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Smog

R.K. Bhatnagar

Editor-in-Chief, Professor of Pathology (Rtd.),
Maulana Azad Medical College, Delhi.

Winter setup with problem of air pollution-come winter and again problem of smog in Delhi and in other big cities e.g. Agra, Kanpur, Firozabad, Patna etc etc. Quality of air is so bad that it not only affects lungs but in long run heart, a blood vessel and even causes cancers of different organs. Eyes irritation, cough, allergy etc etc. are some other acute problems. Visibility is also decreased especially in early morning and late evening, affecting road traffic, railways and flights, smog makes sun look almost invisible. Government is planning traffic control (odd and even numbers of vehicles), helicopters for artificial rain etc etc.

It is caused by burning of unused crops in states like Punjab and Haryana, uncontrolled traffic, traffic jams, construction work, industrial smoke and waste, diesel vehicles and much other man made conditions. Role of air coming from Gulf countries (Middle east) carrying dust and sand is also supposed to be another important factor. So, we have to take responsibility of all this and try to send a message of its control to masses, as a team work. If not now then never and we will make very bad atmosphere and surroundings for our future generations.

Other problems are manmade "green house" affect, delayed summers and obviously delayed winters and so breeding of mosquitoes with diseases like dengue, chicken guinea, viral encephalitis (Japanese encephalitis) all viral diseases and infections like malaria.

Someone has rightly said "We have not taken this atmosphere and environment from our ancestors but borrowed it from our future generation".


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Study of Morphological Patterns and Prevalence of Anemia: A Study from a Teaching Hospital in Rural Telangana

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Abstract

Introduction: Anemia is major public health problem. Diagnosis of anemia and its correction needs crucial intervention. Peripheral blood smear examination plays an important role in classifying anemias based on morphology of RBCs. Nutritional deficiency is a major risk factor for anemias. *Aim of the study:* The aim of the study is to look at the morphological patterns and prevalence of anemias in a teaching hospital in rural Telangana. *Materials and Methods:* It is a hospital based observational study done in the department of Pathology at RVM Institute of Medical Sciences and Research Center, Siddipet district, Telangana State for a period of two months from August 2017 to September 2017. A total of 560 cases attending a rural medical camp were screened for anemia. All the cases were sent to department of Pathology (central laboratory) for routine investigations for anemia. Investigations advised were - Hemoglobin estimation, complete Hemogram, Peripheral smear examination and Reticulocyte count. *Observations and Results:* In the present study all the 560 cases were screened for anemia. 230 (41%) cases were normal and 330 (59%) cases showed anemia. 157/330 cases were among 21-30 years followed by 31-40 years 62/330 cases. Female preponderance was seen 339/560 (60.5%) compared to males 221/560 (39.4%). Clinically about 53.5% cases presented with pallor. Among 560 cases screened, about 330 (59%) cases showed features suggestive of anemia. Microcytic hypochromic anemia was observed commonly among 55.3% cases (310/560) and normocytic normochromic in 230 cases (41%). *Conclusion:* Microcytic hypochromic anemia was the most common type of anemia identified. Females were commonly affected than males.

Keywords: Anemia Prevalence; Iron Deficiency; Microcytic Hypochromic Anemia; Medical Camp Study.

Introduction

Anaemia has a significant public health burden in developing nations [1,2].

Anaemia is not a diagnosis. It occurs secondary to an underlying disease process. Anaemia defines a state in which an individual's haemoglobin concentration (red cell mass) falls two standard deviations below the reference intervals in a particular population (individuals of similar age, gender and geographical location) [3,4]. Various epidemiologic studies both locally and in other developing nations have

highlighted the burden, distribution and risk factors of anemia. According to WHO estimates, more than a third of the world population (2 billion) is affected by anemia [1,2]. In other words, the definition of anemia depends on many variables such as biologic age, gender, race, and altitude above sea level, pregnancy, smoking status and other factors [5].

According to the World Health Organization (WHO), there are two billion people with anaemia in the world and half of the anaemia is due to iron deficiency [6]. Anaemia is a late indicator of iron deficiency, so it is estimated that the prevalence of iron deficiency is 2.5 times that of anaemia [6,7].

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Aim of the Study

To study the morphological patterns and prevalence of anemia in cases from a teaching hospital in rural Telangana.

The objectives are

1. To classify anemias based on morphology on peripheral blood smears.
2. To study clinical and hematological profile of anemia.
3. To identify the etiological factors for anemia.

Materials and Methods

Ethical permission was taken from the institute. This was a hospital based observational study conducted in the department of Pathology at RVM Institute of Medical Sciences and Research Centre, Siddipet District, Telangana State over a period of two months from August 2017 to September 2017.

A total of 560 cases were screened and studied in a medical camp conducted at RVM Institute of Medical Sciences and Research Center during this period.

Thorough clinical history was taken from all the cases who attended the Medical camp, including occupational, personal, dietary history, any addictions and socio-economic status of the subjects. Complete general physical and systemic examination was done and patients were checked for pallor, icterus, koilonychia, lymphadenopathy, pedal edema and any organomegaly.

All the 560 cases were sent to department of Pathology (central laboratory) for routine investigations. Investigations included were - Hemoglobin estimation, complete hemogram, peripheral smear examination and reticulocyte count in all the cases. Additional tests done were as required according to clinical indications such as stool for occult blood, urine analysis, sickling tests, serum electrophoresis etc.

Venous blood was collected under all aseptic conditions from the anterior cubital vein from all the patients. The anticoagulant used was EDTA.

Peripheral smears were taken from all the patients and were stained by Leishman's stain. Morphology of RBC, WBC and platelets was studied. Automated Hematology analyzer (*Horiba 3 part analyzer*) was used. RBC, WBC and platelet parameters were cross checked with the above data. PCV, MCV, MCH, MCHC and RDW were determined by automated cell counter. Normal values were taken as follows: PCV 35-45%, MCV 77-95fl, MCH 25-33pg, MCHC 31-37gm/dl and RDW 14.5-18.5.

Anemia was classified morphologically based on peripheral smear findings and classified as microcytic

hypochromic anemia, macrocytic anemia, dimorphic anemia, normocytic normochromic anemia and normocytic hypochromic anemia.

Inclusion Criteria

1. All the cases attending Medical camp.
2. All the cases sent for routine investigations to the Pathology department.
3. Age group from one year to 80 years were included.

Exclusion Criteria

1. Indoor patients having signs and symptoms of anemia and who were admitted for evaluation of anemia.
2. Pregnant women.
3. Known cases of anemia already on treatment.

Results and Observations

A total of 560 cases including both genders were screened in a Medical camp conducted at RVM Institute of Medical Sciences and Research Center, Telangana, for duration of two months ie, from August-September 2017.

In the present study, a total of 560 cases attended pathology lab and their age distribution varied from newborn to 80 years.

In the present study all the 560 cases were screened for presence of anemia. 230 (41%) cases were normal and 330 (58.9%) cases showed features of anemia.

Hence, the prevalence was calculated as: Total number of cases with anemia x 100.

Total number of cases with anemia ie, $330/560 = 58.9\%$

Prevalence rate of anemia was 58.9% in, Mulugu Mandal, Siddipet district, Telangana.

157/330 cases were among 21-30 years followed by 62/330 cases in the 31-40 years age group. Least age group was between 70 to 80 years (12/330). Also this age group had least number of patients.

In the present study, majority were female patients ie, 339/560 (60.5%) compared to males 221/560 (39.4%).

Symptoms

In the present study fever was seen in 11.6% of patients followed by weakness and fatigability in almost 40% of patients.

On General Examination

In the present study, 53.5 % cases presented with pallor ie, (300/560)cases.

In the present study of the 560 cases screened for anemia, 330 (59%) cases showed anemia. Severe anemia was seen in 33.9% cases (190/330). In females, anemia constituted about 57.2% cases (189/330). In males, anemiaconstituted about 42.7% cases (141/330).

In the Present Study Based on Peripheral Smear Examination

Microcytic hypochromic anemia was observed commonly among 55.3% cases (310/560). Macrocytic anemia was seen in 10 cases (1.7%). Dimorphic anemia and Normocytic hypochromic was seen in 5 (0.8%)

cases each. Normocytic normochromic type anemia was seen in 230 cases (41%).

Among 330 cases of anemia studied based on peripheral smear findings such as anisopoikilocytosis, microcytes, macrocytes,ovalocytes, tear drop cells, pencil shaped cells, target cells, hypersegmented neutrophils and RBC indices. 290 cases showed decrease in MCV, MCH, MCHC values. Normal indices of MCV, MCH and MCHC were seen in 20 cases and increased MCV, MCH and normal MCHC values were seen in 20 cases. Hence, a diagnosis of iron deficiency was reported predominantly in cases 72.7% cases (290/330) followed by megaloblastic anemia in 20/330 (18.1%). Hemolytic anemia was reported in 10 cases and Aplastic anemia in 10 cases. Confirmation of the above diagnosis should be done by special investigations such as serum iron, serum

Table 1: Age distribution of all the cases screened showing normal cases and those with anemia

Age (in years)	Normal cases	Cases with anemia	Total no. of cases
0-10	14	16	30
11-20	17	31	48
21-30	53	157	210
31-40	30	62	92
41-50	45	20	65
51-60	40	15	55
60-70	23	17	40
70-80	08	12	20
Total	230	330	560

Table 2: Gender distribution

Gender	No. of cases	Percentage (%)
Males	221	39.4%
Females	339	60.5 %
Total	560	100%

Table 3: Clinical signs and symptoms

Clinical signs and symptoms	No. of Cases	Percentage (%)
Pallor	300	53.5%
Fever	65	11.6%
Icterus	160	28.5%
Weakness and fatigability	220	39.2%
Cough	30	5.3 %
Splenomegaly	25	4.4%
Hepatomegaly	38	6.7%
Vomiting	35	6.2%
History of Pica	29	5.1%
Koilonychia	80	28.5 %

Table 4: Severity of anemia according to hemoglobin

Grade of Anemia	Males	Females	Total	Percentage (%)
Normal (>12gm%)	80	150	230	41%
Mild (10-12 gm %)	35	30	65	11.6%
Moderate (7- 9 gm %)	30	45	75	13.3%
Severe (< 7 gm %)	76	114	190	33.9%
Total	221	339	560	100%

Table 5: Distribution of anemia according to red blood cell morphology in peripheral smear

Morphology of RBC	No of patients	Percentage (%)
Microcytic Hypochromic	310	55.3%
Macrocytic	10	1.7%
Dimorphic	05	0.8%
Normocytic hypochromic	05	0.8%
Normocytic normochromic	230	41%
Total	560	100%

ferritin, serum vitamin B12 level, serum folic acid level and hemoglobin electrophoresis.

Discussion

Prevalence

In the present study, a total of 560 cases were studied, of which 330 cases were found to be anemic giving a prevalence of 59%. Babu et al [8] studied a total of 920 hemograms and found 685 patients to be anemic giving a prevalence of 74.5%. Joshi et al [9] studied blood samples from 1645 apparently normal people, and found anemia in 740 subjects giving a prevalence of 44.9%.

Gender Distribution

In the present study, in females, anemia was found in about 57.2% cases (189/330). In males, anemia was seen in 42.7% cases (141/330).

In the study by Babu et al [8] females with anemia were 419 (61.2%) and males with anemia were 266 (38.8%), and showed female preponderance with Male: Female ratio of 1:1.6. In the study by Joshi et al [9] out of 740 subjects, 314 were males and 426 were females.

In the study by Le et al [10] overall, the prevalence of anemia in non-pregnant females was significantly higher than that of males. Regarding severity, moderate to severe anemia was five times more common in non-pregnant females in comparison to males (2.5% versus 0.5%, $p < 0.0001$).

Age Distribution

In the present study, age distribution varied from 0-10 years to 80 years. Most commonly affected age group was 21-30 years, ie, 210/ 560 (37.5%) followed by 31-40 years ie, 92/ 560 (16.4 %). Least age group involved was 70 years to 80 years, ie, 09/560 (3.5%). In Babu et al [8] study, female patients, most of them presented mainly between 21-30 years followed by 41-50 years, with shared percentage of 23 and 10.8%. In males, most of cases presented at the age group of 51-60 years followed by >60 years with shared percentage of 13.6, and 5.2%. In the study by Le et al [10] anemia was more common in the age group of 20-40 years (28.82%) as compared to younger, <20 years (3.95%) and older age group 40-60 years, (12.16%). Kumari et al [11] showed prevalence of anemia in general population to be 43.21% in which maximum cases belonged to 0-20 year age group.

Severity of Anemia

In the present study of the 560 cases on hemogram study, 330 (59%) cases showed anemia. In females, anemia was seen in 57.2% cases (189/330). In males, anemia constituted about 42.7% cases (141/330). In the study by Le et al [10] according to severity, mild anemia was present in 79.5% of subjects in which 33.6% were male and 45.85% were female. Moderate anemia was present in 16% in which 6.89% were male and 9.11% were female. In our study, severe anemia was present in total 4.5% cases with 1.89% male and 2.61% female patients.

Table 5: Comparative study showing distribution anemia according to red cell morphology on peripheral smear examination

Morphology of RBC	Elsaid et al [12]	Present study
Microcytic hypochromic	36	310
Macrocytic	01	10
Dimorphic	-	05
Normocytic normochromic	113	230
Normocytic hypochromic	-	05
Total	150	560

Peripheral Smear Examination

In our study, microcytic hypochromic anemia was observed among 55.3% cases (310/560), macrocytic anemia in 10 cases (1.7%), dimorphic anemia and normocytic hypochromic was seen in each 05 cases (0.8%) and normocytic normochromic type was seen in 230 cases (41 %).

Elsayid et al [12] observed in their study that based on gender wise classification the patterns revealed that 62 (55%) of male patients had normocytic normochromic patterns, while 51 (45%) female patients and 7 (19%) males patients had microcytic hypochromic patterns. The macrocytic type anemia was seen in 29 (81%) females and only in one case of a males patient.

Babu et al reported the commonest pattern of anemia as microcytic hypochromic followed by dimorphic type followed by macrocytic anemia. Our findings of observing microcytic hypochromic as the most common type of anemia compare well the findings of Babu et al [8].

Leet al [10] also observed the most common type as microcytic hypochromic type (55.53%) followed by normocytic normochromic anemia. Our observations are similar to this study.

Conclusion

In the present study, microcytic hypochromic anemia was the most common type of anemia observed in cases attending medical camps in rural area suggesting that iron deficiency is the main cause of anaemia. However, special investigations are needed to confirm this cause. Microcytic hypochromic anemia is more common in females. The etiological factors for anemia in the present study could be due to nutritional deficiency and low socioeconomic status.

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Vidya Viswanathan	1078	Vissa Shanthi	750
Vidya Viswanathan	948	Vissa Shanthi	763
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Title	Frequency	Rate (Rs): India		Rate (\$):ROW	
Community and Public Health Nursing	3	5500	5000	430	391
Dermatology International	2	5500	5000	430	391
Gastroenterology International	2	6000	5500	469	430
Indian Journal of Agriculture Business	2	5500	5000	413	375
Indian Journal of Anatomy	4	8500	8000	664	625
Indian Journal of Ancient Medicine and Yoga	4	8000	7500	625	586
Indian Journal of Anesthesia and Analgesia	4	7500	7000	586	547
Indian Journal of Biology	2	5500	5000	430	391
Indian Journal of Cancer Education and Research	2	9000	8500	703	664
Indian Journal of Communicable Diseases	2	8500	8000	664	625
Indian Journal of Dental Education	4	5500	5000	430	391
Indian Journal of Forensic Medicine and Pathology	4	16000	15500	1250	1211
Indian Journal of Emergency Medicine	2	12500	12000	977	938
Indian Journal of Forensic Odontology	2	5500	5000	430	391
Indian Journal of Hospital Administration	2	7000	6500	547	508
Indian Journal of Hospital Infection	2	12500	12000	938	901
Indian Journal of Law and Human Behavior	2	6000	5500	469	430
Indian Journal of Library and Information Science	3	9500	9000	742	703
Indian Journal of Maternal-Fetal & Neonatal Medicine	2	9500	9000	742	703
Indian Journal of Medical & Health Sciences	2	7000	6500	547	508
Indian Journal of Obstetrics and Gynecology	4	9500	9000	742	703
Indian Journal of Pathology: Research and Practice	4	12000	11500	938	898
Indian Journal of Plant and Soil	2	65500	65000	5117	5078
Indian Journal of Preventive Medicine	2	7000	6500	547	508
Indian Journal of Research in Anthropology	2	12500	12000	977	938
Indian Journal of Surgical Nursing	3	5500	5000	430	391
Indian Journal of Trauma & Emergency Pediatrics	4	9500	9000	742	703
Indian Journal of Waste Management	2	9500	8500	742	664
International Journal of Food, Nutrition & Dietetics	3	5500	5000	430	391
International Journal of Neurology and Neurosurgery	2	10500	10000	820	781
International Journal of Pediatric Nursing	3	5500	5000	430	391
International Journal of Political Science	2	6000	5500	450	413
International Journal of Practical Nursing	3	5500	5000	430	391
International Physiology	2	7500	7000	586	547
Journal of Animal Feed Science and Technology	2	78500	78000	6133	6094
Journal of Cardiovascular Medicine and Surgery	2	10000	9500	781	742
Journal of Forensic Chemistry and Toxicology	2	9500	9000	742	703
Journal of Geriatric Nursing	2	5500	5000	430	391
Journal of Microbiology and Related Research	2	8500	8000	664	625
Journal of Nurse Midwifery and Maternal Health	3	5500	5000	430	391
Journal of Organ Transplantation	2	26400	25900	2063	2023
Journal of Orthopaedic Education	2	5500	5000	430	391
Journal of Pharmaceutical and Medicinal Chemistry	2	16500	16000	1289	1250
Journal of Practical Biochemistry and Biophysics	2	7000	6500	547	508
Journal of Psychiatric Nursing	3	5500	5000	430	391
Journal of Social Welfare and Management	3	7500	7000	586	547
New Indian Journal of Surgery	4	8000	7500	625	586
Ophthalmology and Allied Sciences	2	6000	5500	469	430
Otolaryngology International	2	5500	5000	430	391
Pediatric Education and Research	3	7500	7000	586	547
Physiotherapy and Occupational Therapy Journal	4	9000	8500	703	664
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