of the country, and females are the worst sufferers than males and almost solely except vitamin B contributes to the causes proved by morphological classification in our study. Urgent measures are needed to be implanted like counseling, and awareness especially among females in controlling the morbidity of anemia in our community.

Keywords: HcT:Hematocrit, Hb:Hemoglobin, MCH:Mean Cell Hemoglobin, MCHC:Mean Cell Hemoglobin Concentration, MCV:Mean Cell Volume, Red blood cell distribution width (RDW or RDW-CV or RCDW and RDW-SD)

1. Introduction

Anemia is a manifestation that effects both the morbidity and mortality in general population defined as the quantity or quality defect in RBC [O₂-carrying capacity] and is insufficient to meet the physiologic needs, and other physiological condition i.e. age, sex, altitude, smoking, and pregnancy status. The simple, cheap and easily available indicator in community is Hb levels. Globally nutritional deficiency especially the Iron alone accounts for as 50% of the causes and adversely affects cognitive and motor development, causes fatigue and low productivity [9, 10, 12] and, when it occurs in pregnancy, may be associated with low birth weight and increased risk of maternal and prenatal mortality [13, 14]. Other food micronutrients like folic acid, Vit-B₁₂, Vit-A deficiencies, parasitic infections, chronic inflammations and inherited disorders of Hb synthesis, RBC production or survival e.g. haemoglobinopathies [10, 11] can also contribute. Data from the 2005-06 of India's National Family Health Survey [NFHS] shows almost more than half the population is of females and 1/4th males are the sufferers [3]. In the Indian scenario research has identified other causes, i.e. low Fe⁺⁺ intake [19], less vitamin C intake [20, 21], and lower gastric pH compared to western descent [24], multiple pregnancies and lactation, [25] economically backward classes of society [4, 5–7, 26] poor sanitation with parasitic infections i.e. hookworm, malaria [24, 26]. Anemia

has been seen to be associated with increased incidence of spinal headaches and fever [27]. In addition to cultural and religious taboos and practices, access to health services, poor education and strategically defective measures. In its severe form, it can be associated with asthenia, fatigue, dizziness and drowsiness. Around 2010, globally incidence was 32.9%; the main brunt was primarily shared by females, children and geriatric groups especially in underdeveloped countries like Africa and south Asia [1]. Hence etiology in India is multifactorial and area-specific. Most research in India has focused only on urban settings [28, 29], pregnant women [30], and adolescents or children [30–32]. In the southern state of India many districts [33] despite the existence of one of the most long-standing and robust social protection frameworks in the country, particularly with respect to food and nutrition schemes it still exists [34]. Geographical variations also known to exist [4, 8, 9]. In developing regions, maternal and neonatal mortality were responsible for 3.0 million deaths in 2013 and are important contributors to overall global mortality [2, 15, 16, 17]. Our objective is to study the incidence even in tertiary care hospitals as majority can be treated in primary or secondary health care system. With this in mind, we undertook a cross-sectional study in a rural region of northern province of Kashmir, to determine its prevalence and type of severity, despite economic growth and multifocal strategies and preventive measures taken by

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governments, as the incidence of anemia is still on a rise. Hence newer strategies should be tailored according to local needs, implemented on urgent basistoframing of new policies, health education, and future research.

2. Objective and Aims

The main aim of this study was to assess the prevalence and type of severity of anemia among OPD Patients of a Tertiary Care Hospital of Northern Province in Kashmir India

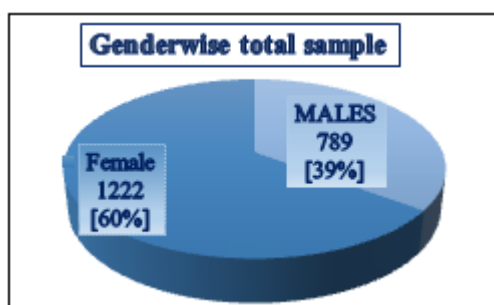
3. Materials and Methods

A study of 2011 blood samples from subjects of Kashmiri origin who attend OPD or were admitted indoor, from 1st march to 1st June 2019 in tertiary care Hospital of Government Medical College Baramulla. **Exclusion criteria:** included subjects receiving hematopoietic drugs, recent blood transfusion, and malignancy, traumatic injuries. **Collection of Blood samples;** -2ml of a venous blood was obtained through venous puncture in an EDTA coated [0.5M, pH8.0] sterilized plastic vials. The samples were properly labeled according to a specially designed coding system, to prevent possible mixing of the sample vials and for easy retrieval. All blood samples were analyzed within 2 hours after phlebotomy in IS-I count 5 Hematology Analyzer an advanced instrument using the latest principle of impedances improved by hydrodynamic focusing. [I.e. centered stream principle will “jacket” the stream of particles by a sheath flow so that the particles are passing centrally and one after the other through the measuring capillary] excluding interference factors such as double passages by coincidence, recirculation, etc. Hence cells were counted with greater precision, parameters included RBC count, HB, HcT, MCV, MCH, MCHC, RDWsd, RDWcv.

Data analysis Study variables were incorporated on the excel sheet of Microsoft office 2016 software. The excel data were uploaded into SPSS software version 20 [The International Business Machines Corporation, New York] to determine the morphological patterns of anemia and their frequencies. Significance of p value considered was below < 0.05. A backup soft copy version, as well as a hard copy print, was dated, saved and secured after each data entry update.

4. Results

In the present study, 2011 samples of blood were collected



Graph 1

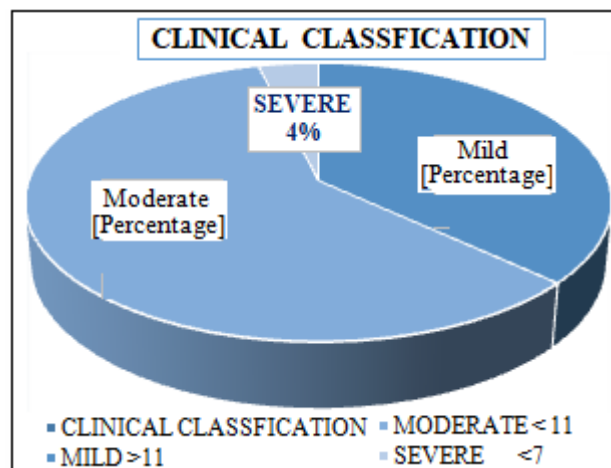
From subjects of Kashmiri origin population attending the OPD from rural areas of Baramulla district.

- 1) Gender difference in a sample was males 789 [39.2%] and females 1222 [60.7%] in **GRAPH NO. 1**
- 2) In our study various value are shown in **TABLE NO. 1**
- 3) Anemia was seen in 1068 [53.10%] subjects for both genders.

Table 1

	RBC/ 10 ⁹ /μL	HB g/dL	HCT %	MCV μm ³ /cell	MCH pg	MCHC %	RDWsd	RDWcv
FOR BOTH GENDERS COMBINED								
Min	0.9	2.4	7.4	9.8	2.8	3.6	13	12.5
Max	8.7	39.9	141.5	118.5	95.8	85.7	61.3	32.6
Mean	4.5	11.6	33.33	72.7	25.7	34.9	29.8	16.7
St Dev	0.6	2.34	6.9	9.50	5.0	2.8	6.9	2.8
For Males Only								
Min	0.9	2.4	7.4	9.8	2.8	3.6	13	12.5
Max	8.7	39.9	141.5	118.5	95.8	85.7	61.3	32.6
Mean	4.6	11.7	33.7	73.2	26.2	35.0	29.6	16.6
St Dev	0.7	2.7	8	10.0	6.8	3.5	6.7	2.76
For Females Only								
Min	1	2.5	7.8	17.1	5.3	6.2	15.4	12.5
Max	6.15	18.7	52.6	93.6	35.2	43.2	61.1	31.5
Mean	4.5	11.5	33	72.5	25.4	34.6	29.9	16.7
St Dev	0.66	2.06	5.99	9.13	3.30	2.17	7.06	2.85

- 4) Clinical classification showed [Graph no. 2] in male category 426 [39.9%] and in female 642 [60%] were found suffering from anemia. Among males and females 178 [41.7%] and 214 [33.3%] had mild, 233 [54.6%] and 405 [62.9%] had moderate and 15 [3.7%] and 23 [3.5%] had severe type respectively with a significance value of p<0.05 only in Hb.HcT, MCH, MCHC counts.
- 5) Physiological classification taking morphological patterns of anemia is shown in TABLE NO. 2. Prevalence of anemia is higher than anticipated among subjects attending the OPD in the tertiary hospital of Baramulla which is >4500 ft. above sea, the levels are far greater as the high altitude factor will increase the prevalence directly. The most common type of anemia was the microcytic hypochromic anemia followed by microcytic normochromic anemia. There was a significant difference in the prevalence of anemia between females and males and was highly significant. [p<0.05]



Graph 2

Table 2: Frequency of physiological classification among anemic group

	Males	Females	Total
Microcytic normochromic	56	48	104
Microcytic hypochromic	369	594	963
Macrocytic	1	-	1
Total	426	642	1068

5. Discussion

Our study primarily targeted rural population in which incidence appeared very high when compared with urban population, with gender variation. Anemia occurs at all stages of human lifecycle from birth for fast growth [4] as it adversely affects the cognitive and physical development of children due to increased demand of iron which in turn results in a significant impairment of work capacity and school educational performance to death [3, 5-7] in underdeveloped countries. The problem also affects the rest of the developed world especially [16MM modern marketing plan]. More than 400 types of anemia known, are divided into three groups: caused by blood loss, decreased or faulty production, or destruction of RBC. Mostly accepted classification medically is the normal children 12g/dl, adults male 16g/dl, females 13-14g/dl, clinically as mild <13.5 g/dl in males or <12 g/dl in female, moderate <11g/dl, severe <7-8 g/dl, altitude and smoking redefines the level by WHO [VMNIS | Vitamin and Mineral Nutrition Information] at altitude of 4000-5000 ft. [-3.5 to -4.5g/dl] while for smoking 1-2 packets/day [-0.5 to -0.7g/dl] as both increase Hb concentration [18], One reason for anemia being so common in both developed and developing countries could be that anemia is difficult to diagnose, as the symptoms are non-specific in the mild early stages. As 50% of people with anemia are not aware of the condition. Overall incidence is higher reported in India [21], Lebanon [14], Nepal [24] and Nigeria [25], between 32 and 50%, variations in different regions may be due to heterogeneity of the studied population, dietary habits, different nutritional status and incidence of worm infestation in a defined geographical spot [21]. A survey done by the directorate health department of JK state showed anemia 48% for urban and 36% for rural Ladakh which is less than the present study probably ignoring the altitude factor for Ladakh [22]. One more study done in Srinagar district of Kashmir in SMHS medical college showed almost [96.67%] females and [63.62%] males in geriatrics group [mean age 74.5 yrs.] were found to be anemic. [23] Preoperative anemia is regarded as a risk factor because of its association with increased preoperative transfusions of blood components. Preoperative anemia has been associated with increased morbidity and mortality in patients undergoing cardiac surgery [35]. In our study the absence of macrocytic anemia proves that the problem is not with vitamin B but with rest of the causes mainly iron. In India poor eating habits [not eating enough fruits, Vit C and legumes such as beans and peas] and lack of access to healthcare among women. Nutritional supplementation programs have not been successful in decreasing anemia in India. This study has equipped everyone in public health to take action against this long-standing problem and to do whatever is needed to be done. Any strategy implemented should be tailored to local conditions, taking into account the specific etiology

and percentage of incidence in a given setting and population group the present Indian government strategies and programs are not sufficient to control the growing menace of anemia. So newer strategies and target groups must be formulated

6. Conclusions

Reducing the morbidity in first place followed by the mortality due to anemia is a major challenge, an area of priority to the medical health workers, and as proposed the second global nutrition target for 2025 calls for a 50% reduction of anemia in female group [2]. With the current status if maintained [1], there is only half chance of attaining it. To make a significant impact, a multipronged approach is needed to be implemented urgently to counter this menace tailored to local conditions, taking into account the specific etiology and prevalence of anemia in a given setting and population group [9, 10], renewal of primary health-care system and existing programs. Despite different strategies and programs still resulting in rise of anemia, newer initiatives must be taken. Finally, while both research on and treatment for anemia should remain context-specific and individualized, interventions that address both age and gender specific iron intake and non-dietary factors such as comorbid diseases, gender inequality, and socioeconomic processes should be further investigated.

References

- [1] N. J. Kassebaum, R. Jasrasaria, M. Naghavi et al., "A systematic analysis of global anemia burden from 1990 to 2010," *Blood*, vol. 123, no. 5, pp. 615–624, 2014.
- [2] A. C. Michalos, *Encyclopedia of Quality of Life and Well-Being Research*, Springer Netherlands, Dordrecht, 2014.
- [3] International Institute of Population Sciences [IIPS], "National Family Health Survey [NFHS-3]," 2007.
- [4] Stevens GA, Finucane MM, De-Regil LM, Paciorek CJ, Flaxman SR, Branca F et al. Global, regional, and national trends in haemoglobin concentration and prevalence of total and severe anaemia in children and pregnant and non-pregnant women for 1995–2011: a systematic analysis of population-representative data. *Lancet Glob Health*. 2013;1:E16–E25
- [5] Alcázar L. The economic impact of anaemia in Peru. Lima: Group for the Analysis of Development and Action Against Hunger; 2013
- [6] Horton S, Levin C. Commentary on "evidence that iron deficiency anemia causes reduced work capacity". *J Nutr*. 2001;131:691S–6S.
- [7] Horton S, Ross J. The economics of iron deficiency. *Food Policy*. 2003;28:51–75. doi:10.1016/S0306-9192(02)00070-2.
- [8] United Nations Children's Fund, United Nations University, World Health Organization. Iron deficiency anaemia assessment, prevention, and control: a guide for programme managers. Geneva: World Health Organization; 2001 [WHO/NHD/01.3;]
- [9] Stoltzfus RJ, Mullany L, Black RE. Iron deficiency anaemia. In: Ezzati M, Lopez Ad, Rodgers A, Murray CJL, editors. *Comparative quantification of health risks:*

- global and regional burden of disease attributable to selected major risk factors. Geneva: World Health Organization; 2004:163–210
- [10] Balarajan Y, Ramakrishnan U, Ozaltin E, Shankar AH, Subramanian SV. Anaemia in low-income and middle-income countries. *Lancet*. 2011;378:2123–35.
- [11] Tolentino K, Friedman JF. An update on anemia in less developed countries. *Am J Trop Med Hyg*. 2007;77:44–51.
- [12] Kozuki N, Lee AC, Katz J, Child Health Epidemiology Reference Group. Moderate to severe, but not mild, maternal anemia is associated with increased risk of small-for-gestational-age outcomes. *J Nutr*. 2012;142:358–62. doi:10.3945/jn.111.149237.
- [13] Steer PJ. Maternal hemoglobin concentration and birth weight. *Am J Clin Nutr*. 2000;71[5 Suppl.]:1285S–7S.
- [14] United Nations Children's Fund, World Health Organization, The World Bank, United Nations Population Division. Levels and trends in child mortality: report 2014.
- [15] GLOBAL PREVALENCE OF ANAEMIA IN 2011 8 the UN Inter-agency Group for Child Mortality Estimation. New York: United Nations Children's Fund; 2014
- [16] World Health Organization, United Nations Children's Fund, United Nations Population Fund, The World Bank, United Nations Population Division. Trends in maternal mortality: 1990 to 2010. Estimates by WHO, UNICEF, UNFPA, The World Bank and the United Nations Population Division. Geneva: World Health Organization; 2014
- [17] Global health estimates 2014 summary tables: deaths by cause, age and sex, by WHO region, 2000–2012. Geneva: World Health Organization; 2014
- [18] Stevens GA, Finucane MM, De-Regil LM, Paciorek CJ, Flaxman SR, Branca F et al. Global, regional, and national trends in haemoglobin concentration and prevalence of total and severe anaemia in children and pregnant and non-pregnant women for 1995–2011: a systematic analysis of population-representative data. *Lancet Glob Health*. 2013;1:web appendices
- [19] A. Rammohan, N. Awofeso, and M.-C. Robitaille, "Addressing female iron-deficiency anaemia in india: is vegetarianism the major obstacle?" *ISRN Public Health*, vol. 2012, 8 pages, 2012.
- [20] S. Seshadri, A. Shah, and S. Bhade, "Haematologic response of anaemic preschool children to ascorbic acid supplementation," *Human Nutrition: Applied Nutrition*, vol. 39, no. 2, pp. 151–154, 1985.
- [21] S. A. Chiplonkar, V. V. Agte, S. S. Mengale, and K. V. Tarwadi, "Are lifestyle factors good predictors of retinol and vitaminC deficiency in apparently healthy adults?" *European Journal of Clinical Nutrition*, vol. 56, no. 2, pp. 96–104, 2002. SaleemurRehman Assistant Director Family Welfare ,Srinagar. J&K JK - Practitioner 2004; 11[4]:284-290
- [22] Nazia Hilal1, Azher Mushtaq2Prevalence of anemia in geriatric population of Kashmir: A hospital based study .*Ann Med Physiol*. 2017; 1 [1]: 26-30
- [23] K. Madhavan Nair and V. VasupradaIyengar, "Iron content, bioavailability & factors affecting iron status of indians," *Indian Journal of Medical Research*, vol. 130, no. 5, pp. 634–645, 2009.
- [24] Food and Agricultural Organization, "Iron," in *Human vitamin and mineral requirements*, Chapter 3, 2013,
- [25] T. Anand, M. Rahi, P. Sharma, and G. K. Ingle, "Issues in prevention of iron deficiency anemia in India," *Nutrition Journal*, vol. 30, no. 7-8, pp. 764–770, 2014.
- [26] Lejoo. J at all world journal of surgery 2012 36[9], pages 2080-2089
- [27] S. Chaudhary and V. Dhage, "A study of anemia among adolescent females in the urban area of Nagpur," *Indian Journal of Community Medicine*, vol. 33, no. 4, p. 243, 2008.
- [28] M. Verma, J. Chhatwal, and G. Kaur, "Prevalence of anemia among urban school children of Punjab," *Indian Pediatrics*, vol. 35, no. 12, pp. 1181–1186, 1998.
- [29] G. S. Toteja, P. Singh, B. S. Dhillon et al., "Prevalence of anemia among pregnant women and adolescent girls in 16 districts of India," *Food and Nutrition Bulletin*, vol. 27, no. 4, pp. 311–315, 2006.
- [30] S. Pasricha, J. Black, S. Muthayya et al., "Determinants of anemia among young children in rural India," *Pediatrics*, vol. 126, no. 1, pp. e140–e149, 2010.
- [31] S. Sundaresan, W. William, A. Prema, and B. Sudhagandhi, "Prevalence of anemia in the school children of Kattankulathur, Tamil Nadu, India," *International Journal of Nutrition, Pharmacology, Neurological Diseases*, vol. 1, no. 2, p. 184, 2011.
- [32] S. Challa, "Surveillance of Anaemia: Mapping and Grading the High Risk Territories and Populations," *Journal of Clinical and Diagnostic Research*, 2016.
- [33] B. Harriss-White, "Nutrition and Its Politics in Tamil Nadu," *South Asia Research*, vol. 24, no. 1, pp. 51–71, 2004.
- [34] Khalid M Musallam M.D at all ,*lancet* vol. 378 issue 9800 oct 2011 page 1396-1407.