## Original   Article

# Study of anemia in adolescent school girls of Bhopal

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**ABSTRACT**

**Background:** Iron-deficiency anemia is the most common form of malnutrition, early intervention during adolescence (girls) can prevent high morbidity and mortality of these future mothers. **Objectives**: To study prevalence & factors contributing to anaemia among adolescent school girls. **Material and Methods:** Area or region addressed – Iron deficiency anemia in adolescent girls. Present study was conducted among 317 adolescent (10-19Yrs) government schoolgirls of Bhopal city from June2005-July2006. Three study groups were selected from three different girls' school by random sampling method. Statistical analysis was done with SPSS. **Result & Conclusion**: Overall prevalence was 58.4% among adolescent schoolgirls. Prevalence of anemia was dependent on the knowledge about prevention of anemia, literacy level, food habits, birth order & also frequency of Iron rich source viz. green leafy vegetable & non vegetarian diet. While there was no significant relation of anemia with duration of menstrual flow but there was significant ($P<0.05$) difference in number of anaemic cases with age at menarche i.e. with higher age at menarche; there was more chances of anemia. Level of anemia was higher ($p<0.05$) in early adolescent (10 -13 Years) age group (81%) as compared to middle (58.3%) and late adolescent (17-19 years) age group girls (48.7%).

**Key words:** Iron Deficiency Anemia, Iron folic acid (IFA), Adolescence, Haemoglobin

## Introduction:

The importance of anemia as a major public health problem throughout the world is widely recognized. According to WHO, in developing countries the prevalence of anemia among pregnant women averages 56%, ranging between 35 to 100% among different regions of the world [1]. Various studies from different regions of the country (India) have reported the prevalence of anemia to be between 33 and 100% [2,3].

In India, anemia is the second most common cause of maternal deaths, accounting for 20% of total maternal deaths [4]. Anemia affects mainly the women in child bearing age group, young children and adolescent girls. Association of anemia with adverse maternal outcome such as puerperal sepsis, ante-partum haemorrhage, post-partum haemorrhage and maternal mortality is no longer a debatable subject [5]. Apart from the risk to the mother, it is also responsible for increased incidence of premature births, low birth weight babies and high perinatal mortality [5,6].

National Nutritional Anemia Prophylaxis Programme (NNAPP) was initiated in 1970 during fourth five year plan with the aim to reduce the prevalence of anemia to 25 % [7].

Subsequent evaluations have shown no change in the situation. Since 1992, the daily dosage of elemental iron for prophylaxis and therapy has been increased to 100 mg and 200 mg, respectively under Child Survival and Safe Motherhood Programme. Overall, only 23 % of women consumed IFA for at least 90 days. This percentage is universally low among all groups of women except women who have completed 12 years of education or more (56 %) and women in households in the highest wealth quintile (49 %) [8].

Improving the target population's knowledge and awareness may increase compliance. Despite sufficient awareness, however, daily tablet intake during a prolonged period of time may continue to be unappealing to people, in part due to unpleasant side effects. Adolescent girls are chosen for the study as by improving anemia & awareness among adolescent girls, maternal morbidity & mortality especially during pregnancy can be improved. There are only few studies focussing on adolescent anaemic girls. In view of the above, present study was carried out to find out the prevalence and factors associated with anemia amongst adolescent girls. The present study was designed to study the prevalence of anemia & associated factors in adolescent girls of Government school of Bhopal and to study knowledge, attitude, practices about Anemia & dietary pattern of adolescent girls.

## Material and Methods:

Study Population: Study has been conducted in adolescent girls of Government Higher secondary school of Bhopal. Period of Study: The study has been carried out over a period of 12 Month i.e. June 2005 to July 2006   including development of study tool, pilot testing, collection of data, analysis and presentation of findings. Sampling Technique: Multistage random sampling technique was used to select the requisite sample size. Sample Population: Sample unit:

Adolescent girl (10-19) who have attained their Menarche. Sample Size: sample size (317) was estimated on the basis of 60% prevalence of Anemia among adolescent girls and absolute allowable error of 9% with confidence interval of 95%. Subjects – 317 adolescent girls (10-19Years) who have attained their Menarche, attending government schools of Bhopal.

All the Government schools of Bhopal were listed, out of this three government schools were selected by the multistage random sampling for selecting the requisite sample size. Group of 105 adolescent girls each from two school & 107 from third school were selected after taking willingness to participate in the study from parents & study subjects in the form of informed consent. All the girls were screened for anemia by Hemo Cue Hb 201+ analyzer method & adolescent anemic girls were selected from three schools as per WHO guidelines for anemia for estimating prevalence. The pre-tested proforma was used for data collection .Clearance from Medical College ethics committee was taken prior to initiation of intervention.

Data was analyzed using SPSS, database management software. Initially frequencies of all variables were taken followed by comparison of various variables. Appropriate statistical tests were used for finding the association and trend.

**Results:**

In the present study prevalence of anemia was 58.4% amongst study participants. Girls having knowledge about sources of iron rich food and prevention of anemia were slightly less anaemic than the girls not having any knowledge while there was no significant difference between proportions of anaemic girls having knowledge about anemia with those having no knowledge.

**Table1: Distribution of adolescent girls according to age group**

| Haemoglobin in gm % | Status of Anemia | |
|---|---|---|
| | No. | % |
| More than 12 (Normal) | 132 | 41.6 |
| 10-11.9 (Mild) | 154 | 48.5 |
| 7-9.9 (Moderate) | 30 | 9.5 |
| Less than 7(Severe) | 01 | 0.4 |
| Total | 317 | 100 |

| Anemia | Knowledge about Prevention of Anemia | | | | Total |
|---|---|---|---|---|---|
| | Yes | | No | | |
| | No. | % | No. | % | |
| Present | 70 | 55.6 | 115 | 60.2 | 185 |
| Absent | 56 | 44.4 | 76 | 39.8 | 132 |
| Total | 126 | 100 | 191 | 100 | 317 |

**consumption of green leafy vegetables**

| Consumption | | Anemia | | No Anemia | | Total |
|---|---|---|---|---|---|---|
| | Frequency | No. | % | No. | % | |
| Green Leafy Vegetables | Daily | 71 | 47.0 | 80 | 53 | 151 |
| | Once weekly | 38 | 80.9 | 9 | 19.1 | 47 |
| | Twice weekly | 44 | 61.1 | 28 | 38.9 | 72 |
| | Thrice week-ly | 32 | 68.1 | 15 | 31.9 | 47 |
| Total | | 185 | 58.4 | 132 | 41.6 | 317 |

significant (P<0.01) difference in level of anemia amongst girls, with literacy level.

**Table 4: Anemia in girls in relation to frequency of iron rich Non-vegetarian food consumption**

**consumption**

| Consumption | | Anemia | | No Anemia | | Total |
|---|---|---|---|---|---|---|
| | Frequency | No. | % | No. | % | |
| Non Vegetarian | Daily | 9 | 37.5 | 15 | 62.5 | 24 |
| | Once weekly | 25 | 73.5 | 9 | 26.5 | 34 |
| | Twice weekly | 46 | 66.6 | 23 | 33.3 | 69 |
| | Thrice weekly | 14 | 46.66 | 16 | 53.3 | 30 |
| Total | | 94 | 59.9 | 63 | 40.1 | 157 |

(61.4%) while prevalence was lesser among Muslims (54.7%) & others. Anemia was found to be higher (P<0.01) among higher birth order.

**Table 5: Distribution of Anaemic adolescent girls on the basis of age of menarche & Anemia**

**Anemia**

| Age of Menarche | Anemia | | No Anemia | | Total |
|---|---|---|---|---|---|
| | No. | % | No. | % | |
| 11 years | - | - | 3 | 100 | 3 |
| 12 years | 20 | 50.0 | 20 | 50.0 | 40 |
| 13 years | 46 | 59.7 | 31 | 40.25 | 77 |
| 14 years | 47 | 52.8 | 42 | 47.2 | 89 |
| 15 years | 38 | 56.7 | 29 | 43.2 | 67 |
| 16 years | 9 | 64.3 | 5 | 35.7 | 14 |

(P<0.01)

(58.3%) and late adolescent (17-19 years) age group per girls (48.7%). There was no significant relation of anemia with duration of menstrual flow but there was significant (P<0.05) difference in number of anaemic cases with age at menarche i.e. with higher age at menarche; there are more chances of anemia.

**Discussion:**

In the present study prevalence of anemia was 58.4% among adolescent girls, similar to study commissioned by PMPSU and State Planning Commission MP in 2009 (supported by DFID) more than half of adolescent girl (56.7 percent) in Madhya Pradesh have anemia (10). It was also observed that prevalence of anemia varies with the knowledge about prevention of anemia & also frequency of Iron rich source viz. green leafy vegetable & non vegetarian diet. It was observed that knowledge and awareness was responsible for status of anemia up to certain extent. Girls having knowledge about sources of iron rich food and prevention of anemia were slightly less anaemic than the girls not having any knowledge while there was no significant difference between proportions of anaemic girls having knowledge about anemia with those having no knowledge.

There was significant (P<0.01) difference in level of anemia amongst girls, with literacy level, with increasing literacy level haemoglobin status improves this may be due better awareness, good compliance for Iron Folic Acid tablet & iron rich diet. In National family health survey (NFHS-III) study, 60.1% anemia amongst illiterate, while 44.6 % amongst literate (12 or more years of education) women [9].

The prevalence of anemia was more amongst Hindu (61.4%) consuming mainly vegetarian diets while Muslims (54.7%) that also consume Non veg. diet prevalence was lesser, it was similar to findings of National family health survey (NFHS-III), anemia was found amongst Hindu (55.9 %), Muslim (54.7 %) [9].

Bioavailability of iron from predominantly cereal based diet is poor and is responsible for wide spread iron deficiency in the country. Dietary iron intake content is related to caloric content of the diet, a thin girl with sedentary habits needs less calorie and hence gets less iron while her iron requirement is high because of menstrual blood loss (Mehta et al). Anemia was found to be higher (P<0.01) among higher birth order. With higher birth order and decreased gap between two pregnancies there was more chances of giving birth to LBW baby, Malnutrition and anemia and vicious cycle continues in females life. Similar trend found in NFHS III, anemia tends to increase with the number of children ever born and decreases with education [9].

In the present study there was no significant relation of anemia with duration of menstrual flow but there was significant (P<0.05) difference in number of anaemic cases with age at menarche i.e. with higher age at menarche; there are more chances of anemia.

Level of anemia was higher (p<0.05) in early adolescent (10 -13 Years) age group (81%) as compared to middle (58.3%) and late adolescent (17-19 years) age group girls (48.7%). Prevalence of 61.9% was observed in age group 10-15 years as compared to 50.2% among 15-19 years in ICDS Impact Study PMPSU SPC 2009 (11).This may be due the fact that at menarche menstrual cycles were irregular and more amount of blood is lost during this period while cycles get periodic and average flow of 40 ml per cycle is mostly maintained in later ages. This may also be due to lower literacy level among early adolescence as compared to late adolescent age group and can be studied among illiterate adolescent group.

**Conclusions:**

Study shows prevalence of anemia varies with literacy, knowledge and awareness about iron rich food. Anemia was observed to be more among Hindus & girls higher in birth order. There is role of literate, small family having adequate spacing between children.

**Suggestion:**

Achievements can be enhanced by strengthening ICDS functions specially for adolescent & reproductive age group women & not only during pregnancy. Sustainability can be achieved by increasing awareness of adolescent girls at school level and community sensitization on adolescent needs by health workers. Strong intersectoral linkages need to be built up in government sector as well as in the form of Public private partnership.

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