International Journal of Medical Research Professionals
P-ISSN: 2454-6356; E-ISSN: 2454-6364
DOI: 10.21276/ijmrp

IJMRP

Original Research Article.

An Epidemiological Study of Prevalence of Hypopoliferative Anemia And Associated Risk Factors in Tertiary Care Population: A Hospital Based Pilot Study

Anju Kochar[1], Radheshyam Shrotriya[2*]

[1]Principal Specialist (General Medicine), Mahatma Gandhi Hospital, Bhilwara, Rajasthan, India.
[2*]Principal Specialist (Pediatrics), Mahatma Gandhi Hospital, Bhilwara, Rajasthan, India.

ABSTRACT

Background: Hypo-proliferative anemia is an anemia where the bone marrow's response, the production of reticulocytes, is absolutely low, or low for the degree of anemia. The aim of this study to evaluated the prevalence of hypoproliferative anemia and associated risk factors in tertiary care population.

Material & Methods: A hospital based observational study done on all cases of anemia >16 year of age was attended in Mahatma Gandhi Hospital, Bhilwara, Rajasthan. Anemia status and severity were defined based on the WHO criteria for different hemoglobin cut-offs for men, non-pregnant, and pregnant women.

Results: Our study showed that the majority of cases (70%) were seen in 20-25 years of age group. Lower & middle class socioeconomic status was most commonly present which reside the rural area, only 36% cases were underweight in our study. Microcytic anemia was more common in moderate to severe anemia in our study. Comparison in prevalence of anemia in various regions of India & other countries.

Conclusion: This study provides several insights into the population burden of anemia among less well-studied groups and indicates that there may be risks associated with higher socioeconomic status and urban living.

KeyWords: Hypoproliferative Anemia, Microcytic Anemia, Reticulocytes.

***Correspondence to:**

Dr. Radheshyam Shrotriya,
Principal Specialist (Pediatrics),
Mahatma Gandhi Hospital, Bhilwara, Rajasthan, India.

Article History:

Received: 25-11-2017, **Revised:** 10-12-2017, **Accepted:** 30-12-2017

Access this article online	
Website: www.ijmrp.com	Quick Response code
DOI: 10.21276/ijmrp.2018.4.1.104	

INTRODUCTION

Anaemia, defined as a low blood haemoglobin concentration, has been shown to be a public health problem that affects low-, middle- and high-income countries and has significant adverse health consequences, as well as adverse impacts on social and economic development.[1] Approximately 50% of cases of anaemia are considered to be due to iron deficiency, but the proportion probably varies among population groups and in different areas, according to the local conditions.[2] Other causes of anaemia include other micronutrient deficiencies (e.g. folate, riboflavin, vitamins A and B12), acute and chronic infections (e.g. malaria, cancer, tuberculosis and HIV), and inherited or acquired disorders that affect haemoglobin synthesis, red blood cell production or red blood cell survival (e.g. haemoglobinopathies).[3,4]

Hypo-proliferative anemia is an anemia where the bone marrow's response, the production of reticulocytes, is absolutely low, or low for the degree of anemia (Reticulocytopenia). It is possible to have a hemolytic anemia or blood loss (a 'hyper-proliferative anemia") simultaneously, in which case the hemoglobin level will fall more rapidly.

Anemias are either hypoproliferative (relative or absolute bone marrow failure) or hyperproliferative (increased loss or destruction with a resultant shortened red cell survival). In a patient with stable but inappropriately low hemoglobin, this is most easily evaluated by the reticulocyte count. There are three possibilities:

- A high reticulocyte count or rapidly falling hemoglobin as seen with shortened red cell survival
- Low reticulocytes or inappropriately normal reticulocyte count as seen with a bone marrow failure.
- Both. The reticulocyte count may be elevated, consistent with a shortened red cell survival (e.g. autoimmune hemolytic anemia) but not as elevated as one would expect (e.g. due to the underlying lymphoma causing the hemolysis).

Although different risk factors influence anemia independently, they commonly exist concomitantly, making it challenging to single out a definitive cause especially in resource-poor settings where access to advanced diagnostic tools is limited.[5] Intricate relationships between economic, political, demographic, sociocultural and biological factors influence the patterns of underlying causes, vulnerability to, and distribution of anemia severity and consequences.

In terms of presentation, iron deficiency anemia is typically microcytic hypochromic, and anemia from chronic diseases is

normocytic normochromic, whereas macrocytic anemia is commonly associated with B12 and folate deficiencies, or drug and alcohol toxicities, though overlap is common.[6] Distinction between different severity levels of anemia has been recommended for the appropriate monitoring of anemia in populations, especially as countries have intensified control efforts, shifting the burden to the lower end of the hemoglobin distribution.[7] The aim of this study to evaluated the prevalence of hypoproliferative anemia and associated risk factors in tertiary care population.

MATERIALS & METHODS

A hospital based observational study done on all cases of anemia >16 year of age was attended in Mahatma Gandhi Hospital, Bhilwara, Rajasthan.

Inclusion Criteria

1. Patients belonging to the age group above 16 years presenting with anemia was included in the study group.
2. All cases of hypoproliferation of anemia.
3. Patients willing with informed consent.

Exclusion Criteria

1. All Patients below 16 years of age.
2. All cases of hemolytic anemia
3. Patients who refused to undergone study trial.

A proforma was used to document demographic data, clinical presentation, dietary history, past history of anaemia, blood transfusions and drugs and treatment history.

Anemia status and severity were defined based on the WHO criteria for different hemoglobin cut-offs for men, non-pregnant, and pregnant women.

We grouped anemia severity: no anemia, mild, and moderate-to-severe anemia for analysis. Any anemia was defined as hemoglobin values <13gm/dl in men and <12.0 gm/dl in non-pregnant women and <11.0g/dl in pregnant women.

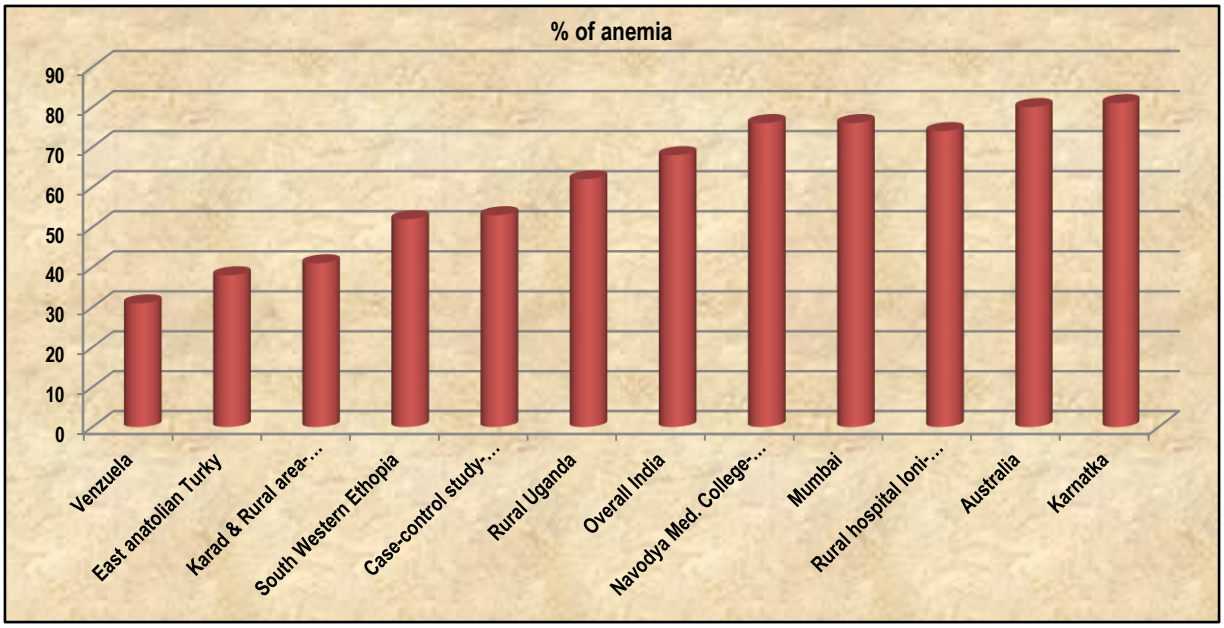
Sociodemographic information and parity as well as subjects status were self-reported. Employment was categorized as not employed, subsistence farming/fishing, self-employed, or salaried. Individuals with body mass index (BMI)<18.5kg/m^2 were categorized as underweight.

Table 1: Epidemiological determinant

Variable		Normal	Mild	Moderate to severe	Total
Age group (yrs)	**<20 yrs**	4 (4.7%)	3 (12%)	1 (2.5%)	8 (5.3%)
	20-25 yrs	***59 (69.4%)***	***14 (56%)***	***32 (80%)***	***105 (70%)***
	26-29 yrs	18 (21.2%)	7 (28%)	3 (7.5%)	28 (18.7%)
	≥30 yrs	4 (4.7%)	1 (4%)	4 (10%)	9 (6%)
Socioeconomic status	**Lower**	33 (38.8%)	***10 (40%)***	***20 (50%)***	***63 (42%)***
	Middle	50 (58.8%)	***14 (56%)***	***20 (50%)***	***84 (56%)***
	Upper	2 (2.4%)	1 (4%)	0 (0%)	3 (2%)
Diet	**Mix**	***70 (82.4%)***	***21 (84%)***	***32 (80%)***	***123 (82%)***
	Vegetarian	15 (17.6%)	4 (16%)	8 (20%)	27 (18%)
Residence	**Rural**	***55 (64.70%)***	***22 (88%)***	***28 (70%)***	***105 (70%)***
	Urban	30 (35.30%)	3 (12%)	12 (30%)	45 (30%)
Underweight	**Yes**	27 (31.76%)	12 (48%)	15 (37.5%)	54 (36%)
	No	***58 (68.24%)***	***13 (52%)***	***25 (62.5%)***	***96 (64%)***

Table 2: Type of Anemia

Type of Anemia	Mild anemia (N=25)	Moderate to severe anemia (N=40)
Microcytic	4 (16%)	16 (40%)
Normocytic	19 (76%)	20 (50%)
Macrocytic	2 (8%)	4 (10%)



Graph 1: Comparison in prevalence of anemia in various regions of India & Other countries

RESULTS

Our study showed that the majority of cases (70%) were seen in 20-25 years of age group. Lower & middle class socioeconomic status was most commonly present which reside the rural area, only 36% cases were underweight in our study (table 1). Microcytic anemia was more common in moderate to severe anemia in our study (table 2). Comparison in prevalence of anemia in various regions of India & Other countries (graph 1).

DISCUSSION

The overall anemia observed in the present study is lower (43.4%) Out of 43.4% anemic cases, the severe anemic cases observed in this study is 0.7% whereas mild anemia 16.7 %, moderate anemia 26%. The reasons for the decline of haemoglobin concentrations with age and why this decline is more pronounced in men than women are not clear. However, it is thought that reductions in bone marrow erythroid precursors[8,9] and decreased responsiveness of these precursors to stimulatory growth factors with advanced age[10] may be responsible. In present study prevalence of anemia was from population taking mix diet as the percentage of women taking mix diet was more than women taking vegetarian diet. Family income in this region is from agricultural origin that is (agricultural economy) providing the nutritional & iron rich diet to the pregnant women which is helping to eradicate anemia& giving results of lower percentage. Dietary products are pure milk and milk products, eggs, Jawar, Jaggery, groundnut, wheat and leafy vegetables though these women are in lower and middle economic class. There was no significant difference in anemic and non-anemic cases as per as above structures concerned. Example - non anemic cases 78.8%from joint family compared with 82% of anemic cases from joint family with mix diet. Higher anemia prevalence in rural regions has been attributed to disparities in health service provision and access, disease risk, fertility preferences, and genetic conditions such as sickle cell anemia.[3,11] Although urban/rural residence was not found to be an independent risk factor for anemia of any severity in men or women, crude rates of anemia were higher in urban than rural women but higher in rural than urban men. There were also urban/rural differences in types of anemia. Microcytic anemia was more prevalent among urban residents. Iron deficiency may be less prevalent in rural areas as rural residents have better access to diverse and more nutritious food sources; foods rich in iron such as eggs, leafy green vegetables and in our lake- shore population, fish; and fruits containing Vitamin C, enhancing iron absorption. Rural women may be more likely to access the mineral-rich clay pellets traditionally consumed during pregnancy.[12] Low BMI (<18.5 kg/m2) was associated with mild anemia in men. Many studies have shown inverse relationships between BMI and anemia.[13,14] A multi-country, multi-level analysis of hemoglobin levels of African women showed stronger associations of anemia with socioeconomic and contextual factors than with BMI.[15] Micronutrient deficiencies have been shown to have different roles in etiology of varying severities of anemia.[16] In Conclusion; this study provides several insights into the population burden of anemia among less well-studied groups and indicates that there may be risks associated with higher socioeconomic status and urban living. Biological (age, parity, pregnancy, and HIV infection) and social (urban residence, education, occupation, and wealth) factors are associated with anemia and this understanding can inform intervention strategies both in identification and management of high-risk groups as well as in the nature of the intervention.

REFERENCES

1. Stevens GA 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(1):e16–e25.
2. United Nations Children's Fund, United Nations University, World Health Organization. Iron deficiency anaemia assessment, prevention, and control: a guide for programme managers. Geneva:2001(WHO/NHD/01.3;http://www.who.int/nutrition/publications/en/ida_assessment_prevention_control.pdf, accessed 7 May 2015).
3. Balarajan Y et al. Anaemia in low-income and middle-income countries. Lancet. 2011;378:2123–35.
4. Tolentino K, Friedman JF. An update on anemia in less developed countries. Am J Trop Med Hyg. 2007;77:44–51.
5. Yip R, Ramakrishnan U. Experiences and challenges in developing countries. J Nutr. 2002;132(Suppl 4):827–30.
6. Roy CN. Anemia of inflammation. Hematology Am Soc Hematol Educ Program. 2010;2010:276–80.
7. Stoltzfus RJ. Rethinking anaemia surveillance. Lancet. 1997;349:1764–6.
8. Lipschitz DA, Udupa KB, Milton KY, Thompson CO (1984) Effect of age on hematopoiesis in man. Blood 63: 502-509.
9 Hirota Y et al. (1988) Haematopoiesis in the aged as studied by in vitro colony assay. Eur J Haematol 40: 83-90.
10. Balducci L, Hardy CL, Lyman GH (2005) Hemopoiesis and aging. Biol Basis Geriatr Oncology:, 124: 109-134.
11. Bentley ME, Griffiths PL. The burden of anemia among women in India. Eur J Clin Nutr. 2003;57:52–60.
12. Lakudzala DD, Khonje JJ. Nutritive potential of some 'edible' soils in Blantyre city, Malawi. Malawi Med J. 2011;23:38–42.
13. Kamruzzaman M, Rabbani MG, Saw A, Sayem MA, Hossain MG. Differentials in the prevalence of anemia among non-pregnant, ever-married women in Bangladesh: multilevel logistic regression analysis of data from the 2011 Bangladesh demographic and health survey. BMC Womens Health. 2015;15:54.
14. Ngnie-Teta I, Kuate-Defo B, Receveur O. Multilevel modelling of sociodemographic predictors of various levels of anaemia among women in Mali. Public Health Nutr. 2009;12:1462–9.
15. Haverkate M, Smits J, Meijerink H, van der Ven A. Socioeconomic determinants of haemoglobin levels of African women are less important in areas with more health facilities: a multilevel analysis. J Epidemiol Community Health. 2014;68:116–22.
16. van Hensbroek MB, Jonker F, Bates I. Severe acquired anaemia in Africa: new concepts. Br J Haematol. 2011;154:690–5.

Source of Support: Nil. **Conflict of Interest:** None Declared.

Cite this article as: Anju Kochar, Radheshyam Shrotriya. An Epidemiological Study of Prevalence of Hypopoliferative Anemia And Associated Risk Factors in Tertiary Care Population: A Hospital Based Pilot Study. Int J Med Res Prof. 2018 Jan; 4(1):495-97. DOI:10.21276/ijmrp.2018.4.1.104