International Journal of Applied Research

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Prevalence of anaemia among adolescent girls: A cross sectional exploratory study

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Abstract
Adolescent girls are the freshly bloomed flowers and literally adolescent means" to grow into the maturity". Adolescence it extends from 10 – 19 years in girls. Many adolescent girls start with anaemia, stunted growth and poor nutrition. Anaemia affects every age and sex group and an adolescent girl are still at higher risk due to over physical activity. Sex difference in diet and is aggravated by menstruation which is one of the common cause of blood loss among the female. A cross sectional descriptive study was conducted at rural Salem District Tamil Nadu, which aimed to assess the prevalence of anaemia among adolescent girls and its association with social demographic variables and its correlates. Data were collected from 285 adolescent's girls at government Girls Higher secondary School at Attayampatti, rural Salem district, Tamil Nadu, systematic random sampling using a Sahil's Hemoglobinometer which was calibrated by investigators and assess the level of anaemia. The results showed that majority of adolescents girls had moderate anaemia. Around 83% of adolescent girls were found anaemic whereas 45.8% of adolescent girls were moderately anaemic. However there was significant association between education and no significant relationship with other variables such as age, dietary pattern and intake of green leafy vegetables.

Keywords: Adolescents girls, anaemia, Prevalence

Introduction
The WHO defines health as not only the absence of disease but as a more positive state of complete physical, mental and social well-being. Nutrition is one of the most important influencing factors for health. Adolescence is a period of transition from childhood to adulthood. They are about one fifth of our Indian population. Adolescents have special problems and need special protection to yield health fruits tomorrow.

Nutritional anaemia especially iron deficiency anaemia is widely prevalent in many parts of the world. The prevalence in the developing countries tends to be three to four times higher than that in the developed countries. Anaemia is the most common nutritional disorders in the developing world and the most common cause of nutritional anaemia among young women with 40% of prevalence of anaemia in the world. Iron deficiency of anaemia is probably the result of many factors with loss of iron during menstruation. The term teenage years are used synonymously with adolescence to describe ages 13 through 19 years. Adolescence extends from 10 – 19 years in girls.

Iron deficiency anaemia is a major nutritional problem in India and other countries. The incidence of anaemia is the highest among women especially adolescent girls varying between 60% to 70%. The prevalence of anaemia was observed among Mexican adolescent girls in the age group of 13-19 years, and it was found that adolescent girls, in predominantly indigenous communities had higher prevalence of anaemia 24.2% than non – indigenous community adolescent girls 14.67%. A corss sectional study on the prevalence of anaemia among school going adolescent girls of Parbhani, found that 88.3% of adolescent girls were affected by anaemia.

Iron deficiency anaemia is currently the most widespread micronutrient deficient globally. One third of the world's population suffers from iron deficiency anaemia of which 90% lives in third world countries. According to WHO, estimates the prevalence of nutritional anaemia in India is and 50 - 80% in women and 70 – 90% in pregnant women. A study conducted at one of the slum of Ahmedabad city shows that over all prevalence of anaemia among adolescent girls were found mild, moderate and severe anaemia. However, being 55.2%, 26% and 0.6% respectively. National Commission on population, Government of India 1998

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reported that anaemia in adolescent age group decrease the capacity to do physical work, reduce concentration and school performance, affect growth and restrict their performance as adults including reproductive In 1997 India lays a great emphasis on promotion of safe motherhood and child survival programme, National nutritional anaemia control programme and RCH programme. The public health nurse is to educative the people on iron rich diet and distribution of iron supplementary to the adolescent girls.

Materials and Methods
The study was conducted using a cross sectional exploratory survey design with 285 subjects selected by using systematic random sampling technique from government girls Higher Secondary School, Attayampatti, Rural Salem District, Tamil Nadu. Subjects were adolescent girls 13 – 18 years of age studying in VIII standard to XII standard and they can comprehend in Tamil. Calibrated Sahil's Hemoglobinometer were used to collect the Hb % level among adolescent girls and the baseline date were validated with 5 expert and reliable (r=0.98) test – retest methods was carried out repeatedly 3 times in the same apparatus and the results was same. It consisted of two sections; Section A: Baseline data and Section B: used calibrated Sahil's Hemoglobinometer to assess the Hb% level among adolescent girls.

Table 1: Classification of anaemia based on Hb % level with various standards.

Grades of Anaemia	WHO	IAP	Nelson''s (Essential Pediatric, 2002)	Jain A K (Anatomy and physiology for nurses, 2004)	Ghai A C (Applied physiology, 2000)
Normal	11gm and above 11gm/dl	Above 14 gm /dl	12 and above 12gm /dl	Above 12gm/ dl	Above 10gm/dl
Mild	10-11gm/dl	10-14gm/dl	10-12gm/dl	8-12gm/dl	8-10gm/dl
Moderate	7-10gm/dl	6-10gm/dl	8-10gm/dl	5-8 gm/dl	7-8gm/dl
Severe	Below 7gm/dl	Below 6gm/dl	Below 8gm/dl	Below 5gm/dl	Below 7gm/dl

Permission was obtained from concern authority from school. Informed written consent was obtained from participants. Hb% were collected by using Sahil's hemoglobinometer followed by the level of haemoglobin percentage was compared with various standards and presented in graphs and tables.

Results
The highest percentage 42.8% of adolescent girls was in the age group of 15- 16 years. 58.2% of adolescent's 8th- 10th standard. According to their dietary pattern 76.5% of them were non vegetarian. 41.4% of adolescent girls were taking green leafy vegetables some times. Hence, very less percentage of adolescent was taking green leafy vegetable.

**Table 2:** Prevalence of anaemia as per various standards

Anaemia as per Hb% level	Standards of anaemia as various standards									
	WHO		IAP		Nelson's		Jain A K		Ghai A C	
	F	%	F	%	F	%	F	%	F	%
Normal	49	17.2	-	-	29	10.4	26	9.3	100	35.3
Mild	53	18.6	102	35.8	73	25.8	153	53.6	94	32.9
Moderate	132	46.3	175	61.4	91	31.8	83	29.1	43	15.1
Severe	51	17.9	8	2.8	92	32	23	8	48	16.7
Total	285	100	285	100	285	100	285	100	285	100

Comparison of Hb % of 2.85 adolescent girls with various standards shows that the adolescent girls with normal Hb % level were the highest 35.3% according to Ghai. A.C Standard and the lowest was 9.3% as per Jain. A.K Standard. However according to WHO, only 17.2% had normal Hb % and none of the adolescent girls had normal Hb % level as per IAD Standard. Mild Anaemia was highest 53.65% as per Jain. A.K Standard and the lowest Hb% was 18.6% as per WHO standard. However around one third of the subjects had mild anaemic was found according to IAP Standard 35.8% and Ghai A.C Standard 32.9%

Majority 61.4% of them were moderate anaemia as per IAP Standard were as, the lowest percentage of adolescent girls 15.1% had moderate anaemia were as per Ghai A.C Standard. However 46.3% and 31.8% were also found to be anaemic as per WHO and Nelson's Standards respectively. Severe anaemia was found to be the highest 32% as per Nelson's standard and the lowest percentage 2.8% as per IAP Standard. However 32% of adolescent girls were severely anaemic as per Nelson's Standard and around 17% as per WHO and Ghai A.C Standards. It seems that most of the adolescent's girls of the study were anaemic and majority of them had moderate anaemia. (Table No: 2)

The line graph drawn to compare the Hb% to assess the prevalence of anaemia among adolescent girls with Nelson's, Jain A.K, Ghai. A C Standards shows that highest percentage 35.3% of adolescent girls had normal Hb% as per Ghai A.C Standard and lowest percentage 9.3% of adolescent had normal Hb% as per Jain A.K Standard. Mild Anaemia was highest 53.6% of adolescent girls as Jain A K standard whereas the lowest percentage 25.8% of adolescent girls as per Nelson's standard. However, around 30% of adolescent girls had severe anaemia as per Nelson's standard. It reveals that most of the adolescent girls had mild anaemia as per Jain A K standard. (Fig. 1)

Line graph drawn to assess the prevalence of anaemia among adolescent girls the Hb% level was compared with WHO and IAP standards, shows that the highest percentage of adolescent girls had moderate anaemia 46% and 61% respectively, when compared to mild and severe anaemia as per WHO and IAP standards respectively. However, more or less similar percentage 18.6% and 17.9% of adolescent girls mild and severe anaemia. Only 2.8% adolescent girls had severe anaemia when compared to mild and moderate anaemia. It seems that majority of the girls had moderate anaemia according to these standards. (Fig. 2)
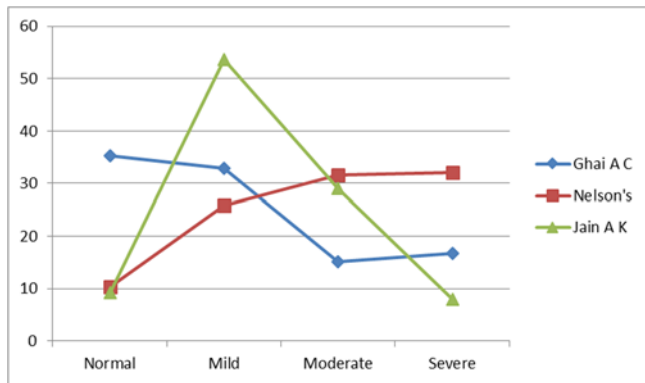
Fig 1: Line graph showing the comparison of anaemia with Jain A K, Ghai A C and Nelson's standard
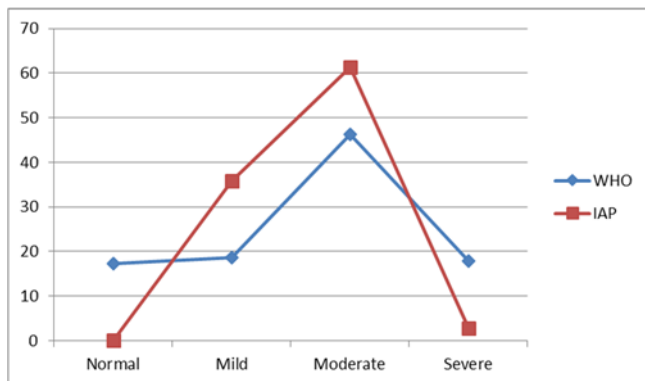
Fig 2: Line graph showing the comparison of grades of anaemia with WHO and IAP standards.

Analysis of association between the baseline data and the prevalence of anaemia among adolescent girls based on Hb% level reveals that there was no significant association between age, dietary pattern and intake of green leafy vegetables and significant association was with their education.

Discussion
This study reports majority of the subjects 42.8% of adolescent girls were in the age group of 15 – 16 years and they were them from VIII to X standard and most of the 76.5% were them in vegetarian and 41.4% of them were used to green leafy vegetables sometimes. Only 33% of adolescent girls had normal Hb% leve as per Ghai A C standard and mild anaemia was the highest as per Jain A K standard. According to IAP standard moderate anaemia was the highest and severe anaemia was found to be highest as per Nelson's standards. Prevalence of anaemia was more or less similar for all age groups, dietary patter and frequency of intake of green leafy vegetables. However, increase educational status shows reduction in the percentage of anaemia.

The study results have been supported by the findings, among young women is an urban colony in Chandigarh, 76% of women were observed as anaemic. 8.4% had mild anaemia, 64.9% had moderate anaemia and 3% had severe anaemia. Only 23.7% were found to be non-anaemic.

Based on findings of the study, motivate the school teachers and nursing health care personnel to participate in nutritional workshop and conduct seminars in Block, District and State level. And also encourage the adolescent girls to take iron and folic acid tablets especially in menstruation. The community health nurse must organize training programme to train dai in the village so as to create awareness among the mothers of adolescent girls on preventive measures.

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