

Original Article



Study on RBC Count and Hb level between Bangladeshi and Kashmiri Medical Students of Khwaja Yunus Ali Medical College

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Abstract

Background: Among the different blood parameters the total RBC count and blood hemoglobin level is important for the diagnosis of anemia. The results vary in different nations for environmental conditions and different dietary habits. **Objectives:** This study was to observe the total RBC count and blood Hb level in between the Bangladeshi and Kashmiri students of same age group. Dietary chart was also studied in between the two nationalities of students to observe any alteration of the result or not. **Materials and Methods:** This random study was done in Khwaja Yunus Ali Medical College, Sirajganj, Enayetpur on September, 2019. Total 200 students were included with specific age range, sex and diet history. The students were divided as 100 male and 100 female students. Total RBC count was estimated by fluid dilution (Dacie's fluid) method and Hb level was estimated by Sahli's acid hematin method. **Results:** Among 200 students, 94% Bangladeshi male and 98% Bangladeshi female and among Kashmiri's 96% male and 94% female students were in age between 19 to 21 years. Total RBC count > 5 million/cumm of blood was found in 24% Kashmiri and 08% Bangladeshi male students. Total RBC count in between 4M/cumm to 5M/cumm was present in 84% and 94% of Bangladeshi male and female students respectively and among 76% Kashmiri male and 90% Kashmiri female students. Hemoglobin level > 15 gm/dl was found among 54% Kashmiri and 10% Bangladeshi male students. It was also observed that Kashmiri students were more habituated to protein rich diet than the Bangladeshi students. **Conclusion:** Present study revealed that environment and diet habit has an impact on alteration of total RBC count and blood Hb level.

Keywords: Total count of RBC, Hb level, Bangladesh Medical Students, Kashmiri Medical Students.

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Introduction

Study on blood parameters in age groups who has just crossed adolescent, is an important factor for future reproductive life. The hemoglobin concentration of blood is widely used as an aid in assessment of the state of health.¹ The long phylogenetic history of sex difference in hemoglobin levels in vertebrates indicates that males and females are evolved different mean venous hemoglobin levels for different purposes or under different selection pressure.² Total red blood corpuscle and hemoglobin level differs in between adult males and females.^{3,4,5} Evidence of a genetic effect on red cell count and mean cell volume, genetic and non shared environmental influences on white cell counts, and indices related to circulating red cell mass and platelet numbers and sizes, have also been detected.^{6,7} Conditions like nutritional deficit, acute and chronic inflammations, parasitic infestations, growth spurt, increase in iron requirements and increased iron loss from the body during menstruation, inherited or acquired

disorders of hemoglobin synthesis, RBC production or survival are also considered as causes of anemia or low Hb level.⁸ Total RBC count in adult male is $5.5 \times 10^{12}/L$, in adult female $4.8 \times 10^{12}/L$ and Hb level in adult male is 15.5 gm/dl and in case of adult female is 14 gm/dl.⁹ These levels are important in diagnosis of anemia.¹⁰ Because deficient in iron status or anemia among adolescent girls is a major cause of growth retardation, impaired physical and mental development, delayed menarche, morbidity and future poor reproductive outcome.^{11,12} Poor iron consumption and high menstrual blood loss is one of the major causes of anemia.¹³ In addition to these direct causes, there are indirect socioeconomic factors such as illiteracy, poverty, and rural residence that can also cause anemia.¹⁴ Anemia has serious consequences in adolescent boys and girls with growth retardation as well as impaired physical and cognitive performances.¹⁵ For that reason, following study was done to find out the differences of values in between total RBC count and blood Hb level among the Bangladeshi and

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Kashmiri students of KYAMC to see whether there is any environmental or social impact is present in alteration of their Hb and total RBC values or not.

Materials and Methods

This random study was a done among 200 MBBS students of KYAMC, of 100 boys and 100 girls. Among these, they are again divided as 100 Bangladeshi and 100 Kashmiri students. The age group was in between <18 to >22 years. The questionnaire was containing their height, weight, total RBC count, Hb level including personal history of diet, family history and socio-economic status. The study was done in one month during September, 2019. The blood parameters were collected from Physiology laboratory. Total RBC count was estimated by fluid dilution (Dacie's fluid) method and Hb level was estimated by Sahli's acid hematin method. The RBC count was expressed as million/mm³ of blood and Hb level was expressed as gm/dl. The diet history was taken by questionnaire.

Results

Table I: Percentage of age group (n=200)

Age Years	Bangladeshi-Male	Bangladeshi-Female	Kashmiri-Male	Kashmiri-Female
≤18	02 (04%)	01(02%)	00	03(06%)
19-21	47 (94%)	49 (98%)	48(96%)	47(94%)
≥22	01(02%)	00	02(04%)	00
Total	50 (100%)	50(100%)	50(100%)	50(100%)

Table II: Levels of Total RBC Count and their percentage (%). n=200.

T C of RBC M/mm ³	Bangladesh-M (50)	Kashmir-M (50)	Bangladesh-F (50)	Kashmir-F (50)
<4	00	00	03 (06%)	02 (04%)
4-5	42 (84%)	38(76%)	47 (94%)	45 (90%)
>5	08 (16%)	12(24%)	00	03(06%)
Total	50 (100%)	50 (100%)	50 (100%)	50 (100%)

M=Male, F=Female

Table III: Hemoglobin Status of Students and percentage (n=200)

Hb Level gm/dl	Bangladesh-M (50)	Kashmir-M (50)	Bangladesh-F (50)	Kashmir-F (50)
<10	00	00	03(06%)	02(04%)
10-12	05(10%)	01(02%)	22(44%)	08(16%)
12-15	40(80%)	22(44%)	25(50%)	40(80%)
>15	05(10%)	27(54%)	00	00
Total	50(100%)	50(100%)	50(100%)	50(100%)

M=Male, F=Female

Table IV: Students Dietary Habit Chart Main Food (n=200).

Diet Habit main food	Bangladesh n=100 (%)	Kashmir n=100 (%)
Rice	98(98%)	60(60%)
Bread	02(02%)	40(40%)
Total	100	100

Table V: Dietary Chart Additional Food (n=200)

Additional food	Bangladesh (100)	Kashmir (100)
Beef	15(15%)	25(25%)
Chicken	20(20%)	20(20%)
Eggs	25(25%)	15(15%)
Lamb	00	35(35%)
Fish	30(30%)	00
Vegetables	10(10%)	05(05%)
Total	100(100%)	100(100%)

In present study, the data was collected randomly from 200 students between <18 to >22 years of age (Table I). Of which 100 were Bangladeshi and 100 were Kashmiri male and female students. The age range in between 19 to 21 years among Bangladeshi male and female was 94% and 98% respectively (Table I) and among Kashmiri male and female students were 96% and 94% respectively (Table I). Total RBC count >5million/cumm of blood was found in 24% Kashmiri males and 08% Bangladeshi males (Table II). Total RBC count in between 4M/cumm to 5M/cumm was present in 84% and 94% of Bangladeshi male and female students respectively and among 76% Kashmiri male and 90% Kashmiri female students (Table II). Hemoglobin level >15gm/dl was found among 54% Kashmiri male and 10% Bangladeshi male students (Table III). Results also showed that, 50% of Bangladeshi and 80% Kashmiri female students had Hb level in between 12.1-15gm/dl (Table III). Though, 06% Bangladeshi and 04% Kashmiri female students had Hb level <10gm/dl with a history of poor diet and heavy menstrual bleeding. According to dietary habit (Table IV & Table V) both nationalities were taking rice as main food and fish/chicken or lamb as additional food. The percentage of protein rich diet was more among the Kashmiri students (Table V).

Discussion

Total RBC count and estimation of Hb level in adolescents and in adult is one of the most important blood test to diagnose anemia. Age range, sex differences, environmental and dietary habit has an important impact on alteration of these blood levels.

In present study, most of the student's age range was in between 19-22 years (Table I). Only 03 Bangladeshi and 03 Kashmiri students were in age group of <18 years.

In present study, it was found that among the Kashmiri, 12 male and 03 female students had their total RBC count above 5million/mm³ of blood (Table II). On the other hand, none of the Bangladeshi female students had their total RBC count >5million/mm³.

In present study, it was also found that, 27 Kashmiri and only 05 Bangladeshi male students had their Hb level above 15 gm/dl. On the other hand, 40 Kashmiri and only 25 Bangladeshi female students were having Hb level in between 12-15gm/dl (Table III). The result was differing, in between two nationality students in both RBC count and Hb levels. This was supported by previous studies where it was found that,

the total RBC count and Hb level was more in case of peoples who were living in high lands.¹⁶

In present study, it was also observed that 03 Bangladeshi and 02 Kashmiri students had their Hb level <10 gm/dl (Table III). These girls had irregular menstrual history with heavy flow. Similar findings were observed in several studies.¹⁷⁻¹⁸

In present study, it was found that rice was the main food in both nationalities (Table IV). Yet, the additional food varied in case of both nationality students (Table V). Animal protein is a rich source of iron, which can increase the blood Hb level.¹⁹ This might be, one of the reasons caused increased RBC count and more Hb level in Kashmiri students than that of Bangladeshi (Table III & Table IV).

High altitude is the promotional factor for erythropoiesis.²⁰ However, living in high lands a number of Kashmiri females were having low Hb level with a poor dietary history and heavy menstrual flow (Table III). It is supported by several research works.^{21,22}

Conclusion

Following study showed that, the Kashmiri students have a higher Hb level and increased total RBC count than that of the Bangladeshi students. This might be due to the environmental effect and dietary habit of the different nationalities. Though, few girls of both nationalities' had low Hb level. Therefore, it is important to check total RBC and Hb level among the students regarding early diagnosis of anemia and to take the necessary steps to improve their health condition.

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