



Clinico - Hematological Profile of Nutritional Anaemia among Adolescent Girls in Rural Area

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Anaemia in adolescent girls contributes to prenatal morbidity and mortality in the future. The present study was undertaken with the aim of studying the clinical-haematological profile of anaemia in adolescent girls in the North Indian tertiary care hospital. Among 380 adolescent girls, hemoglobin concentration was less than 12 gm/dl among 172 (45.3%) girls which was classified as anemia. 91 (52.9%) girls were classified as having mild anemia (Hb- 11.0 to 11.9 gm/dl), 69 (40.1%) had moderate anemia (Hb- 8.0 to 10.9 gm/dl) and 12 (7.0%) girls had severe anemia (Hb- less than 8 gm/dl). Most common cause of anaemia was iron deficiency anaemia. Mean age of study participants was 14 years with Standard deviation of 2.73. In the present study, prevalence of anemia increases with increase in socio- economic class of study participants. Prevalence of anemia was more in underweight girls in comparison to those girls who had normal range of BMI.

Keywords: Anaemia; adolescent girl; hematological.

1. INTRODUCTION

Adolescence health is of prime importance because they undergo a transition from childhood to adulthood. These teen years are a period of intense growth, not only physically, but also mentally and socially. During this time 20% of final adult height and 50% of adult weight are obtained. Anaemia is a widespread nutritional problem which is more commonly seen in women and children affecting their most crucial periods like during pregnancy and growth respectively [1,2]. The present study is planned to assess the magnitude of the nutritional factors contributing to anaemia. There are not many studies on anaemia in rural adolescent girls. The present study was done to know the clinical manifestations and various hematological changes in adolescent girls with nutritional anaemia. This study will throw light on the cause of anaemia especially nutritional factors by assessing Serum iron, TIBC, transferrin saturation which can help in the management and dietary advises for adolescents in future.

1.1 Aim and Objectives

To estimate the prevalence of anaemia in adolescent girls in rural area around Karad. To assess the clinico-hematological profile of nutritional anaemia in adolescent girls in rural area around karad. To assess the nutritional and socio demographic factors contributing to anaemia among adolescents girls in rural area.

2. MATERIALS AND METHODS

The Clinico - Hematological Profile of Nutritional Anaemia among Adolescent Girls in Rural Area around Karad, District-Satara, and Maharashtra is a multi-centric, community based descriptive cross sectional study. In the South of the Maharashtra (India), Karad a city of district-Satara is situated 320 kilometres from Mumbai and 159 kilometres away from Pune. The present study was conducted on randomly selected Adolescents girls attending Zila Parishad schools in rural area of Karad district-Satara as per the inclusion and exclusion criteria. The schools selected were Anandraochavan School Malkapur, govt girls' school, Malkapur, govt. school wather.

Selected schools taking into consideration the time constraint and the feasibility of completing the data collection. Approximately equal number of sample were collected from each area and

also efforts were made to have equal no of representatives from each age group so as to ensure equality among data collection and minimum bias of exclusion.

2.1 Inclusion Criteria

We included adolescent girls aged 12-19 years who engaged willingly in the experiments, also teenagers who have quit their school and were being transfused with blood before four months of collection of data. Additionally, pregnant and lactating adolescent girls who underwent anemia medication were considered. A human chorionic urine test of gonadotropin was prescribed for married school girls not using contraception and not confirmed of pregnancy.

The period of data collection was spread over 1 year from January to December 2015. After collection of data, the data entry forms were checked for their completeness and missing and incomprehensible data was rechecked from the respective participant profile. Data entry was done in MS Excel data sheet. This procedure was conducted over the period of 2 months. The data cleaning and the retrieval of the missing data were done over a period of one month. The collected data was statistically correlated where percentage, mean and standard deviation (SD) was applied to mathematically relate the outcomes of results.

3. OBSERVATION AND RESULTS

Table 1 shows that among 380 study participants, mother of 126 (33.2%) girls were illiterate, 112 (29.5%) were studied up to primary level, 55 (14.5%) were studied up to secondary school, 61 (16.1%) were studied up to higher school, 25 (6.6%) were graduate. Only 1 (0.3%) mother had post-graduate degree.

Table 1. Distribution of study participants according to mother's education

Mother's education	Frequency	Percentage
Illiterate	126	33.2%
Primary	112	29.5%
Secondary	55	14.5%
High school	61	16.1%
PUC/graduate	25	6.6%
Post graduate	1	0.3%
Total	380	100%

Table 2 shows that among 380 study participants, father of 87 (22.9%) girls were illiterate, 72 (18.9%) were studied up to primary

level, 129 (33.9%) were studied up to secondary school, 61 (16.1%) were studied up to higher school, 22 (5.8%) were graduate. Only 9 (2.4%) father had post-graduate degree.

Table 2. Distribution of study participants according to father's education

Father's education	Frequency	Percentage
Illiterate	87	22.9%
Primary	72	18.9%
Secondary	129	33.9%
High school	61	16.1%
PUC/graduate	22	5.8%
Post graduate	9	2.4%
Total	380	100%

Among 305 girls who had menstruation, 186 (61.0%) had irregular menstruation. 146 (47.9%) girls had menstrual cycle ranging between 21 to 35 days. 84 (27.5%) had cycle less than 21 days and 75 (24.6%) had menstrual cycle greater than 35 days. Heavy amount of blood flow was noticed among 72 (23.6%) girls. Among 73 (23.9%) menstrual blood flow was observed for more than 5 days. Clots were reported among 152 (49.8%) girls [Table 3].

As shown in Table 4, among 380 adolescent girls, hemoglobin concentration was less than 12 gm/dl among 172 (45.3%) girls which was classified as anemia. Out of 380 girls, 208 (54.7%) girls had hemoglobin concentration more than 12 gm/dl.

4. DISCUSSION

Anaemia is defined as reduction of RBC volume or Hemoglobin concentration below the range of values occurring in healthy persons [1]. Anaemia is one of the leading causes of morbidity and mortality in Pediatric age group. In India about 70 million children i.e., 60%-70% of all children below 6 years suffer from varying degrees of anaemia [3]. There may be signs of heart failure with pedal edema, impaired renal function or associated protein deficiency. Skull changes with caput quadratum appearance (frontoparietal bossing) similar to that seen in congenital hemolytic anaemia may be seen in children with chronic long standing iron deficiency anaemia. Koilonychia, platynychia, glossitis, stomatitis and angular cheilosis are other common features not commonly seen in children. Iron Deficiency Anaemia is the most wide spread micro-nutrient deficiency in our country [4]. Iron Deficiency Anaemia is a major health problem in children and adolescent age population. The first of the

probable cases of pernicious anaemia were recorded by Combe and Andral in 1823. In 1849 Thomas Addison described a patient with pernicious anaemia. For many years pernicious anaemia was known as Addison's anaemia. In 1872 Biermer was the first to use the term pernicious to describe this type of anaemia. The term rapidly gained widespread acceptance [5]. Ehrlich introduced the term 'megaloblasts' to describe the large nucleated erythroid precursors found in pernicious anaemia [6]. The term megaloblastic anaemia is used to describe a group of clinical states characterized by a distinct morphological pattern in hematopoietic cells in the form of a regenerative macrocytic anaemia with nuclear dysmaturity. The most common causes of megaloblastosis are true cellular deficiencies of Vit B12 or folate, both being essential co-factors for DNA synthesis [7]. Hypercellular with erythroid hyperplasia of megaloblastic type. Myeloid precursors are larger than normal. Abnormal neutrophils forms i.e., giant metamyelocytes and band neutrophils with cytoplasmic vacuolization are seen as well as hyper segmentation of the nuclei of megakaryocytes.

Pattnaik S et al. [7], among fathers of adolescent girls 53% have had primary education, 37.7% have studied up to secondary education, 6.0% have gone up to higher secondary level and only 2.6% have completed graduation and only 0.7% of them are illiterate.

Rawat CMS et al. have reported similar findings that a significant higher prevalence of anaemia in adolescent girls of illiterate or just literate mothers, which indicates better awareness among literate mothers [8]. Rajaratnam et al. also had observed significant association of presence of anaemia with parent's educational status, particularly mother's education [9].

SM et al. [10], in anemic group 8.4% participants belong socio-economic class II, 26% participants belong socio-economic class III, 33% participants belong socio-economic class IV and 32.4% participants belong socio-economic class V while in anemic group 9.3% participants belong socio-economic class II, 18% participants belong socio-economic class III, 36% participants belong socio-economic class IV and 36.6% participants belong socio-economic class V. In anemic group 85% participants had iron deficiency and 15% does not have iron deficiency while in non-anemic group 49.5% participants had iron deficiency and 50.5% does not have iron deficiency.

Table 3. Characteristics of menstruation among study participants

Characteristics of menstruation		Frequency	Percentage
Menstruation	Regular	119	39.0%
	Irregular	186	61.0%
	Total	305	100%
Inter menstrual interval	< 21 days	84	27.5%
	21 – 35 days	146	47.9%
	> 35 days	75	24.6%
	Total	305	100%
Amount of blood flow	Scanty	53	17.4%
	Moderate	180	59.0%
	Heavy	72	23.6%
	Total	305	100%
Days of blood flow:	< 3 days	87	28.5%
	3 – 5 days	145	47.5%
	> 5 days	73	23.9%
	Total	305	100%
Associated with clots	Yes	152	49.8%
	No	153	50.2%
	Total	305	100%

Table 4. Distribution of study participants according to presence of anemia

Anemia	Frequency	Percentage
Present (<12 g/dl)	172	45.3%
Absent (>12 g/dl)	208	54.7%
Total	380	100%

Data shown in the present study is similar to the data shown in other studies with anaemia being common in mid and late adolescent girls and various socio-economic factors which are responsible for that are low socio-economic class, vegetarian diet, heavy bleeding during menstruation, bleeding with clots and low body-mass index of these children. Most common cause of anemia in these children is iron deficiency anemia [11,12].

Over the past two decades, importance of identifying anemia among adolescents has increased its significance [7,13]. But there's also a issue of rising anemia prevalence that stresses anemia-associated causes and its long term effects [12]. In the present study, mean age of study participants was 14 years with Standard deviation of 2 years. Among 380 study participants, 164 (43.2%) were among age group of 14-16 years and 163 (42.9%) were among age group of 12-14 years. No significant association was found between anemia groups and age groups (p 0.8174). In the present study, among 380 study participants, mother of 126 (33.2%) girls were illiterate, 112 (29.5%) were studied up

to primary level, 55 (14.5%) were studied up to secondary school, 61 (16.1%) were studied up to higher school, 25 (6.6%) were graduate. Only 1 (0.3%) mother had post-graduate degree. No significant association was found between anemia groups and Parent education (p 0.0457).

5. CONCLUSION

It is concluded from the present study that 45.3% of the adolescent girls are suffering from anemia. Among the factors low socio-economic status, vegetarian diet, history of deworming, presence of menstruation, irregular menstruation, heavy amount of bleeding during menstruation, more than 5 days of menstruation, menstruation associated with blood clots and underweight girls are significantly associated with the presence of anemia. From these results we recommend that adolescent girls should be dewormed every six months, iron and folic acid tablets should be supplemented under National Iron plus Initiative programme (NIPI), nutritional education should be given to these girls and efforts should be taken to take care of nutritional demand of these adolescent girls by various programme like mid-day meal programme of by food fortification with iron supplements.

CONSENT AND ETHICAL APPROVAL

As per university standard guideline, participant consent and ethical approval have been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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