International Journal of Medical and Health Research

Volume: 1, Issue: 1, 01-04
Aug 2015
www.medicalsjournals.com
ISSN: 2454-9142

Prabhusaran N
a) Postgraduate and Research Department of Microbiology, Chennai Medical College Hospital and Research Centre (SRM Group), Tiruchirapalli, India.
b) Department of Diagnostic and Transfusion Medicine, Team Superspeciality Hospital, Pudukkottai, India.

Nithya N
Department of Occupational Therapy, Kirubai Rehabs Centre, Villivakkam, Chennai, India.

Sundhararajan A
Postgraduate Department of Biochemistry, Chennai Medical College Hospital and Research Centre (SRM Group), Tiruchirapalli, India.

Asirvatham Alwin Robert
Department of Endocrinology and Diabetes, Diabetes Treatment Center, Prince Sultan Military Medical City, Riyadh, Saudi Arabia.

Syed M
Department of Diagnostic and Transfusion Medicine, Team Superspeciality Hospital, Pudukkottai, India.

Correspondence
Prabhusaran N
a) Postgraduate and Research Department of Microbiology, Chennai Medical College Hospital and Research Centre (SRM Group), Tiruchirapalli, India.
b) Department of Diagnostic and Transfusion Medicine, Team Superspeciality Hospital, Pudukkottai, India.

Correlation of nutritional anemia and blood group prevalence among adolescent girls in Pudukkottai district of India

Prabhusaran N, Nithya N, Sundhararajan A, Asirvatham Alwin Robert, Syed M

Abstract
The main objective of this study is to find out the epidemiological correlates of nutritional anemia and blood group prevalence among adolescent girls in rural areas of Pudukkottai of Tamilnadu. A cross-sectional study was carried out in adolescent girls of ten villages of Pudukkottai district. The relevant information was collected with blood grouping kit and hemoglobin estimation. Among the adolescent girls included, 45.9% and 24.3% supported O and B positive respectively, followed by A positive of 13.6%. The Less percentage of negative blood group identified and no AB negative group registered in this study. The number of subjects included verses various age groups denoted to 228, 375 and 359 among 10-12, 13-15 and 16-19 years respectively. Among them, 121, 191 and 206 cases were found to be severe anemia among 10-12, 13-15 and 16-19 years respectively. Children and adolescent group of girls are the future backbone of the growth of our nation, their nutritional observation and earliest intervention in screening and treatment. Long term policies of government, non-government agencies and the community can be directed to formulate effective plans like eradicating anemia in children and adolescent girls.

Keywords: Nutritional anemia, Blood group, Adolescent girls, Pudukkottai.

1. Introduction
Haemoglobin is the metalloprotein that is present in the blood. It is this iron containing substance within the red blood cells that helps in carrying oxygen. It is naturally very important to the human body as a lot of energy within the body is derived from pure oxygen. Blood tests are generally conducted to figure out how much haemoglobin there is within the blood [1, 2]. The general standard for measuring haemoglobin levels in the blood is grammes per hundred millilitres. This is written as g/dl. The normal or healthy level of haemoglobin within a human varies between 11.5 to 15.5 g/dl in women and 13.5 to 17.5 g/dl in men. The human body is very good at adapting and even if the haemoglobin levels drop to a considerable extent symptoms may not appear [2, 3].
Nutritional anemia has become a global disease and cuts across all the sections of the population. It is not just a medical problem, but has its roots in the sectors of education, demography, occupation etc. Developing countries like India is facing this problem for the last 50 years [4]. Adolescents being a formative year in life are more prone to major nutritional deficiency. Since adolescence has the lowest rate of mortality among different age groups it has been placed in least priority [5, 6].
Anemia not only affects the present health status of girls, but also has deleterious effects in future pregnancies, that puts the women at three times greater risk of delivering low birth weight and nine times higher risk of perinatal mortality, thus contributing significantly to increased infant mortality rate and 30% maternal deaths [5, 7]. Since children and young adults are our future citizens, therefore it is important for us to assess their nutritional health at an early stage so that strategic intervention can be planned. Therefore, this study was planned to assess the level of anemia and blood group in the adolescent girls in Pudukkottai district of India who need to access adequate diet.

2. Material and Methods

2.1. Sample size and design

A population based cross sectional study adopting multistage stratified random sampling procedure was carried out in the rural area of Pudukkottai district of Tamilnadu during 2014. The ten villages of Pudukkottai district of Tamilnadu investigated in the study. The participating villages are Arasannagaripattinam, South Pudukudi, North Pudukudi, Mimisal, Ponnagaram, Muthukuda, P.R. Pattinam, Ammapattinam, Athipattinam, R. Pudupattinam. The study was carried out from September 2014 to November 2014. The institutional ethical committee clearance was obtained before starting this prevalence study. Using a simple random sample technique, 962 children and adolescents were selected for blood determining the Hb content (nutritional anemia). Assuming the prevalence of anemia in school children as 70% and considering the 95% confidence interval (CI), 90% power and relative precision of 10%, a sample size covered due to some constraints during the survey [8, 9].

2.2. Selection of subjects

The sample size to be covered from each of the selected villages was determined on the basis of proportion to population size (PPS) method. The study was approved by the scientific advisory committee and written informed consent and permission was obtained from the parents and school administrators respectively. The subjects included were classified into three categories including 10-12 years, 13-15 years and 16-19 years.

2.3. Blood sample collection and Technique

The basic socio demographic informations were collected and finger prick blood samples were collected for blood groups and hemoglobin level estimation. Finger prick blood sample of 20µl was collected using fixed volume Finn pipette. Blood grouping was analyzed by standard method and hemoglobin was estimated by cyanmethemoglobin method using colorimeter [7, 10]. The cut-off value of <11, <10 and <7g/dL of hemoglobin for mild, moderate and severe anemia in test subjects was compared [11, 12]. Trained medical officer, diagnostic experts, nutritionist and social workers were involved in this investigation and trained before going to field.

3. Results and Discussion

World interest in adolescent health issues has grown dramatically in the past decade beginning with the International Year of Youth in 1985 and the World Health Assembly in 1989, when discussions were focused on the health of youth [1, 13]. Among adolescents, girls constitute a vulnerable group struggling with anemia, particularly in developing countries where they traditionally marry at an early age and exposed to a greater risk of reproductive morbidity and mortality [2, 7]. Adolescence represents a real opportunity to make a difference in lifelong patterns. The prevalence of anemia is disproportionately high in developing countries, due to poverty, inadequate diet, certain diseases, pregnancy/lactation and poor access to health services [2].

The nutritional anemia in this group attributes to high MMR, high incidence of low birth weight babies, high perinatal mortality and fetal wastage and consequent high fertility rates [13]. This phase of life is also important due to the ever-increasing evidence that control of anemia in pregnant women may be more easily achieved if satisfactory iron status can be ensured during adolescence [5]. To plan effective interventions, it is important to understand the epidemiology. Hence, the present study was carried out to study the epidemiological correlates of nutritional anemia and prevalent blood grouping among adolescent girls in rural Pudukkottai.

Among the subjects included in this study, the maximum numbers of 375 were determined in the age group of 13-15 followed by 16-19 and 10-12 age groups with 359 and 228 subjects respectively. The maximum determinants were identified in the area R. Pudupattinam followed by Muthukuda, Ponnagaram etc. The maximum of 97 subjects in the age group of 16-19 and 73 subjects in the age group of 13-15 were included in R. Pudupattinam. In the age group of 10-12 the maximum of 47 subjects included in Arasanagaripattinam. The detailed description of number of subjects included agewise verses areas was included in figure1.

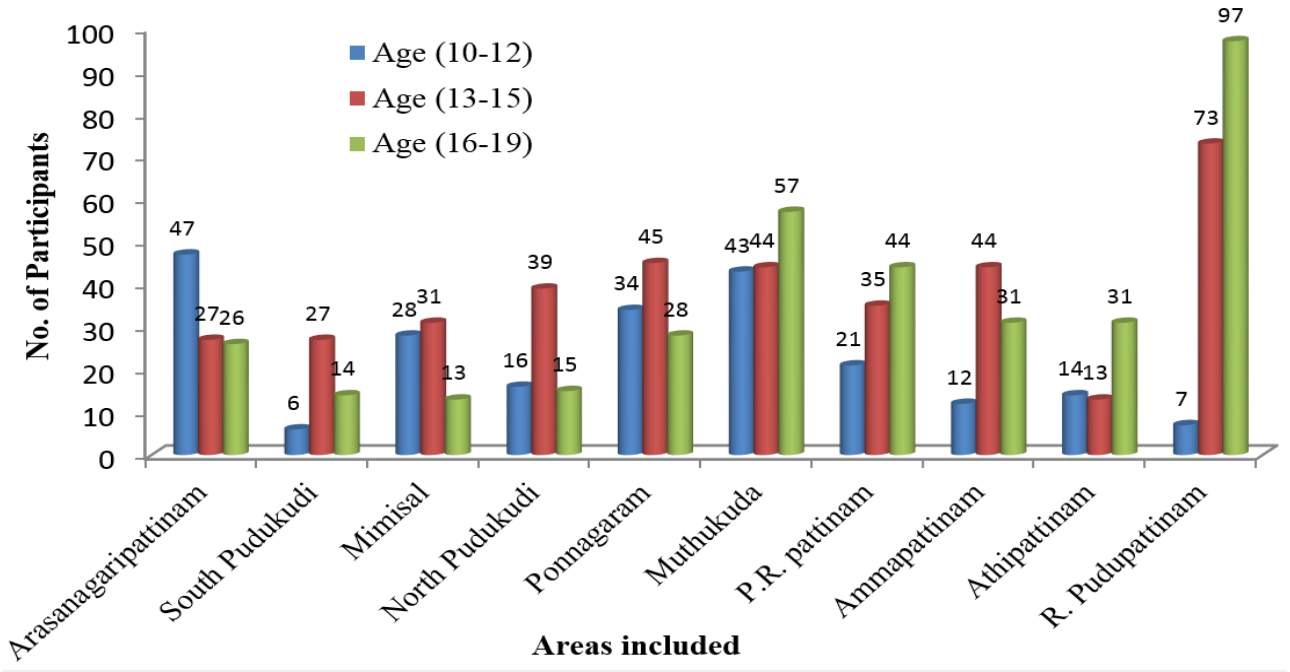

Fig 1: Number of subjects included agewise verses areas

Out of 962 subjects enrolled in this study, all were subjected for determining blood groups. Maximum of 45.9% supported O positive followed by B positive with 24.3%. The blood group a positive was determined among 131 subjects, whereas a negative was found only among 11 subjects. Among the A group, A1 positive was found among 71 (7.4) subjects. The AB positive group was determined among 55 (5.7%) subjects supported. The detailed determination of the various blood groups was screened among the subjects and the results were depicted in table 1. Among the Rh negative blood groups, O and B negative groups were identified among 10 (1.1%) and 9 (0.9%) subjects respectively. Further, the percentage of the blood groups among various study areas were determined and interpreted in figure 2.

Table 1: Number of Subjects involved in various blood groups

S.No.	Village	A+ve	A1+ve	B+ve	AB+ve	O+ve	A-ve	B-ve	O-ve	Total
1	Arasanagaripattinam	34	-	18	8	37	1	1	1	100
2	South Pudukudi	4	10	11	7	13	2	-	-	47
3	Mimisal	18	-	15	4	30	1	2	2	72
4	North Pudukudi	2	6	15	4	41	-	1	1	70
5	Ponnagaram	9	-	30	3	59	1	2	3	107
6	Muthukuda	29	-	40	9	62	1	1	2	144
7	P.R. Pattinam	9	14	17	5	55	-	-	-	100
8	Ammapattinam	10	12	19	5	40	1	-	-	87
9	Athipattinam	4	4	12	1	36	-	1	-	58
10	R. Pudupatinam	12	25	57	9	68	4	1	1	177
Total		131	71	234	55	441	11	9	10	962

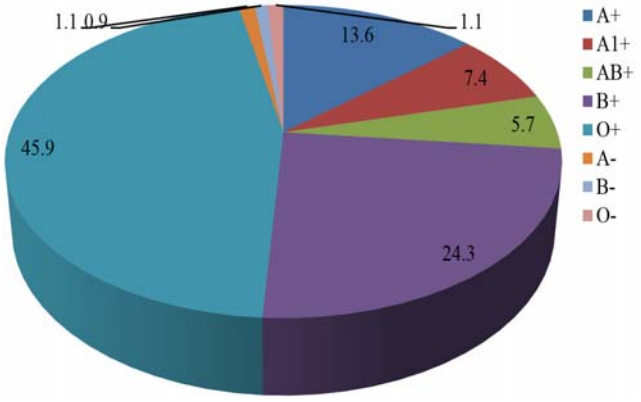

Fig 2: Percentage positivity of various blood groups among subjects included

Table 2: Anemia in Adolescents

Age group	Anemia [Level of Hemoglobin (gm/dl)]	No. of girls observed in this category (n=962)
10-12 years (n=228)	Normal (>11)	52 (22.8)
	Mild (10.0 – 10.9)	12 (5.3)
	Moderate (7.0 – 10.0)	43 (18.8)
	Severe (<7)	121 (53.1)
13-15 years (n=375)	Normal (>11)	59 (15.7)
	Mild (10.0 – 10.9)	13 (3.5)
	Moderate (7.0 – 10.0)	112 (29.9)
	Severe (<7)	191 (50.9)
16-19 years (n=359)	Normal (>11)	81 (22.5)
	Mild (10.0 – 10.9)	16 (4.5)
	Moderate (7.0 – 10.0)	56 (15.6)
	Severe (<7)	206 (57.4)

[Figure in parenthesis denoted percentages]

Considering that Anemia development is a consequence occurred at a later stage of iron deficiency, the problem of iron deficiency in these adolescent girls with a prevalence of 59.8% should be considered serious and calls for an action. In this study, the prevalence of normal, mild, moderate and severe anemia were 19.9%, 4.3%, 21.9% and 53.9% respectively among 962 subjects screened (Table 2). High prevalence of mild and moderate anemia demands due to the emphasis so as to bring down total prevalence of anemia in adolescent girls [10]. The prophylaxis measures for adolescent girls in India including nutrition education in schools [14, 15]. The impact of iron deficiency in the upper class adolescents may not be of much consequence since the availability of best health care, antenatal care and regular consumption of iron folate preparations and also better quality of food during pregnancy would obviate the iron deficiency acquired during adolescence [15].

Among the age groups, 13-15 and 16-19 groups were showed with high severe anemia due to

1. Lack of proper nutrition during the adolescent age
2. Stress due to education
3. Non replacement of iron deficiency during menarche
4. Deficiency of Vitamin D, calcium etc.

The Government of India has made the adolescent health as a part of RCH package since 1997 [16, 17]. The anemia in this age group has been identified as an important health problem[10] followed by further reinforcement at the 1994 International Conference on Population and Development held at Cairo. In the present study, the prevalence of anemia was found to be 80.1% where other studies showed prevalence rate of 73.7% and 74.7% respectively [18, 19]. These differences in the prevalence of anemia may be due to difference in the study area. WHO/ UNICEF have suggested the problem of anemia is of very high magnitude in a community when prevalence rate exceeds to 40% [11].

4. Conclusion

Of the 962 persons examined almost all of them belong to either any one of the anemia classifications namely, mild, moderate and severe as per the WHO guidelines. It is interesting to note that more severe cases were identified in the age groups of 13-15 and 16-19 years. The limitations of the study were that no intervention was planned, worm infestation in these rural women could not be studied, and in a subsample both methods hemocue and cyanmethemoglobin should have been applied for haemoglobin estimations.

5. References

1. Amato A, Cappabianca MP, Lerone M, Colosimo A, Grisanti P, Ponzini D *et al*. Carrier screening of inherited haemoglobin disorders among secondary school students and young adults in Latium, Italy. Journal of Community Genetics. 2014; 5:265-268.
2. Verma A, Rawal VS, Kedia G, Kumar D, Chauhan J. Factors influencing anemia among girls of school going age (6-18 years) from the slums of Ahmadabad city. Indian Journal of Community Medicine. 2004; 29:25-26.
3. Shatha S, Al-Sharbatti, Nada J, Al-Ward, Dhia J, Al-Timini. Anemia among adolescents. Saudi Medical Journal. 2003; 24:189-194.
4. Goel S, Gupta BP. Low anemia prevalence among adolescents of an urban hilly community. Indian Journal of Community Medicine. 2007; 32:67-68.
5. Devi R, Jaysree TM, Felix AJW, Ethirajan N. Prevalence of anemia among two independent groups of adolescent girls – pre merache and post menarche. Journal of Drug Discovery and Therapeutics. 2014; 2:4-7.
6. Sanjeev MC, Vasant RD. A study of anemia among adolescent females in the urban area of Nagpur. Indian Journal of Community Medicine. 2008; 33:243-245.
7. Rekha D, Shirish P, Sumedha J, Ranjana M, Ramdev. Prevalence of anemia among adolescent girls in rural area of Raigad District, Maharashtra. Indian Journal of Preventive and Social Medicine. 2009; 40:143-146.
8. Murray CJL, Lopez AD. The global burden of disease. Cambridge, mass, USA: Harvard University Press, 1996, 247-293.
9. Arlappa N, Balakrishna N, Laxmaiah A, Brahmam GNV. Prevalence of anemia among rural pre-school children of Maharashtra, India. Indian Journal of Community Medicine. 2012; 24:4-8.
10. DeMaeyer EM. Preventing and controlling iron deficiency anemia through primary health care. A Guide for health administrators, WHO, 1989, 26-39.
11. World Health Organization (WHO): Control of nutritional anemia with special reference to iron deficiency. WHO Tech Rep Ser No. 580, Geneva, WHO, 1975.
12. Kapoor RK, Ajay K, Mahesh C, Misra PK, Sharma B, Awasthi S. Cardiovascular responses to treadmill exercise testing in anemia. Indian Pediatrics 1997; 34:607-612.
13. Kaur S, Deshmukh PR, Garg BS. Epidemiological correlates of nutritional anemia in adoslescent girls of rural Wardha. Indian Journal of Community Medicine. 2006; 31:255-258.
14. Yogesh S, Abha S, Vartika S. Effect of gender on correlation of anaemia with body mass index in medical students. Indian Journal of Physiology and Pharmacology. 2011; 55:364-369.
15. Vasanthi G, Fawashe AB, Susie H, Sujatha T, Raman L. Iron nutritional status of adolescent girls from rural area and urban slum. Indian Pediatrics 1994; 31:127-132.
16. Richa L, Mishra CP, Kaushik A, Ahamed S, Manoj KG, Saurabh S. Prevalence of anemia in rural adolescent girls of Varanasi. Indian Journal of Preventive and Social Medicine. 2012; 43:113-116.
17. Bulliyy G, Mallick G, Sethy GS, Kar SK. Haemoglobin status of non-school going adolescent girls in three districts of Orissa, India. International Journal of Adolescent Medical Health. 2007; 19:395-406.
18. Rajaratnam J, Asokan JS. Prevalence of anemia among adolescent girls of rural Tamilnadu. Indian Pediatrics. 2000; 37:532-535.
19. Heath AL, Skeaff CM, Williams S, Gibson RS. The role of blood loss and diet in the etiology of mild iron deficiency in premenopausal adult in New Zealand women. Public Health Nutrition. 2001; 4:197-206.