

Original Article

Dietary habits in adolescents girls and their association with anaemia

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To study the dietary habits affecting availability and absorption of iron in adolescent girls and to assess their association with anaemia. Cross sectional study in 320 girls aged 17-18 years with apparently normal general physical examination, studying in Government College were enrolled. Data collected (predictor variables) was related to 8 dietary habits, 2 clinical conditions and with chronic blood loss (worm infestation, menorrhagia), SES (according to Kuppaswamy scale 2007), anthropometric indices. Haemoglobin estimation was done in all girls (primary outcome variable). Criteria to define anaemia was according to WHO guidelines. Odds ratio with 95% confidence intervals was calculated for testing the association. Prevalence of anaemia was 53% with 39% mild, 13.4% moderate and 0.6% severe. Proportion of anaemia was higher if girls were vegetarian, taking rice predominant diet, consuming <3 meals/day and consuming fruits, <4/week. Non vegetarian versus vegetarian diet (OR=0.44, P 0.015), Wheat versus rice predominant (OR=0.66, p 0.04), number of meals = 3/day vs less (OR=0.61, p 0.018), consumption of fruits \geq 4/week versus less (OR=0.44, p 0.0001). Anaemia was significantly associated with weight <45 kg (OR=0.64, p 0.02) among anthropometric indices. No association with comorbidities was found. High prevalence of anaemia (53%) & high prevalence of underweight girls (45%) point to the improper dietary intake affecting both general health and micronutrient status. Presence of adverse dietary habits in majority of subjects point towards the importance of proper dietary advice to combat nutritional anaemia.

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Key words : Dietary Habits, Adolescence girls, Anaemia.

To ensure good adolescent health, the Government of India has made adolescent health a part of RCH package since 1997. Among various morbidities affecting adolescents the nutritional anaemia is very common. As suggested by report of NFHS -3¹, 56% adolescent girls and 30% adolescent boys are anaemic. Iron deficiency anaemia is the commonest nutritional anemia and therefore of foremost importance.

Reducing its prevalence can lead to a significant change in the total health scenario of the masses, especially in adolescent girls - better physical growth, improved cognitive function, better school performance as well as work productivity² and improved quality of life³. It will also in the long run positively influence and improve the performance of ongoing programmes to combat anaemia in pregnancy and in under five children. IDA can be modified by identifying various dietary habits affecting iron absorption. By improving the awareness of society to promote the good habits will help in combating iron deficiency anemia. This was the reason to undertake this study to identify the prevailing dietary habits in adolescent girls of Ghaziabad.

MATERIAL AND METHODS

An observational cross sectional study conducted at a government college located within 5 km radius of Santosh Medical College from September to November 2012. Adolescent girls of B.A programme (aged 17-18 years) were enrolled after informed and written consent from participants and who fulfilled the following inclusion criteria- 1). Free from any chronic illness like TB/Bronchial asthma 2). No hospitalization in the last 3 months 3). Willing for haemoglobin estimation 4). Normal general physical examination.

The collected data was related to dietary habits besides Socio economic status (according to Kuppaswamy scale 2007) and anthropometric indices i.e. weight & height.

Outcome variable was anemia and predictor variables were a) Dietary habits b) Anthropometric indices c) Certain co-morbidities

The criteria for diagnosing anemia was as per WHO guidelines- Mild anemia (10-12 g%), Moderate anemia (7-9 gm%), Severe anemia (<7 gm%)

Epi info 7 was used for statistical calculation. Odds ratio along with confidence interval and p value were calculated.

The study was approved by the ethical committee of the Institute.

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RESULTS

Prevalence of anaemia was 53.1% (Fig 1) of which mild anemia was the commonest (39%). Majority of study subjects belonged to SES grade 3 & grade 4 (Fig 2).

Dietary habits of the study subjects are shown in Table 1. Out of eight studied habits the statistically significant association of anemia was found with vegetarian diet, rice predominant diet, taking number of meals less than three per day and infrequent consumption of fruits. Only half of the girls were taking GLV more than three times a week. Citrus fruits with meals were being consumed by only one fourth girls, while one third girls were taking tea or coffee with meals and breakfast was being skipped at least thrice per week by 40% of girls.

Table 2 shows nearly half of the girls were underweight (44%) and anemia was commoner in these girls (p value =0.02). Only six percent girls were overweight but 30% of them were anemic. Odds of a girl being anemic is 2.77 if she is overweight.

Table 3 shows the low prevalence of worm infestation and menorrhagia in study subjects and their association with anemia was insignificant.

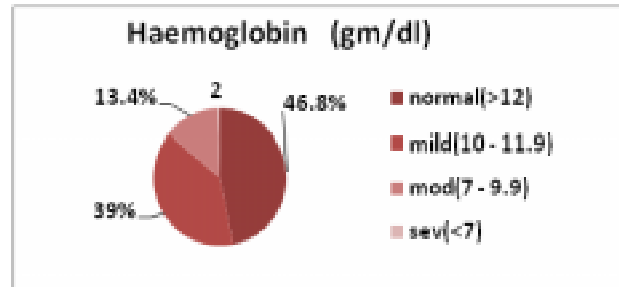


Fig 1 — Haemoglobin levels in adolescent girls

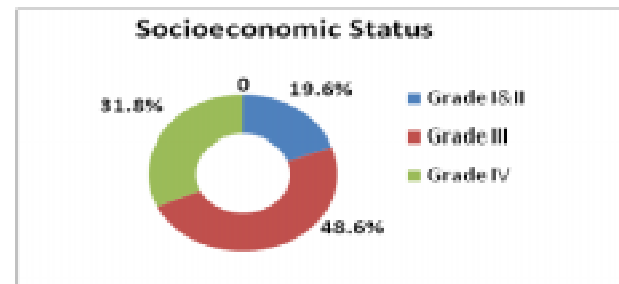


Fig 2 — Anaemia in relation to Socioeconomic Status (Kuppuswamy 2007) of 320 girls

DISCUSSION

According to WHO cut offs⁴ if the prevalence of anemia is above 40%, it becomes a public health problem of high magnitude. The prevalence in present study was

Table 1 — Anaemia in relation to adolescent dietary patterns

| Adolescent dietary pattern | Total n (%) n=320 | Anaemia n (%) n=170 (53.1%) | Odds ratio (C. Intervals) | P value |
|-----------------------------------|----------------------|-----------------------------------|---------------------------|---------|
| Nonveg | | | | |
| Yes | 34 (10.7%) | 12 (35.2%) | 1.00 | 0.015 |
| No | 286 (89.3%) | 158 (55.2%) | 0.44 (0.21-0.93) | |
| Wheat predominant | | | | |
| Yes | 108 (33.8%) | 50 (46.2%) | 1.00 | 0.04 |
| No | 212 (66.2%) | 120 (56.6%) | 0.66 (0.41-1.05) | |
| No of meals >= 3/d | | | | |
| Yes | 196 (61.2%) | 95 (48.4%) | 1.00 | 0.018 |
| No | 124 (38.3%) | 75 (60.48%) | 0.61 (0.39-0.97) | |
| Skips breakfast >= 3 t/wk | | | | |
| No | 192 (60%) | 93 (48.4%) | 1.00 | 0.08 |
| Yes | 128 (40%) | 72 (56.2%) | 0.73 (0.46-1.14) | |
| Consumes GLV >= 3 t/wk | | | | |
| Yes | 159 (49.7%) | 80 (51.9%) | 1.00 | 0.15 |
| No | 161 (50.3%) | 90 (55.9%) | 0.79 (0.51-1.24) | |
| Consumes fruit >= 4 t/wk | | | | |
| Yes | 153 (47.8%) | 65 (42.4%) | 1.00 | 0.0001 |
| No | 167 (52.8%) | 105 (62.8%) | 0.44 (0.28-0.68) | |
| Consumes citrus fruits with meals | | | | |
| Yes | 80 (25%) | 41 (51.3%) | 1.00 | 0.34 |
| No | 240 (75%) | 129 (53.8%) | 0.90 (0.54-1.54) | |
| Consumes tea /coffee with meals | | | | |
| No | 218 (68.1%) | 114 (52.3%) | 1.00 | 0.33 |
| Yes | 102 (31.9%) | 56 (55%) | 0.90 (0.56-1.44) | |

Table 2 — Anthropometric indices and anemia in adolescent girls

| Anthropometric Indices | Total n (%) n=320 | Anaemic n (%) n=170 | Odds ratio (CI) | P value |
|------------------------|----------------------|------------------------|-----------------------|---------|
| Weight >= 45kg | | | | |
| Yes | 178 (55.6%) | 86 (48.3%) | 1.00 | 0.02 |
| No | 142 (44.4%) | 84 (59.1%) | 0.64 (0.41 - 1.00) | |
| Height >= 145cm | | | | |
| Yes | 295 (92.2%) | 158 (53.5%) | 1.00 | 0.29 |
| No | 25 (7.8%) | 12 (48%) | 1.24 (0.55 - 2.82) | |
| BMI | | | | |
| Normal | 186 (58.2%) | 101 (54.8%) | 1.00 | 0.43 |
| < 5th percentile | 114 (35.6%) | 63 (55.2%) | 0.96 (0.60 - 1.53) | |
| > 85th percentile | 20 (6.2%) | 6 (30%) | 2.77 (1.02- 7.5) | |

Table 3 — Worm infestation and menorrhagia in adolescent girls

| Comorbidity | Total n (%) n=320 | Anaemic n (%) n=170 | Odds ratio (CI) | P value |
|------------------|----------------------|------------------------|----------------------|---------|
| Worm infestation | | | | |
| No | 306 (95.6%) | 162 (52.9%) | 1.00 | 0.38 |
| Yes | 14 (4.4%) | 8 (57.1%) | 0.84 (0.28 - 2.4) | |
| Menorrhagia | | | | |
| No | 271 (84.7%) | 142 (52.4%) | 1.00 | 0.27 |
| Yes | 49 (15.3%) | 28 (57.2%) | 0.82 (0.44 - 1.5) | |

53%, showing anemia as a major problem among adolescent girls of Ghaziabad. Overall prevalence of anaemia available from various studies in UP ranged from 56% Lucknow⁵ to 34.5% in Meerut⁶. Singh *et al*⁵ included adolescent girls from urban slums while Rawat *et al*⁶ had rural girls belonging to medium and low SES families with good agricultural income.

Nutritional Anthropometry: In present study 55% girls were underweight and anaemia was commoner in them (59% vs 48%) than girls with normal weight. This finding is in concordance with the findings of Chaudhary and Dhage⁷, Shah and Gupta⁸. Although Kaur *et al*⁹ have reported no significant relationship between anaemia and low BMI.

Dietary habits: Vegetarian diet is an important correlate of anaemia. In present study increase iron intake in non vegetarian food is significantly associated with decrease prevalence of anaemia as also reported by S Kaur *et al*⁹.

Wheat versus Rice based diet: Presence of phytates in cereals results in poor bioavailability of iron which from wheat is around 5% and even poorer from rice (2%). Girls in present study were mostly rice eaters (66.2%) similar to the observations of Vijaypushpam *et al*¹⁰ and Seshadri *et al*¹¹.

Iron and micro-nutrient rich food consumption: Green leafy vegetables, fruits, milk and milk based products are rich sources of iron and micronutrients. In present study, consumption of green leafy vegetables more than three times a week was found in only 49.7% girls. There are several studies^{11,12,13} reporting low intake of GLV similar to present study. The association between low intake of GLV and anaemia was found in present study is in unison with the observation of Kaur *et al*⁹.

Consumption of fruits more than three times a week was found in only 47.8% of the total girls and consumption of citrus fruits in even lower percentages (25%) similar to the observation of Patel *et al*¹⁴.

Consumption of tea and coffee with meals : Tannins reduce the absorption of dietary iron. This inappropriate dietary habit was found in nearly one third girls (31.9%) in present study. This observation is in concordance with the observation by Thankachan P *et al*¹⁵. Efforts should be made to discourage the habit of intake of tea/coffee with or within half an hour of meals.

Skipped meals: This was found in app. 38% girls and majority of times it happened to be the breakfast. Prevalence of anaemia was quite high at 48.4% in this group of girls. So stress on taking more than three meals a day and not missing the breakfast will be an important part of nutritional training.

CONCLUSION

High prevalence of anaemia (53%) & high prevalence of underweight girls (45%) point to the improper dietary intake affecting both general health and micronutrient status. Adverse dietary habits were present in large number of girls.

To combat iron deficiency anaemia, efforts have to be multipronged ranging from Iron folic acid and nutritional supplementation to imparting nutritional education¹⁶ through mass media, posters, brochures, health classes in schools and colleges.

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