INTRODUCTION

Anaemia is a condition in which the number of red blood cells (and consequently their oxygen-carrying capacity) is insufficient to meet the body’s physiologic needs. Specific physiologic needs vary with a person’s age, gender, residential elevation above sea level (altitude), smoking behavior, and different stages of pregnancy. Anaemia is defined as a decreased concentration of haemoglobin and red blood cell mass compared with that in age matched controls. It is a frequent laboratory abnormality in children. As many as 20% children in United States and 80% in developing countries will be anaemic at some age of 18 years. Prevalence of deficiency anaemias, among healthy teenage population group, can be an important indicator of general nutritional status. The aim of this study was to assess haemogram values of medical students in Karachi and correlate it with WHO parameters.

Material & Methods: This descriptive cross-sectional study was conducted in 2010 on 518 apparently healthy subjects of both genders, who presented for fitness test prior to admission in medical college. Anti-coagulated whole blood samples were collected and tested on automated haematology cell counter and an 18 parameter haemogram was obtained. Peripheral smear was prepared using Leishman’s stain.

Results: The mean age was 18.1 years with male to female ratio of 1:3. The mean haemoglobin was 14.7 g/dl in males and 12.8 g/dl in females. Mean MCV 83.3 fl in males and 82.4 fl in females. Mean MCHC 33.4 g/dl in both genders. Mean platelet count 247.4x10^9/l in males while 289.6x10^9/l in females. Normochromic-normocytic morphology was found in 478(92.2%), hypochromia with aniso and poikilocytosis in 38(7.3%) and macrocytosis in 2(0.4%) persons. These frequencies were consistent to WHO reference ranges.

Conclusion: The blood indices of medical students fall within the specified range as set by WHO parameters.

KEY WORDS: Blood count, Haemogram, Medical student.
Anemia can thus have a relevant effect on healthcare needs and become a significant healthcare burden.\textsuperscript{10,11} It is an established fact that anemia is very common in teenage population especially in girls. Hence more work needs to be done in Pakistan.

The objective of this study was to evaluate haemogram values among teenage medical students in Karachi and to compare it with normal age and gender specific reference ranges provided by WHO.\textsuperscript{12}

**MATERIAL AND METHODS**

This descriptive cross-sectional study was conducted in 2010 on 518 apparently healthy subjects of both genders, who presented for fitness test prior to admission in medical college. Anticoagulated whole blood samples were collected and tested on automated haematology cell counter TAC-\(\alpha\) and an 18 parameter haemogram was obtained of which we included 10 parameters i.e. white blood cells (WBC), red blood cells (RBC), hemoglobin (Hb), haematocrit (HCT), mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), mean corpuscular hemoglobin concentration (MCHC), platelets (PLT), red cell distribution width (RDW) and platelet Crit (PCT) in our study. Analysis was done on SPSS version 16.0.

Peripheral smear was prepared within a standardized time limit of 4 hours while Leishman’s stain was utilized for staining. Peripheral smear morphology was reported by conventional microscopy.

Reference ranges for both genders were used in accordance to the WHO guidelines. For morphology, normochromic normocytic picture was considered as non-anaemic. hypochromia with anisocytosis & poikilocytosis as either iron deficiency anaemia or haemoglobinopathy or both while macrocytosis was found as vitamin B\textsubscript{12} or folic acid deficiency anemia.

Out of the two approaches i.e. kinetic (focusing on production, destruction and loss)\textsuperscript{10} and morphological (which groups anaemia by red blood cell size) the second one was used as it is reliable and conveniently done by routine haematology analyzers.

**RESULTS**

Mean age group of the subjects included in the study was found to be 18.1 yrs with 127(24.52) males and 391 (75.48) females.

In males the calculated means of all the parameters are shown in Table-1

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>MEAN (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WBC(103/ul :mean ± SD)</td>
<td>7.27±1.94</td>
</tr>
<tr>
<td>RBC(106/ul:mean ± SD)</td>
<td>5.36±0.61</td>
</tr>
<tr>
<td>Hb(gm%:mean ± SD)</td>
<td>14.71±1.46</td>
</tr>
<tr>
<td>MCV(10^3/ul:mean ± SD)</td>
<td>83.35±8.55</td>
</tr>
<tr>
<td>MCH(10^3/ul:mean ± SD)</td>
<td>27.62±2.82</td>
</tr>
<tr>
<td>MCHC(10^3/ul:mean ± SD)</td>
<td>35.14±25.80</td>
</tr>
</tbody>
</table>

In females the calculated means of all the parameters are shown in Table-2

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>MEAN (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WBC(103/ul :mean ± SD)</td>
<td>7.744 (1.9090)</td>
</tr>
<tr>
<td>RBC(106/ul:mean ± SD)</td>
<td>4.7967 (0.44702)</td>
</tr>
<tr>
<td>Hb(gm%:mean ± SD)</td>
<td>12.884 (1.2365)</td>
</tr>
<tr>
<td>MCV(10^3/ul:mean ± SD)</td>
<td>39.303 (3.5127)</td>
</tr>
<tr>
<td>MCH(10^3/ul:mean ± SD)</td>
<td>82.449 (7.4339)</td>
</tr>
</tbody>
</table>

Normochromic and normocytic morphology was found in 92.2% (478), while Hypochromia with anisocytosis and poikilocytosis was seen in 7.3% (38). Macrocytosis was found in 0.4% (02).

**DISCUSSION**

Anaemia begins to show its effects since childhood and continue to cause problems throughout a person’s life. Research have highlighted the fact that iron-deficiency anaemia in children is associated with impaired cognitive and intellectual performance; it also has significant effect on motor development, coordination, language development, and scholastic achieve-
The adverse health consequences do not only impair cognitive and physical development of children but reduces work productivity of adults. This study was carried out in a population which was about to enroll in a medical college.

The analysis showed 8% prevalence of anaemia in the study group. This poses the question as to why the frequency of anaemia in future medical students is lower as compared to the general population. The possible explanations could be the presence of awareness about the issue. Pre medical students have been taught the importance of a balanced diet and the functions of iron in the body. Haemoglobin and oxygen transport form a core part of their biology curriculum.

Prevalence of anaemia among different populations has been a hot topic amongst doctors throughout the world. Several studies have been done on the issue. It is more widespread in South Asia (53%) than in other regions of the world. A study conducted in Taiwan highlights the anaemia prevalence in children and adolescents with IDA is a mild public health problem among people with intellectual disabilities. Majority of the anaemia control programs of the developing world focus on iron supplementation as their core strategy. A study conducted in underdeveloped district of Vehari, Punjab showed anaemia prevalence of 47% in children. It may be due to difference in socio-demographic profile of study subjects. On the other hand the research statistics among young pregnant women analyzed prevalence of anemia as 90.5% indicating physiological stress to be the reason.

Along with non-modifiable factors such as female sex, genetic predisposition and age, there are potentially preventable risk factors leading to anaemia. The most important of these is a balanced diet. Adequate iron supplementation can prevent anaemia and the trail of defects it brings about. Awareness about the issue is the best way to beware the population from this issue and being well informed comes a long way in its prevention, as shown by the results of our study.

It is strongly recommended that future research be directed towards this issue. While unawareness and poverty play a huge role in the causation of anaemia, it is commendable to note that on the other side; education and awareness play the role as barrier in preventing anaemias.

CONCLUSION

The mean concentration of blood indices of the pre-medical students in Karachi fall within the normal range as set by WHO parameters.

Further inference deducted from the study show the importance of socio-demographic status and health awareness as valuable indicators for the prevention of nutritional deficiency anaemias.

REFERENCES


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