Available online at http://www.ijims.com
ISSN: 2348 – 0343

Assessment of Diet and Anaemia status among Adolescent girls in Urban Bangalore

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Abstract

Adolescence (10-19 years age) are considered vulnerable to anaemia because of increased iron requirements related to rapid growth and menstrual loss which severely impairs the physical and mental development. Hence, the health of adolescent girls demands special attention. The objective of this study was to assess diet profile of adolescent girls in urban Bangalore. To determine anaemia status in the same was another objective.The present study was a cross-sectional study conducted from June 2014 to November 2014 in girl's schools and pre-university colleges in urban Bangalore. Data was collected from 370 adolescent girls, aged between 10-19 years, on diet using 24 hour dietary recall method and anaemia status was assessed by dietary iron content (as per National Institute of Nutrition 2010 dietary guidelines), anthropometric measurements and relevant clinical examination. Data was analysed with SPSS, version 22.0.Dietary inadequacy of iron was found in 69% girls and 35.9% girls were underweight. Clinical signs and ill effects of anemia were common, especially pallor(44.7%) and fatigue (78.1%). Significant association was found between dietary inadequacy of iron and presence of pallor ($p<0.05$). Consumption of tea and coffee was high(76.1%)and diets were inadequate in fruits, vegetables and milk products.Nutritional anaemia found to be prevalent even in adolescent girls who are literate and have access to nutritive diet in a good and healthy environment. Improvement of overall nutritional status of adolescents is needed.

Key words: Diet , Anaemia, Adolescents, Pallor, examination

Introduction

Anaemia due to iron deficiency is the most widespread clinical nutritional deficiency disease in the world today. India has the world's maximum prevalence of iron deficiency anaemia , mostly among young children and women of child bearing age[1]. Iron requirements are highest for pregnant women –1.9 mg/1,000 Kcal of dietary energy in the second trimester and 2.7 mg/1,000 Kcal in the third trimester. These are followed by iron requirements in infants (1.0 mg), adolescent girls (0.8 mg), adolescent boys (0.6 mg), non-pregnant women (0.6 mg), preschool and school age children (0.4 mg), and adult men (0.3 mg)[2].

The prevalence of anaemia is disproportionately high in developing countries due to poverty, inadequate diet, worm infestations, pregnancy/lactation and poor access to the health services [3].

Iron deficiency adversely affects: 1.The cognitive performance, behaviour and physical growth of infants, preschool and school-age children, 2.The immune status and morbidity from infections of all age groups, 3.The use of energy sources by muscles and thus the physical capacity and work performance of adolescents and adults of all age groups[3].Adolescents, as defined by the United Nations as those between the ages of 10 and 19, are1.2 billion in number in the world today, constituting 18 per cent of the world's population. More than half of all adolescents live in Asia. In absolute numbers, India is home to more adolescents– around 243 million – than any other country[4].Adolescents are the future generation of any country and their nutritional needs are critical for the well being of society. In SEAR, a large number of adolescents suffer from chronic malnutrition and anaemia, which adversely impacts their health and development[5].Adolescent girls are more vulnerable to anaemia because

of increased iron requirements related to rapid growth and menstrual loss. Inadequate dietary intake results in deficiency of nutrients ,especially iron. The prevalence of anaemia among girls (Hb <12 g%) and boys (Hb <13 g%) is alarmingly high as per the reports of NFHS-3 and the National Nutrition Monitoring Bureau Survey (NNMBS). The consequences of anaemia and malnutrition are manifold. First,it reduces women's energy and capacity for work and can therefore threaten household food security and income. Second, severe anaemia in pregnancy impairs oxygen delivery to the foetus and interferes with normal intra-uterine growth, resulting in intrauterine growth retardation, stillbirth, LBW and neonatal deaths. Therefore, anaemia is a major contributor to poor pregnancy and birth outcomes in developing countries as it predisposes to premature delivery, increased perinatal mortality and increased risk of death during delivery and postpartum[6].

Anaemia is a multi-factorial disorder that requires a multi-pronged approach for its prevention and treatment. Iron deficiency and infections are the most prevalent aetiological factors. Prevention of both iron deficiency and anaemia require approaches that address all the potential causative factors. Interventions to prevent and correct iron deficiency and IDA, therefore, must include measures to increase iron intake through food-based approaches, namely dietary diversification and food fortification with iron; iron supplementation and improved health services and sanitation[5].

Hence this study assesses the dietary adequacy and anaemia status in adolescent girls because: It constitutes large group (>18%) of Karnataka's population, 2. Adolescents remain a largely neglected, difficult- to- measure and hard -to- reach population, in which the needs of adolescent girls in particular, are often ignored, 3. Iron reserve subsequently helps adolescent girls for better reproductive outcome, 4. Deficiency of iron results in decreased performance as well as acaedemic achievement

Materials and Methods

Here, cross-sectional descriptive study method was used and the study was conducted during June-November 2014 (6 month duration) in schools and pre-university colleges in urban Bangalore.

Study Subjects: 370 adolescent girls, aged 10-19 years, from different schools and pre-university colleges in urban Bangalore.

Sampling Technique: A total of 370 adolescent girls, aged 10-19 years, were included in the study taking into account the prevalence of anaemia in this age group as per NFHS-3 survey. Data was collected from different schools and pre-university colleges in urban Bangalore by population probability sampling till the desired sample was met.

Data Collection Technique: Data on diet was collected using 24 hour dietary recall method and anaemia status was assessed by dietary iron content (as per National Institute of Nutrition 2010 dietary guidelines), anthropometric measurements and relevant clinical examination.

Data Analysis Technique: Data was analyzed by SPSS, version 22.0.

Results

The present study was a cross-sectional study which was conducted in different schools and pre-university colleges in urban Bangalore. It included a total of 370 adolescent girls, aged 10-19 years.

Out of the 370 girls, 333 (89.9%) were in the age group of 10-14 years, whereas only 37(10.1%) were in the age group of 15-19 years. Thus, a majority of the girls were in the age group of 10-14 years. The mean height was 151.73 ± 6.39 cms. The mean weight was 41.51± 9.45 kgs and the mean Body Mass Index (BMI) was 17.93± 3.44 kg/sqmt (Table 2).

The overall prevalence of dietary inadequacy of iron was found to be present in 69% (255 out of 370) girls.(Table/Fig. 1) Majority of them were in the age group 12-14 years.

As per WHO criteria for Asian, 35.9% (133 out of 370) girls were underweight (BMI < 18.5 kg/mtsq). Adolescent girls who were categorized as overweight as per the criteria (BMI- 23 to 24.9 kg/mtsq) were 2% (7 out of 370).

88.6% of girls had mixed diet whereas only 11.4% of girls had vegetarian diet.(Table3/Fig.2) Diet profile showed high consumption of tea and coffee (76.1%).12.5% girls skipped breakfast.

Among the symptoms, Pallor and easy fatigability were most common, prevalent in 44.7% (165 out of 370) and 78.1%(289 out of 370) girls respectively. The symptoms were more common in girls with vegetarian diet (Pallor- 28.14%, Easy fatigability-44.3%) as compared in girls with mixed diet (Pallor-16.56% and Easy fatigability-33.8%). (Fig 3)

Significant association was found between dietary inadequacy of iron and presence of pallor ($p<0.05$) (Table 4)

Discussion

It is evident that control of anaemia in pregnant women may be more easily achieved if satisfactory iron status of the adolescent females can be ensured prior to marriage. The causes of anaemia are multifactorial. Nutritional requirement for iron in relation to the body size is higher during adolescence, because it is a period of rapid growth and development. During adolescence, iron deficiency not only reduces work productivity but also leads to iron deficiency during pregnancy. Therefore, targeting adolescent girls would not only have an immediate curative effect but may also have long term preventive effect on iron deficiency during pregnancy. In view of the implications of iron deficiency on development, growth, health and work output of an individual and thereby, nutritional productivity, urgent steps are needed to control it [7].

The reasons for the high incidence of anaemia among the adolescent girls are:Increased iron requirements because of growth, Menstrual loss, Discrepancy between high iron need for haemoglobin formation and low intake of iron containing foods, Erratic eating habits, dislike for foods which are rich in iron, like green leafy vegetables and Iron absorption inhibitors in food: phytates/tannins[8]

Inadequate iron status

In the present study, it was found that out of 370 girls, 255 girls (69%) had dietary inadequacy of iron in their diet.In a multi-country study on the nutritional status of adolescents, which was carried out by the International Centre for Research on Women (ICRW), anaemia was found to be the most widespread nutritional problem and its prevalence ranged from 32-55%[9].A one year cross-sectional study by Biradar et al(2012) in Belgaum, Karnataka found 41.1% adolescent girls to be anaemic[10].A study by Kaur et al (2011) in adolescent girls and boys in Patiala revealed 98% of girls and 56% of boys to be anemic[11].Similar study by Kaur et al(2015) in adolescent medical students in Amritsar, Punjab showed 45.7% of girl students as anaemic[12].Goyle et al (2009) found anaemia in 98% of adolescent girls attending government schools in Jaipur, Rajasthan[13].

Ill effects of anaemia

Among the clinical effects of anaemia, Pallor and easy Fatigability were found in 44.7% and 78.1% girls respectively. Similar results were found by a study by Kaur et al (2011) with 68% pallor and 64% easy fatigability[11].

Anthropometric Measurements

The results of anthropometric measurement revealed that the average height of the girls ranged from 145-158 cms with the mean value being 151.73 ± 6.39 cm. The height was almost comparable to NCHS standard (Table

2).Average weight of the girls ranged between 32-51 kgs with the mean value being 41.51 ± 9.45 kg. Results showed lower weight values when compared to NCHS standard (Table 2).Anthropometric data showed 35.9% of girls were underweight with BMI <18.5 kg/mtsq. The disparity in anthropometric data might be due to poor growth and development because of inadequate growth support due to inadequate dietary iron.Similar results were shown by study by Kaur et al (2011) where the height and weight of adolescent girls were compared to NCHS standard and weight was found to be lower. 44% of girls were found to be underweight in the study[11].
Study by Kaur et al(2015) in Amritsar, Punjab found 18% of girls to be underweight[12].

Dietary assessment

88.6% girls had mixed diet whereas 11.4% followed vegetarian diet. The general meal pattern showed that majority of girls consumed 3 major meals per day, breakfast, lunch and dinner. Only 12.5% girls were consuming 2 meals per day by skipping breakfast. Consumption of tea and coffee were found in majority of the girls, 76.1% population. They were consuming both morning and evening tea and some along with the meals. Higher tea and coffee intake hinders body's absorption of iron and might contribute towards inadequate iron status in adolescent girls.Diet was found to be poor in green leafy vegetables, milk and milk products, meat and poultry products.Study by Kaur et al (2011) showed 14% female subjects consuming mixed diet, 16% of girls skipped breakfast, 34% of girls consumed more tea and coffee[11].Bhoite et al (2011), Kaur et al (2015) also revealed higher tea and coffee consumption as well as inadequate intake of these food groups [13].

Conclusion

In conclusion, the present study revealed dietary inadequacy of iron to be a major health problem in adolescent girls, which has an inverse effect on the later stages of life.The adverse effect of dietary inadequacy of iron was evident in the anthropometric data when compared to NCHS standards.Among the ill effects of anaemia, pallor and easy fatigability were common and found to be more prevalent in vegetarian diet.Majority of girls skipped breakfast and consumed high quantity of tea and coffee. Girls with pallor had significant dietary inadequacy of iron.

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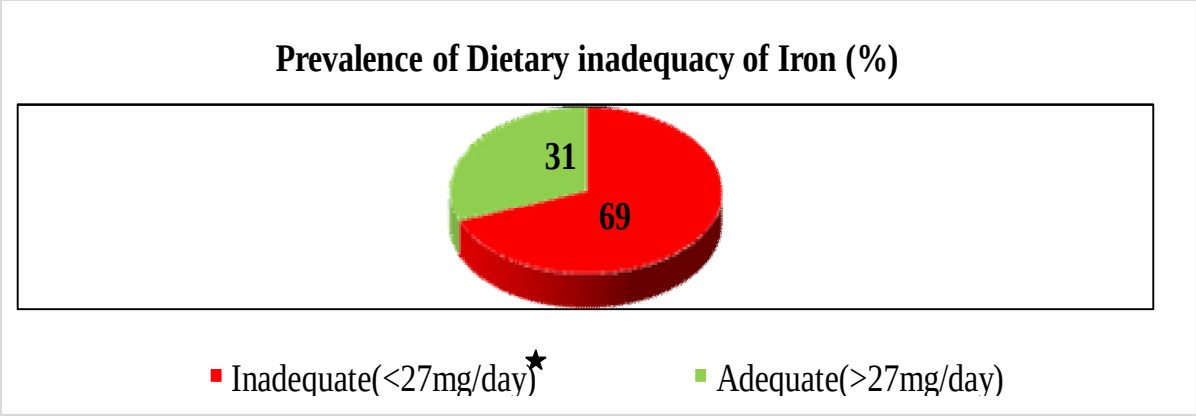
Tables and Figures



★ National Institute Of Nutrition (NIN) 2010 Dietary Guidelines Manual for Indians

Fig 1-Prevalence of Dietary Inadequacy of Iron

Table 1: Distribution of study participants in relation to dietary inadequacy of iron

Dietary Inadequacy of Iron	Study Participants (n=370)	
	Number	Percentage
Inadequate	255	69
Adequate	115	31

Table 2: Mean Age, Height, Weight and BMI of study participants

Anthropometric Measurements		**NCHS**
Parameter	**Mean ± S.D**	
Height (in cms)	151.73 ± 6.39	163
Weight (in Kg)	41.51 ± 9.45	53.8
BMI (Kg/sqmt)	17.93 ± 3.44	

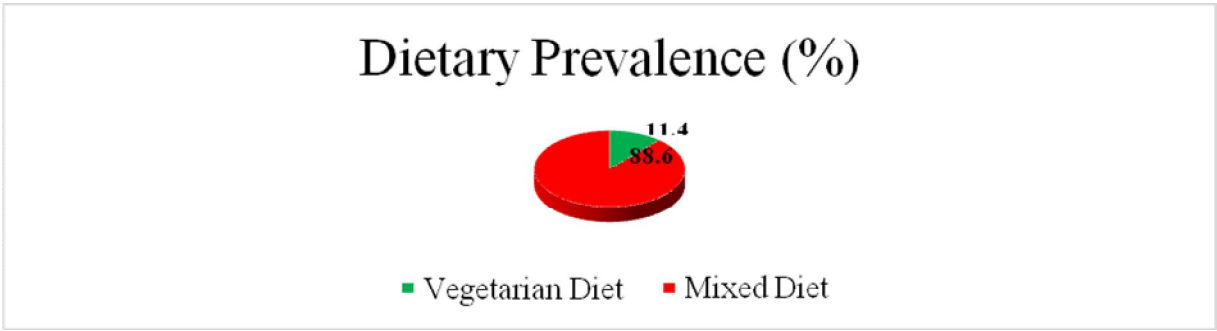


Fig2- Distribution of study participants according to Diet

Table 3- Prevalence of Clinical symptoms in relation to Diet (%)

Dietary Prevalence	Study Participants (n=370)	
	Number	Percentage
Vegetarian	42	11.4
Mixed	328	88.6

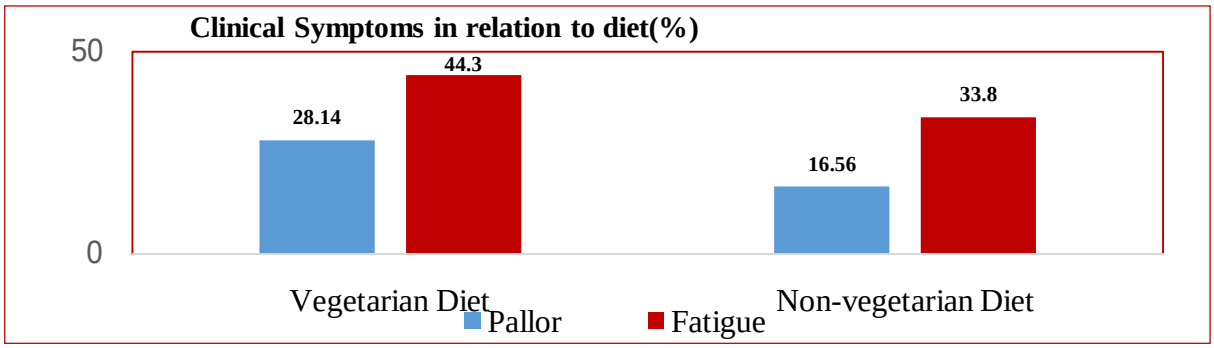


Fig. 3- Distribution of study participants according to presence of Pallor

Table 4- Distribution of study participants according to presence of Pallor

Pallor	Dietary Iron Status		Total
	Inadequate	Adequate	
Absent	20	38	58
Present	235	77	312
Total	255	115	370

x2 = 38.0776, DF=1, p<0.00001