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Research Article

**PREVALENCE OF MAJOR TYPES OF ANEMIA AMONG  
ADULTS IN LOCAL POPULATION OF LAHORE**Aliya Aslam<sup>1</sup> Ambreen Tauseef<sup>2</sup>, Qundeel Zahra<sup>3</sup>, Mehwish Iftikhar<sup>4</sup>, Faiqa Arshad<sup>5</sup>,  
Saadia Sajjad<sup>6</sup><sup>1</sup>Associate Professor, Department of Pathology, Azra Naheed Medical College Lahore.,<sup>2</sup>Associate Professor, Department of Physiology, CMH, Lahore Medical College Lahore.,<sup>3</sup>Assistant Professor, Department of Ophthalmology, Azra Naheed Medical College Lahore.,<sup>4</sup>Assistant Professor, Department of Biochemistry, Azra Naheed Medical College Lahore.,<sup>5</sup>Assistant Professor, Department of Pathology, Gujranwala Medical College, Gujranwala.,<sup>6</sup>Assistant Professor, Department of Physiology, Continental Medical College Lahore.**Article Received:** August 2019**Accepted:** September 2019**Published:** October 2019**Abstract:**

Anemia is a major public health burden with severe consequences. It is one of the most common nutritional deficiency diseases observed globally. This study was conducted to determine the prevalence of major types of anemia in a sample of apparently healthy adults.

**Materials and Methods**

This cross-sectional study recruited 400 diagnosed anemic adults (19-60 years) outdoor patients of either gender (males & non pregnant females). Hemoglobin & cell indices were used as a tool to assess the type and severity of anemia. SPSS version 19 was used to analyze the data. Chi square was used at 95% confidence interval. The p-value < 0.05 was considered statistically significant.

**Results**

Out of total 400 patients, 52 patients (13%) were anemic (normocytic normochromic anemia). Whereas, 234 patients (58.5%) had mild anemia, 76 patients (19.0%) were suffering from moderate, whereas 90 patients (22.5%) from severe anemia respectively.

**Conclusion**

The prevalence of iron deficiency was high in females and the normocytic normochromic anemia was common in elderly patients depending upon the nutritional conditions in accordance with socioeconomic status of individuals. The hemoglobin & complete blood count (CBC) indices are the best tools to diagnose anemia.

**Keywords:** Anemia, adults, major types.**Corresponding author:****Aliya Aslam,**Associate Professor, Department of Pathology,  
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**INTRODUCTION:**

More than two billion people are affected with anemia globally with prevalence of 43% in developing countries and 9% in developed nations with multiple causative factors. [1,2] The World Health Organization (WHO) estimates that the most affected group is preschool-age children, with a prevalence of 47%, followed by pregnant women (41%), non-pregnant women (30%), school-age children (25%), and people older than 60 years of age (24%); while men are the least affected group (12%). [3] In Pakistan, It is a common disorder at any stage of life, which may increase the risk of impaired cognitive and physical development, lethargy, reduced work ability and increased mortality and morbidity rate [4,5]. According to WHO criteria, anemia is characterized by hemoglobin levels below 12.0 g/dl in females and below 13.0 g/dl in males. [6] Anemia is classified as mild, moderate, or severe based on the concentrations of hemoglobin in the blood. In females, mild, moderate and severe anemia is characterized by 10.0-11.9 g/dl, 7.0-9.9 g/dl and <7.0 g/dl respectively. While in males, mild anemia corresponds to level of hemoglobin concentration of 11.0-12.0 g/dl, 8.0-11.0 g/dl, as moderate & <8 g/dl is designated as severe anemia [7,8,9]. Age is associated with anemia levels, with older women are three times more likely to be moderately or severely anemic than younger women. Severe anemia puts a huge burden on individual's health [10,11]. Current magnitude of anemia needs to be defined properly in order to reduce this public health problem. Proper handling is required for its diagnosis and management of patients. Therefore, this study was designed to assess the prevalence of major types of anemia in the patients presenting to outdoor at Chaudhry Muhammad Akram Teaching & Research Hospital Lahore.

**MATERIAL & METHODS:**

This cross-sectional study was conducted after receiving approval from Institutional Review Board (IRB) and recording of consent and all demographic data of patients on a predesigned proforma. A total of 3076 samples were taken, out of which, 13% (400 anemic patients) were taken for further investigation

and evaluation. All healthy adult males and non-pregnant females (19-60 years) of age were included in this study. Infants and young children including pregnant women have variable CBC and other hematological values due to physiological and other conditions *and so* were excluded. Under aseptic techniques a venous sample of five (5) ml of blood was taken from each patient. Patients were selected on the basis of low Hb according to the anemic criteria. Their results were selected for further analysis. We considered the diagnostic approach to diagnose & classify anemia as microcytic (MCV, <80 fL), normocytic (MCV, 80-100 fL), or macrocytic (MCV, >100 fL).

CBC was performed on Sysmex KX 21 hematology analyzer. It included hemoglobin (Hb), Hematocrit % (Hct), Mean cell hemoglobin (MCH), Mean cell volume (MCV), Red Cell Distribution width, Mean cell hemoglobin concentration (MCHC), Red blood cell count (RBC), White blood cell (WBC), Differential leukocyte count (DLC) & Platelet count.

The prevalence and association of diagnosed anemia according to the WHO criteria with age and gender was measured with the help of Hb & Indices in outpatient department (OPD) of the Chaudhry Muhammad Akram Teaching & Research Hospital.

SPSS version 19 was used to analyze the data. A statistical association among variables was measured by Chi-square. An association was observed among categorical variables at 95% CI,  $p$  value  $\leq 0.05$  was considered significant.

**RESULTS:**

In the present study, we found 13% anemic patients out of total 400 subjects. The common age group was 19-30 years. On the basis of investigations, 58.5% of the patients were labelled as mild anemia while 19% showed moderate & severe anemia was shown by 22.5% of the patients. In females, moderate anemia is more common. However due to nutritional deficiencies, the prevalence is high in females than in males [Table 1].

**Table 1: Distribution of patients according to age, gender and CBC parameters with different types of anemia**

Study subjects	N (%)	Degree of anemia			p-value	95% CI	
		Mild N (%)	Moderate N (%)	Severe N (%)			
Age	19–30	214 (54%)	114(52.6)	48 (22.8)	0.037*	0.000–0.013	
	31–45	94(24%)	63(65.3)	14 (14.7)			
	46–60	65(16%)	37(58.5)	10 (15.4)			
Gender	Female	168 (42%)	88 (53.0)	42(25.0)	36 (22.0)	0.031*	0.013–0.048

	80.0–100.0	247(62%)	171(68.5)	39 (15.7)	39 (15.7)		
	> 100.0	43 (11%)	15 (34.9)	5 (11.6)	23 (53.5)		
MCH	< 25.0	137 (35%)	66 (48.6)	38 (28.3)	33 (23.2)	0.001*	0.223–0.307
	25.0–32.0	209 (52%)	146 (69.7)	27 (13.5)	36 (16.8)		
	> 33.0	55 (14%)	22 (40.7)	8 (16.7)	22 (42.6)		
MCHC	< 32.0	185 (46%)	97 (52.2)	45 (23.9)	45 (23.9)	0.004*	0.170–0.250
	32.0–36.0	205 (52%)	137 (66.0)	28 (14.1)	40 (19.9)		
	> 36.0	11 (3%)	3 (20.0)	4 (30.0)	5 (50.0)		
RDW	10.0–14.0	75 (19%)	60 (82.4)	8 (9.5)	7 (8.1)	0.001*	0.000–0.007
	> 14.0	327 (82%)	174 (53.1)	68 (21.2)	85 (25.8)		
WBC	5.0	94 (24%)	41 (41.6)	135 (67.1)	57 (57.2)	0.001*	0.000–0.012
	5.0–10.0	202 (51%)	18 (19.7)	36 (16.8)	23 (22.2)		
	> 10.0	102 (27%)	38 (38.6)	31 (15.8)	22 (20.3)		

\*p-value < 0.05 is significant

Out of total subjects, 62% were found to be suffering from normocytic normochromic anemia while 27% and 11% were diagnosed as microcytic hypochromic and macrocytic anemic patients based on MCV and MCH (p value: 0.001). Whereas, in patients with hypochromic anemia the values of MCH and MCHC were 35 and 46% (p value: 0.004). WBC count was also high (> 10,000/mm<sup>3</sup>) in 26% anemic patients (p value: 0.001) (Table 1). The results showed second common anemia was hypochromic microcytic followed by macrocytic anemia in our local study population.

#### Statistical Analysis:

Data was collected in a format prepared for CBC results, age and sex of patients. Data was analyzed using SPSS version 19.0. Chi square was used to see statistical association among variables. Statistically

significant association among categorical variables was observed at 95% CI and  $p \leq 0.05$  level of significance.

#### DISCUSSION:

This study observed that normocytic normochromic anemia is the most common type of anemia found in the local population of hospital of Lahore. Anemia is a diverse problem of our society characterized by low levels of hemoglobin concentration than normal. Our results are in consistent with previous studies who also found lower levels of mean blood hemoglobin concentration in females than males. A study conducted in South Africa observed the prevalence of iron deficiency in females (39.8%) than males. [12] Similar studies also found anemia more prevalent in females as compared to males. [13,14] Prevalence of anemia depends on age, gender, socio-economic status

& nutritional status. Our study found high prevalence of anemia which is consistent with previous studies [15,16]. The difference in prevalence rates of anemia among different studies could be attributed to differences in the study designs and methodologies, population ages, sample sizes, dietary habits, ethnic and socio-economic backgrounds.

This study observed the normocytic normochromic anemia is the most commonly found anemia in the local population. Similar study was conducted reporting 46% prevalence of normocytic normochromic anemia. [17] On the other hand other studies found the high prevalence of microcytic hypochromic anemia during pregnancy [9,15,18]. In this study, 11% of macrocytic anemia was reported which is comparable with other studies [14].

This study found the high prevalence of mild anemia (p value: 0.037). 54% of mild anemia occurs in the 19-30 years of age and 6% is found in the elderly. Other studies are also comparable with our study which reported 8% to 44% & 11.8%, 5.4% prevalence of anemia in the elderly [15,19]

### CONCLUSION:

The prevalence of iron deficiency was high especially in females and the normocytic normochromic anemia was common in elderly patients which varies according to the geographical and nutritional conditions in accordance with socioeconomic status of individuals. To prevent the prevalence of anemia, a proper health education to increase knowledge about anemia and its causative factors, benefits of taking iron-rich food, and avoiding unhealthy food and drink intake is needed.

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