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RESEARCH ARTICLE

PREVALENCE OF ANEMIA AND HEMATOLOGICAL PROFILE AMONG PARA MEDICAL STUDENTS IN COIMBATORE

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Abstract

Anemia is one of the most common hematological disorder among male and female in the worldwide. If left untreated, it can cause serious morbidity and leads to life threatening. Hence, the current study was aimed to evaluate the occurrence of anemia between adolescent in Coimbatore Medical College students. The cross-sectional study was done in the Multi Disciplinary Research Unit, Coimbatore Medical College and Hospital, Coimbatore, India for a period of six months from November 2022 to April 2023. The given work was based on hematological profile of 100 adults (age 17-21 years). A blood sample by vein puncture was derived in an EDTA vacutainer. The sample was used to analyze WBC, RBC, platelets, Hb, PCV and MCV using hematology analyzer "Sysmex XN 1000". Out of 100 people, males were 16% and females were 84%. According to distribution of age, maximum adults were in 17-18 years (78%) and minimum adults were in 19-21 years (22%). The level of hemoglobin of those adolescents range between 12-16 g/dl (42%). Moderate anemia cases were 37% (10-12 g/dl). 12% cases were present in 8-10 g/dl. Whereas, severe anemia cases were found to be 9% (<8 g/dl). In the level of RBC count the maximum case of adolescents shows the RBC count ranges between 4.01-6 millions/mm³ were 75%. In the level of WBC count the maximum cases of adolescent's shows the WBC count ranges between 4500-11000 cells/cu mm were 89%. In the level of platelet count, maximum cases showed grade I and IV thrombocytopenia with 46% and 36%. In the present study, the maximum cases are in the range <35-48% PCV value shows 77% cases and in the level of MCV counts 75-96 fl were 83% cases. MCV value <75% were found to be 8% cases and the level of MCV count >96 fl were 9% cases. From the above results it was clearly indicated that hematological parameters were better among 17-18 years of age group when compared to 19-21 years.

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Introduction:-

Nutrition plays an important role in maintaining optimal hematological profile in young adults/adolescents. Adequate intake of essential nutrients is crucial for the right production and function of blood cells. This can be demonstrated by assessing various hematological parameters such as RBC, WBC, platelet count etc in individuals with different nutritional status. These parameters can help to determine whether there is a correlation between the nutritional status of adolescents and their hematological profile (Sun et al., 2024). By comparing the hematological profile of individuals with different nutritional status, we can identify any deviations from the normal range and assess how nutrition impacts on blood cell production and function in this population (Sari et al., 2022). Furthermore, establishing standard values for hematological and serum biochemical indices based on parameters such as age, sex, stress level, management systems, health status and nutrition can provide a baseline reference for diagnosing and treating hematological disorders among adolescents. This information can also be used to develop targeted nutritional interventions to improve hematological health in this population (Prabhu et al., 2024). The relationship between nutrition and hematological profile highlights the importance of ensuring proper nutrition in this population for optimal health and well-being. Additionally, monitoring the hematological profile can provide important insights into their overall health and nutritional needs. Therefore, it is essential to include hematological analysis as a part of assessment of nutritional status and it may provide valuable information about their overall health and nutritional well-being. Furthermore, dietary intake assessment can provide valuable insights into the overall nutritional adequacy and quality of the diet consumed adolescents. Understanding their dietary habits and patterns can help identify potential deficiencies or excesses that may be influencing their hematological parameters (Sun et al., 2024).

By integrating these additional aspects into the valuation of nutritional status, healthcare professionals can achieve a more comprehensive perspective of the factors influencing hematological health among adolescents. This holistic approach to assessing nutritional status can inform the development of targeted interventions to address specific nutritional gaps and optimize hematological well-being in this population. Nutritional deficiency is more common in girls which are susceptible to anemia (Masini et al., 2022).

Among health science students, the hematological profile is the important profile to analyze the anemia. These students are tasked with understanding and interpreting the blood parameters of young adults, which can provide precious insights into their overall health and potential underlying medical conditions. This information can be used to identify any abnormalities from the established reference intervals, allowing for early detection and intervention for potential health issues (Gafer-Gvili et al., 2019). In addition, creating age and sex specific reference intervals for hematological markers among young adults is crucial. These intervals may serve as a target for evaluating the hematological profile of young adults and comparing it to the general population (Girelli et al., 2018). Hence, the study was aimed to evaluate the blood parameters specifically in young adults, predominantly among health science students in a medical college.

Materials and Methods:-

The study was performed among para medical students at Coimbatore Medical College, Coimbatore, India. The study was excluded students who were not in good health or had a history of any chronic medical condition. Dietary profile includes the frequency of major meals consumed in a day, where meals are eaten, snacking behaviors, meal skipping patterns and frequency of food intake with regard to pulses, legumes, cereals, green leafy and other vegetables, fruits and non-vegetarian foods.

The study period is of six months from November 2022 to April 2023. The given study was based on blood profile of 100 cases (aged 17-21 years). Blood sample was collected by vein puncture in a 5 ml tube containing ethyl diamine tetra acetic acid (EDTA) and used for the analysis of hematological profile using hematology analyzer "Sysmex XN 1000".

Study procedure and data collection

Data was collected using a questionnaire designed specifically for this investigation. A component of the questionnaire was intended to gather information on socio-demographic variables and eating dietary habits. The study was introduced and the objectives were explained. The data was collected to students who agreed to participate and completed a consent form. Anthropometric data were then measured and recorded in an accurate

manner. Details on the dietary profile were collected through mini nutritional assessment scale, food frequency and 24 hours recall survey. The Institutional Human Ethical Committee (IHEC) reviewed and approved the study procedures via expedited review.

Statistical Analysis

All datas were tabulated in Microsoft excel and examined by descriptive statistics.

Result:-

Total 100 adolescent aged 17 to 21 years age where included in this study over six months. The gender wise distribution of adolescents was depicted in table 1. Out of 100 adolescents, Boys were 16% and girls were 84%.

Table 1:-Gender-wise distribution of Adolescents (17 to 21 years of age).

Gender	Percentage (%)	No of cases
Male	16	16
Female	84	84
Total	100	100

Table 2 shows the age (17 to 21 years) distribution of adolescents. Maximum cases were found in 17-18 years of age group. In 19-21 years of age group there were 22% cases.

Table 2:- Age-wise distribution of Adolescents.

Age	Percentage (%)	No of adolescents
17-18	78%	78
19-21	22%	22
Total	100	100

Table 3 shows the level of hemoglobin (g/dl) in adolescents. Maximum cases were found in 12-16 g/dl range (42%). Out of 100 cases, moderate anemia cases were 37% (Hb: 10-12 g/dl) while mild anemia cases were 12% (Hb: 8-10 g/dl). Whereas, severe anemia cases were found to be 9% due to low Hb level (<8 g/dl).

Table 3:- Values of Hb in Adolescents.

Level of Hb (g/dl)	Percentage	17-18 years	19-21 years
<8	9%	6	3
8-10	12%	7	5
10-12	37%	28	9
12-16	42%	37	5
>20	0.00	0	0
Total	100	78	22

Table 4 shows the level of RBC count in Adolescent. In the level of RBC count <4.01 millions/mm³ cases were found to be 24%. The maximum case of adolescents shows the RBC count ranges between 4.01-6 millions/mm³ were 75%. The minimum case of adolescent shows the RBC count >6 millions/mm³ was 1%.

Table 4:- Values of RBC count in Adolescents.

Level of RBC (millions/mm ³)	Percentage	17-18 years	19-21 years
<4.01	24%	11	13
4.01-6.00	75%	66	9
>6.00	1%	1	0
Total	100	78	22

Table 5 shows the level of WBC count in Adolescent. In the level of WBC count <4500 cells/cu mm cases were found to be 5%. The maximum case of adolescents shows the WBC count ranges between 4500-11000 cells/cu mm were 89%. 6% in >11000 cells/cu mm range of WBC count.

Table 5:- Values of WBC count in Adolescents.

Level of WBC (cells/cu mm)	Percentage	17-18 years	19-21 years
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<4500	5%	4	1
4500-11000	89%	70	19
>11000	6%	4	2
Total	100	78	22

Table 6 shows the level of platelet count according to the thrombocytopenia grades in adolescent. Maximum cases showed grade I and IV thrombocytopenia with 46% and 36%. Grade II thrombocytopenia showed 13% cases and grade III thrombocytopenia showed minimum cases which were found to be 5%.

Table 6:- Level of platelet count of thrombocytopenia cases in Adolescents.

Grade of thrombocytopenia	Platelet count (Lakhs/cu mm)	Percentage	17-18 years	19-21 years
I	130000-70000	46%	35	11
II	70000-52000	13%	5	8
III	52000-25000	5%	3	2
IV	<25000	36%	35	1
-	Total	100	78	22

Table 7 shows the level of packed cell volume in Adolescent. Maximum cases are in <35-48% PCV value shows 77% cases. Moderate PCV value <35% were found to be 12% cases and the minimum level of PCV count 11% cases were >48%.

Table 7:- Values of PCV in Adolescents.

PCV (%)	Percentage	17-18 years	19-21 years
<35	12%	8	4
35-48	77%	62	15
>48	11%	8	3
Total	100	78	22

Table 8 shows the level of mean corpuscular volume (MCV) in Adolescent. The level of MCV counts 75-96 fl were 83% cases. MCV value <75% were found to be 8% cases and the level of MCV count >96 fl were 9% cases.

Table 8:- Level of MCV in Adolescents.

MCV (fl)	Percentage	17-18 years	19-21 years
<75	8%	2	6
75-96	83%	71	12
>96	9%	5	4
Total	100	78	22

Discussion:-

The most common nutritional deficiency among peoples in worldwide is anemia. The adverse on work productivity of adults and physical development of children are of major concern. It affects all age groups which can effect from nutritional and non-nutritional factors (Joshi et al., 2022). Iron deficiency usually developed by negative iron balance due to menstrual blood loss, iron deficient diet and accelerated growth in adolescents (Saha and Sarkar, 2015). In the present study out of 100 adolescents, 78 were 17-18 years of age and 22 were 19-21 years of age. The mean values of Hb, RBC, WBC, platelet, MCV, PCV showed raise with the increase of age.

The maximum cases of hemoglobin level were found in 12-16 g/dl range (42%). Whereas, severe anemia cases were found to be 9% due to low Hb level (<8 g/dl) which may be due to poor dietary habits and skipped breakfast. The above results were coincidence with the previous report of Gligoroska et al., 2019. Likewise, the level of RBC count <4.01 millions/mm³ cases were found to be 24%, level of WBC count <4500 cells/cu mm cases were found to be 5%, level of platelet count maximum cases showed grade I and IV thrombocytopenia with 46% and 36%, moderate PCV value <35% were found to be 12% cases and MCV value <75% were found to be 8% cases. The biochemical results showed that some of the students were anemic because they are in the production stage, also the iron has an efficient impact on their mental abilities, this may be either due to decreasing high iron diet consumption or it may be due to poor absorption (Burayu and Degefa, 2024).

Although hematological profile of individuals exhibits notable variation across different age groups. Individuals in the 17–18 age groups tend to exhibit higher levels of red blood cells, hemoglobin and hematocrit compared to 19-21 years age group. The same results were observed that level of hematological profile were higher in young age groups (Rahman et al., 2023; Shill et al., 2014).

Conclusion:-

In conclusion, some of the adolescent in medical college students are suffering from anemia which may be due to poor diet consumption, low economic status, blood loss during menstruation, underweight or it may be due to iron deficiency which are significantly associated with anemic condition. Thus nutritional deficiency anemia was more prevalent in young age students. Hence, to overcome this adequate nutrition is an important for young adolescents to prevent anemia.

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Conflict Of Interest

We, the authors declared that there is no conflict of interest related to this work.

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