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HAEMATOLOGICAL PARAMETERS OF ANEMIC AND NORMAL PATIENT OF ALPHA THALASSEMIA TYPE-II IN BAIGA TRIBE OF ANUPPUR DISTRICT (MADHYA PRADESH)

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ABSTRACT:
Alpha Thalassemia is one of the most common hereditary haemoglobin disorder world-wide, particularly in some tribal caste, Mean haemoglobin parameter of anemic population has lower values of MCV & MCH. This show the percent prevalence of Haemoglobin in patient, also the indicative deficiency of Microcytosis & Iron Deficiency. Iron Deficiency is not done in the studied population.

Keywords: - Alpha Thalassemia, Baiga Tribe, MCV, MCH, Iron Deficiency, Haemoglobin percent rate, Baiga Tribe, CBC.

INTRODUCTION :

Complete Blood cell Counts (CBC's) are used during diagnosis, treatment, and follow-up to determine the health of the patient. It was done with the help of CBC Counter, an automatic blood cell counter. Many parameters have been taken into consideration.

In Madhya Pradesh, tribal population of Baiga Tribes which has a 29% tribal population. District Anuppur is situated in the south-eastern part of Madhya Pradesh. Anuppur district has been formed from the district of Shahdol. The area known as 'BAIGA-CHAK' in Mandla district Total area of newly formed Anuppur district is 3701 sq.

Mean haematological parameters of anaemic population. shown that anaemic population has lower values for MCH in all the three groups. This is the indicative of microcytosis and iron deficiency. Identification of Iron deficiency is not done in the studied population. The mean haemoglobin level for the adult male is 11.5±2.0 g/dl. It is 10.4±1.2 g/dl for female and 11.2±0.6 g/dl for the children. Children have relatively low indices.

Mean corpuscular volume (MCV):

It measures the average size of the red blood cells. When RBC is larger than normal, this condition is called macrocytic anemia. When RBC is smaller than normal, this condition is called Microcytic and MCV is decreases in Microctytic anemia. When MCV values are normal, the RBC is normal in size and they are called normocytic. However, a person with normocytic RBC can it still be anemic when there are too few RBC or when other RBC indices are abnormal. This is called normocytic anemia.

MCV = (PCV/TRBC) X 10 (Normal value is 85 ± 9 β)

Mean corpuscular haemoglobin (MCH):

It represents the average amount of Haemoglobin in a red blood cell (RBC). When MCH value is high, the red blood cells are called hyperchromic. The RBC will be deeper in color. This condition is called hypochromic anemia. When MCH values are normal, the red blood

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cells are normal in color. They are called normochromic. However, a person with normochromic red blood cells can still be anemic, when there are too few red blood cells or when other RBC indices are abnormal. This is called normochromic anemia.

MCH = (Hb%. /TRBC) X 10 (Normal value is 29.5 ± 2.5pg)

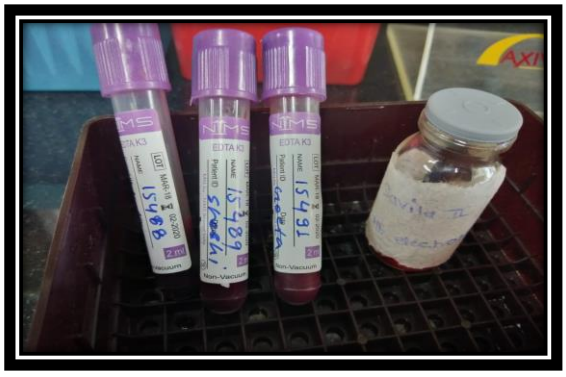
Mean corpuscular haemoglobin concentration (MCHC):

Cavaliere 2004 explains that the MCHC is the average concentration of Haemoglobin in 100gm of packed red blood cells. When MCHC is normal, RBC is called normochromic and the Haemoglobin concentration is normal. When the MCHC is higher than normal, this reflects distortions of RBC volume that cause compression in to smaller space. MCHC is in microcytle anemia and normal ("normochromic") in macroeytic anemia (due to larger cell size, though the Haemoglobin amount of MCH is high, the concentration remains MCHC is elevated ("hyperchromic") in hereditary spherocytosis, sickle cell disease and homozygous Haemoglobin C disease MCHC "Hb% /PCV) X 100 (Normal value is 33 ± 52 g/dL).

MATERIALS AND METHOD:

Sample Collection:

Venous blood is preferred for most haematological examinations. About 3 ml of venous blood is collected in sterile vials containing Ethylene Diamine Tetra Acetic acid (EDTA) acid as anticoagulant.



Basic Laboratory investigations:

Complete Blood Count CBC:

The complete blood count including total haemoglobin percentage (Hb%) total red blood cell count (TRBC) and red cell indices such as mean cell volume (MCV), mean cell haemoglobin (MCH), mean cell Haemoglobin concentration (MCHC) were measured using an automated blood cell counter (Cellenium 19, China). Complete Blood cell Counts (CBC's) are used during diagnosis, treatment, and follow-up to determine the health of the patient. It was done with the help of CBC Counter, an automatic blood cell counter. Many parameters have been taken into consideration. Those parameters and their normal values are as followed-

- **WBC [White Blood Cell Count]: 4000 to 10800 cells/µl**
- **Haemoglobin %:**

Men: 13 (or 14) to 18 gms/dl
Women: 12 to 16 gms/dl
Children: 11 to 13 gms/dl

- **Hemotocrit [Packed Cell Volume (PCV)]:**

Men: 0.42 – 0.52 [42% - 52%]
Women: 0.37 – 0.47 [37% - 47%]
Children: 0.36 – 0.40 [36% - 40%]

- **RBC [Red Blood Cell Count]:**

Men: 4.5 – 6.2 million cells/µl
Women: 4.2 – 5.4 million cells/µl
Children: 4.6 – 4.8 million cells/µl

- **MCV [Mean Corpuscular Volume]:**

Adult: 86 ± 10 f l
Infants: 106 f l
Children (3 months): 95 f l
Children (1 year): 78 ± 8 f l
Children (3-6 years): 81 ± 8 f l
Children (10-12 years): 84 ± 7 f l

- **MCH [Mean Corpuscular Haemoglobin]**

Adult: 29.5 ± 2.5 pg
Children (3 months): 29 ± 5 pg
Children (1 year): 27 ± 4 pg
Children (3-6 years): 27 ± 3 pg

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- **MCHC [Mean Corpuscular Haemoglobin Concentration]:** 32-36 gms/dl
- **Lymphocytes:** 1.3 - 4.00 x 10^3 / µl
- **Monocytes & Eosinophils Granulocytes [MID]:** 0.15-0.70 x10^3/µl
- **Granulocytes:** 2.5 – 7.50 x 10^3 / µl
- **Hemotocrit (HCT):** 36.0 – 48.0 percent
- **Platelet (PLT):** 150 – 400 x 10^3 / µl(or 10^9 / l)
- **Mean Platelet volume (MPV):** 8.0 – 15.0 fl

Sickle Solubility Test:

This test was performed to check the presence of Sickling in the sample.

RESULT AND DISCUSSION:

The prevalence of anaemia among Baiga population of Anuppur district is shown in Table 1. The cut-off level of haemoglobin for computing anemia status was adopted from the WHO protocol. Anemia was graded into three categories i.e. mild, moderate and severe as per the criteria defined by WHO for developing countries. The anemia status is determined for adult male adult female and children. Over all more than half of the population of Baiga (59%) is affected by anaemia which is categorized into 3 categories i.e. mild, moderate and severe. All the children were showed 50% of adult females and 58% adult males showed anemia mention for makes first followed by females & then by children were mildly anemic followed by adult females 32% and adult males 50%. Overall 16% of Baiga population was moderately anaemic was in 10% of children were moderately anaemic followed by 28% of adult females and adult male (4%). No any adult female individual was seen in the severe category. None of the children were severely anaemic. 4% individual of studied population were severely anaemic (Hb < 7 mg/dl).

The haematological parameters for all normal haemoglobin level individuals is given in Table 2. The mean haemoglobin was 14.1±0.5 g/dl and 12.7±0.5 g/dl for adult male and female group respectively and in children it is 12.8±0.1. mean values for MCV is 72.5±7.4 fl for adult males, 72.7±4.9 fl is for females and 74.9±5.8 fl for children. Low mean values of MCH in all groups indicates the microcytosis. The mean value for MCHC is in normal range for all three groups i.e. male (36.1±1.1pg), female (36. ±1.0pg) and children (35.8±1.1). The mean values for WBC is 7.7±2.9X10^3/µl among male, 8.1±1.9 X 10^3/µl for female and 10±2.4 for children. The mean HbA_2 level in all male (2.8±0.5), female (3.0±0.7) and children (2.8±0.5) is in normal range. The mean Hb F levels are observed as 0.9±0.4 in males, 0.6±0.4 among female group and 0.6±0.2 in children.

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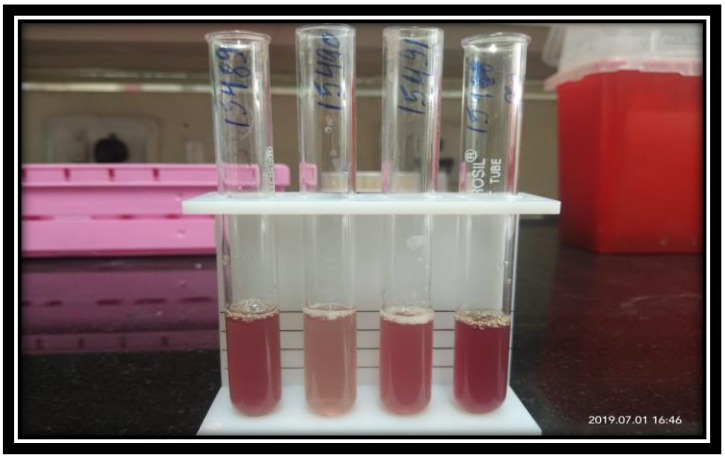
Table No. 1 Percent prevalence of anaemia among Baiga population of Anuppur District.

Group	N	Type of anaemia			Total Anaemia
		Mild	Moderate	Severe	
Male	26	13 (50%)	1 (4%)	1 (4%)	15 (58%)
Female	34	11 (32%)	9 (28%)	0	20 (59%)
Children	10	5 (50%)	1 (10%)	0	6 (60%)
Total	70	29 (41%)	11 (16%)	1 (4%)	41 (59%)

TABLE NO. 2 HAEMATOLOGICAL PARAMETERS OF ALPHA THALASSAEMIA AND NORMAL INDIVIDUAL OF BAIGA POPULATION OF ANUPPUR DISTRICT

Group	N	Hb (g/dl)	Hct (%)	TRBC ($x10^6/\mu l$)	MCV (fl)	MCH (pg)	MCHC (g/dl)	HbF (%)	HbA 2(%)	WBC ($x10^3/l$)	PLT ($x10^3/\mu$ l)
Normal (αα/αα)	10	11.5 ± 1.7	31.9± 4.4	4.6±0.6	69.3±5.6	24.1±2.1	36.1±1.0	0.6±0.2	2.5±0.5	7.4±2.1	206.6±51.9
Homozygous us ($(-\alpha^{3.7}/-\alpha^{3.7})$	8	11.8 ±1.9	33.5 ±4.7	4.7 ±0.8	70.7 ±7.6	25 ±2.9	35.4 ±1.1	1.1 ±2. 5	2.8 ±0.7	7.4 ±2.4	194.5 ±48.3
Homozygous ($(-\alpha^{3.7}/\alpha\alpha)$ ($\alpha\alpha/ -\alpha^{4.2}$)	7	2.4±1.2	34.833	4.8±0.5	72.3±5.2	25.7±2.3	35.5±1.2	0.6±0.5	2.8±0.3	7.4±2.3	202.3±74.7



Turbidity shows positive result

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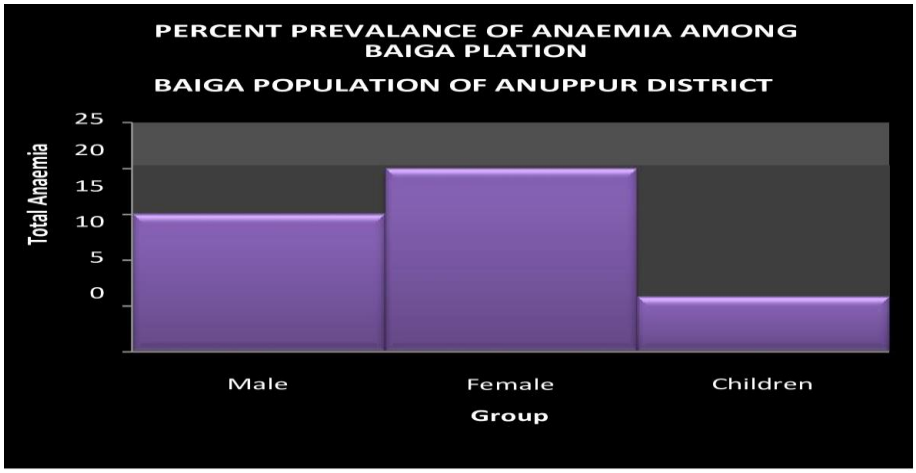

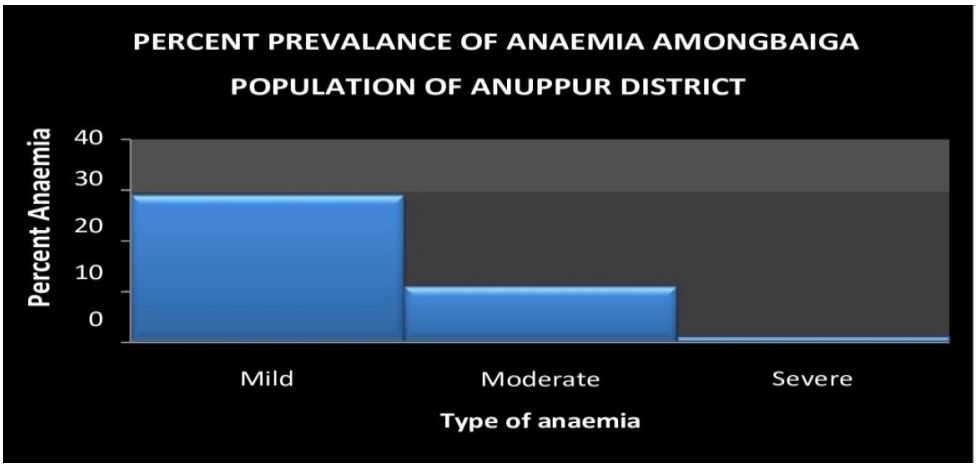

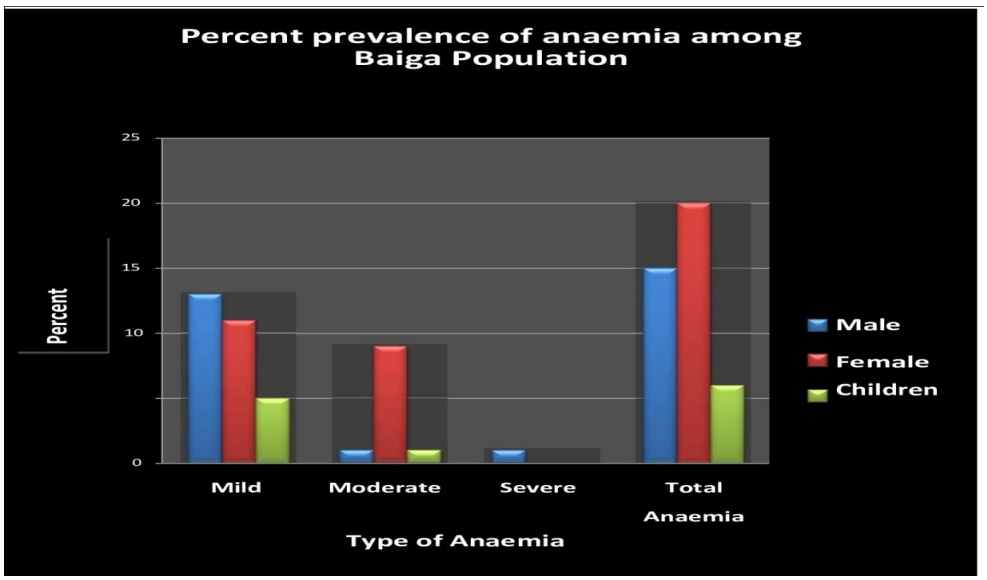

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