A STUDY ON PREVALENCE OF ANAEMIA AND HAEMOGLOBINOPATHIES AMONG GIRLS LIVING IN HOSTEL OF RAJKOT, GUJARAT.

Health Science

Dr. Vachhani Nishith A*	Indian Medical Scientific Research Foundation, Life Blood Centre, 24-Vijay Plot, Samir Dholakiya Marg, Malaviya Road, Rajkot – 360002, Gujarat, India *Corresponding Author
Dr. Nandani Sanjeev L.	Indian Medical Scientific Research Foundation, Life Blood Centre, 24-Vijay Plot, Samir Dholakiya Marg, Malaviya Road, Rajkot – 360002, Gujarat, India
Dr. Sorathiya Varsha P.	Indian Medical Scientific Research Foundation, Life Blood Centre, 24-Vijay Plot, Samir Dholakiya Marg, Malaviya Road, Rajkot – 360002, Gujarat, India
Ms. Vekariya Daya J.	Indian Medical Scientific Research Foundation, Life Blood Centre, 24-Vijay Plot, Samir Dholakiya Marg, Malaviya Road, Rajkot – 360002, Gujarat, India
Ms. Boghra Disha B.	Sarvodaya College of Science & Technology, Rajkot – 360002, Gujarat, India
Ms. Poshia Hinal C.	Sarvodaya College of Science & Technology, Rajkot – 360002, Gujarat, India
Ms. Dangariya Ekta R.	Sarvodaya College of Science & Technology, Rajkot – 360002, Gujarat, India

ABSTRACT

Low haemoglobin concentrations and anaemia in women are important risk factors for the health and development. We studied distribution of haemoglobin concentration, prevalence of anaemia and haemoglobinopathies in hostel living girls. 1027 hostel living girls in the age group of 11-40 years of Rajkot, Gujarat were the subjects of study. Haemoglobin estimation was performed by automated cell counter and observations were interpreted as per WHO criteria. The study showed 28.72% were affected with various grades of anaemias. 16.55% mildly anaemic, 11.78% moderately anaemic while 0.39% suffered from severe anaemia. Various haemoglobinopathies were also studied by HPLC method. Prevalence of Beta thalassaemia carrier was 4.39%. Low consumption of iron rich foods and faulty dietary pattern cause of high prevalence of nutritional anaemias. Continuous follow-up programme and nutrition education can improve the nutritional status of hostel living girls. Frequent screening for anaemia and haemoglobinopathies and health education is a must for betterment of girls living in hostels.

KEYWORDS

Anaemia, Haemoglobinopathies, Thalassaemia Carrier, HPLC

INTRODUCTION

Anaemia is a condition, in which the number of red blood cells or their oxygen- carrying capacity is insufficient to meet physiologic needs, which vary by age, sex, attitude, smoking, and pregnancy status.[14]Anaemia is indicator of both poor nutrition and poor health.[9] Most of the anaemias are due to inadequate supply of nutrients like iron, folic acid, and vitamin B12, proteins, amino acids, vitamin A, C, and other vitamins of B complex group.[16] Poor eating habits are a major public health concern among college students. Meal skipping, eating away from home, snacking and fast food consumption predispose them to dietary deficiencies.[4]Anaemia prevalence has barely changed in the 10 years between NFHS-3 and NFHS-4, decreasing from 55% in 2005-06 to 53% in 2015-16 among women.[19]

India has the world's highest prevalence of iron deficiency anaemia among women, with 60-70% of adolescent girls and young adults being anemic.[16]On an average a healthy woman loses about 25-30 ml blood monthly. Therefore, the body needs to produce blood in order to compensate for this loss and if the essential nutrients for haemopoiesis are not supplied in their diet, anaemia will develop.[5]

This present study was undertaken to assess the prevalence of anaemia and correlation with other hemoglobinopathies among hostels living girls. Both Iron deficiency anaemia and Beta thalassaemia trait are the most frequent causes of microcytic hypochromic anaemia. Microcytic anaemia in case of thalassaemia results from impaired globin chain decreased hemoglobinization.[12]Hence, our objective is to find out the prevalence of anemia among hostel living girls of Rajkot city.

MATERIAL & METHODS

A total 1027 girls enrolled in this studies who were residing in hostels during the study period. A total volume of 2 ml of venous blood was drawn from each participant into EDTA (ethylene diamine tetra acetic acid) container for CBC Test and HPLC test to classify the type of anaemia and hemoglobinopathies. Blood was drawn by skilled personal. Universal precautions were followed during blood collection, transportation, storage, and disposal to protect the participants as well as researchers. The blood samples were mixed for 8 to 10 minutes and there after analysed on the Sysmex XP-100, three part differential cell counter to obtain the hemoglobin values and indices as described in the instruction manual. A CBC measures total number of red blood cells and total amount of hemoglobin in the blood etc. All samples were analysed on the Bio-Rad Variant-II Hemoglobin system (Bio-Rad Laboratories, Hercules) as described in the instruction manual. HPLC method is rapid, reproducible and accurate method for the various abnormal hemoglobins.

The Variant-II β-thalassaemia short program utilizes principles of ion exchange high performance liquid chromatography (HPLC). The samples are automatically mixed and diluted on the variant-II chromatographic station (VCS) dual pumps deliver a programmed buffer gradient of increasing ionic strength to the cartridge, where Hb A2/F are separated based on the ionic interaction with the cartridge material. The separated Hb A2/F then pass through the flow cell of the photometer where the changes in absorbance at 415nm are measured. An additional filter at 690 nm corrects the background absorbance. The Variant-II CDM software performs reduction of raw data collected from each analysis. Other relevant tests were done, for example. Sickling test (using sodium meta bisulphite) when D-window or/and S-window eluted in the sample.

RESULT

The hostel living girls were about the half participants belonging to the age groups of up to 17 years (58%), between 18 to 21 years (36%) and

rest were more than 22 years (6%).(Table 1)

Table-1: Age wise distribution (in years)

Up to 17	18-21	More than 22
596 (58%)	368 (36%)	62 (6%)

All participants were school and college girls who were distributed in studying groups such as up to HSC (54.23%), graduation (40.60%) and post graduation (5.06%). The mean Hb % of the study population was 12.46% gm/dl. As per hemoglobin concentrations for the diagnosis of anaemia and assessment of severity by World Health Organization, we observed there were mild anaemia among 170 girls (16.55%), moderate anaemia among 121 girls (11.78%) followed by severe anaemia in 4 girls (0.38%).

In the present study, it was found that out of 1027 hostel living girls 28.72% were suffering from various degrees of anaemia and rest of 71.18% girls were non anemic as per WHO criteria for anaemia.[8](Table-2)

Table-2: WHO classification of Anaemia for non-pregnant woman

	Non-Anaemia (Hb >12 gm%)	Mild Anaemia (Hb 11-11.9gm%)	Moderate Anaemia (Hb 8-10.9 gm%)	Sever Anaemia (Hb <8 gm%)
Up to HSC	425 (58.14%)	79 (46.47%)	52 (42.98%)	2 (50%)
Graduation	280 (38.30%)	75 (44.12%)	59 (48.76%)	2 (50%)
Post graduation	26 (3.56%)	16 (9.41%)	10 (8.26%)	0
Total	731 (100%)	170 (100%)	121(100%)	4 (100%)

All samples were analyzed by high performance liquid chromatography (HPLC) on variant-II for hemoglobin fractionation study. Out of 35 cases of beta thalassaemia with concomitant 16 (9.41%) & 26(21.49%) cases were mild to moderate anaemia respectively. Beta thalassaemia prevalence is 4.39% with 45 cases. Other haemoglobinopathies which were diagnosed are 35 (3.41%) cases as borderline for beta thalassaemia trait, 4(0.39%) cases of Hb D Punjab trait, 2 (0.19%) cases of sickle cell trait and 1 (0.10%) case Hb D Iran. (Table-3)

Table-3: Spectrum of Haemoglobinopathies by HPLC method

Result	Number (%)
Thalassaemia Minor	45 (4.39%
Borderline for Beta Thalassaemia Minor	35 (3.41%)
Hb D Punjab Trait	04 (0.39)
Sickle Cell Trait	02 (0.19%)
Hb D Iran Trait	01 (0.10%)

DISCUSSION

In India, the mean blood hemoglobin concentration is 11.9 gm% (95% CI: 11.3-12.5) in non-pregnant women.[17] In present study the hemoglobin concentration in non-pregnant women is 12.46 gm%. The reasons for anaemia seems to be among the hostel living girls are malnutrition, increase iron requirements because of growth, menstrual loss, and low intake iron containing foods, erratic eating habits, dislike for foods which are iron rich, like green leafy vegetables, antioxidant rich food.

A lower prevalence of 19% was also reported in a government medical college among female students in Kerala.[14]This finding is an agreement with this studies that have reported to mild to moderate among students.

Joglekar, A. *et.al.* conducted study on prevalence of anaemia among college going girls of Raipur city had varying severity of anaemia with 16.86% was mild anemic which is similar to our study – 16.55% but 7.30% was severely anemic cases which is quite high than our present study–0.4%.[3] While it is heartening to note that only a negligible percentage of patients have severe anaemia.

A research has been carried out in Sri Lanka university of Sri Jayewardenepura, based on similar hypothesis as our research, has found a 17.5% similar prevalence of mild anaemia and there is a small degree of variability in the prevalence of moderate anaemia in hostel residing females.[5]

CONCLUSION

The present study indicates prevalence of anaemia and haemoglobin opathies in hostel residing females is very high.The most effective approach to reduce the burden of the anemia and to prevent thalassaemia in the society is implementation of combinations of programmes like iron rich food, the thalassaemia carrier screening, awareness programmes, nutritional determinants of low hemoglobin and differentiation of beta thalassaemia trait with or without iron deficiency anemia and regular counseling.

REFERENCES
1. Stevens, G. A., Finucane, M. M., De-Regil, L. M., Paciorek, C. J., Flaxman, S. R., Branca, F.,& Nutrition Impact Model Study Group. (2013). Global, regional, and national trends in haemoglobin concentration and prevalence of total and severe anaemia in children and pregnant and non-pregnant women for 1995–2011: a systematic analysis of population-representative data. The Lancet Global Health, 1(1), e16-e25.
2. Kassebaum, N. J., Jasrasaria, R., Naghavi, M., Wulf, S. K., Johns, N., Lozano, R., & Flaxman, S. R. (2014). A systematic analysis of global anemia burden from 1990 to 2010. Blood, 123(5), 615-624.
3. Joglekar, A., Verma, V., Sharma, G., &Bhoi, S. Prevalence of Anemia among College Going Girls of Raipur City.
4. Kannan, B., & Ivan, E. A. (2017). Prevalence of anemia among female medical students and its correlation with menstrual abnormalities and nutritional habits. Int J ReprodContraceptObstetGynecol, 6, 2241-5.
5. Chathuranga, G., Balasuriya, T., &Perera, R. (2014). Anaemia among female undergraduates residing in the hostels of University of Sri Jayewardenepura, Sri Lanka. Anemia, 2014.
6. Ghorpade V V, Shinde P P, Madhekar N S, Pol V S. Prevalence of anaemia in female students of pharmacy college and its association with various socio-demographic variables: a study conducted in rural teaching institute, Kasegaon. International Journal of Contemporary Medical Research 2016;3(8):2295-2297.
7. Kaur, I. P., & Kaur, S. (2011). A comparison of nutritional profile and prevalence of anemia among rural girls and boys.Journal of Exercise Science and Physiotherapy, 7(1), 11.
8. World Health Organization. (2011). Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity (No. WHO/NMH/NHD/MNM/11.1). World Health Organization.
9. World Health Organization. Global nutrition targets 2025: anaemia policy brief (2014).
10. WHO, U. (2004). Joint statement by the World Health Organization and the United Nations Children's Fund.Focusing on anaemia.
11. World Health Organization. (2017). Nutritional anaemias: tools for effective prevention and control. Geneva: World Health Organization, p83.
12. Kabir, A. L., Dipta, T. F., Khatun, H., Rahman, M. H., Haq, M., Uddin, M. K., & Begum, M. (2014). A Screening Test for Iron Deficiency Anaemia and Thalassaemia Traits. Journal of Bangladesh College of Physicians and Surgeons, 32(4), 190-193.
13. Kharb, M., Verma, R., Govila, V., & Arora, V. (2013). Prevalence of anemia in college going youths in Urban setting of a dist. of Northern India. EXCEL International Journal of Multidisciplinary Management Studies, 3(5), 58-68.
14. Subramaniyan K, George M, Seshadri D, Jena A, Chandraprabha N. Prevalence of anemia among health science students of a university in South India. Int J Res Med Sci 2016;4:4598-601.
15. Khan, H. M. S., Sohail, M., Ali, A., Akhtar, N., Khan, H., &Rasool, F. (2014). Symptoms-Based Evaluation of Iron Deficiency Anemia in Students of Bahawalpur Correlated with their Eating Habits. Tropical Journal of Pharmaceutical Research, 13(5), 769-772.
16. Singh, Renu, Chaudhary, Parul and Jain, N.K. (2018). Study the status of anaemia in hostel girls of Ahmedabad city. Internat. J. Appl. Home Sci., 5 (4) : 826-831.
17. Nishith, Vachhani & Sanjeev, Nandani & Daya, Vekariya. (2017). PREVALENCE OF ANAEMIA AND HAEMOGLOBINOPATHIES AMONG COLLEGE STUDENTS OF RAJKOT, GUJARAT. International Journal of Advanced Research. 5. 1532-1537. 10.21474/IJAR01/4277.
18. Patel Ashwin, P., NaikMadhuben, R., Shah Nilam, M., Sharma Narmadeshwar, P., & Parmar Prakash, H. (2012). Prevalence of common hemoglobinopathies in Gujarat: an analysis of a large population screening program. National Journal of Community Medicine, 3(1), 112-6.