AN EPIDEMIOLOGICAL STUDY OF ANAEMIA AND ITS ASSOCIATED RISK FACTORS AMONG ADOLESCENT GIRLS IN RURAL AREA OF KATIHAR

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ABSTRACT

BACKGROUND
Anaemia is a serious public health concern in most developing countries and the prevalence of anaemia is quite high among adolescent girls. Adolescence is also a phase where a rapid upsurge is seen in growth and development which leads to increase requirement of nutrition especially high micronutrients requirement. Adolescent girls are vulnerable to iron deficiency and anaemia due to accelerated increase in requirements for iron, poor dietary intake of iron, prolonged menstrual period, and worm infestation. A study was conducted with the objective to determine the associated risk factors of anaemia among adolescent girls.

METHODS
A cross-section study was conducted among 202 adolescent girls in rural area of Katihar. Information was collected on a predesigned and pretested proforma about contributory factors in relation to anaemia, by oral questionnaire method. Sahil’s haemoglobinometer was used for the haemoglobin estimation.

RESULTS
Prevalence of anaemia and severity of anaemia was found to be high in the age group 17 to 19. Prevalence of anaemia was significantly high (80%) in the adolescent girls who already attained menarche. A statistically significant relation exists between family size and anaemia. Percentage of anaemia was high among labour class (85%) than business class (61.7%). Prevalence of anaemia was to be found high in vegetarian (78.13%) than non-vegetarian (75.29%).

CONCLUSIONS
This study shows that the anaemia was to be found more prevalent in higher age group, vegetarian group, and girls who had already attained menarche. This may be because of repeated menstrual blood loss with each cycle and use of low bioavailability iron.

KEYWORDS
Anaemia, Adolescent Girl, Occupation, Menarche


BACKGROUND
Adolescent girls are at a high risk for anaemia and malnutrition. Inadequate nutrition during adolescence can have serious consequences throughout the reproductive years of life and beyond.¹ It is a period of transition between childhood & adulthood, a time of profound biologic, intellectual, psychosocial and economic changes.² It has been defined by the World Health Organization as the period of life spanning the ages between 10-19 years. Adolescent girls need extra iron for menstruation, in addition to growth and development. Iron deficiency anaemia impairs cognitive and behavioural development resulting in reduced school performance. Further, low iron stores throughout childhood may contribute to a delayed menarche and impaired immune response.³ Anaemia in adolescent girls attributes to high maternal mortality rate in future, high incidence of low birth weight babies and high perinatal mortality.⁴ According to WHO estimates approximately 50% of all anaemia is attributable to iron deficiency. Studies indicate that the incidence of anaemia in adolescents tends to increase with age and corresponds with the highest acceleration of growth during adolescence.⁵ In India, anaemia is the second most common cause of maternal deaths, accounting for 20% of total maternal deaths.⁶ Among adolescents girls, anaemia may lead to delayed menstrual cycle, poor growth, reduced work capacity and poor reproductive outcome. Demographic factors and socio-economic factors also play an important role on the health of adolescent girls. All these factors make adolescents more susceptible to anaemia. This study was planned to assess the magnitude of problem of anaemia in
rural field practice area of Katihar Medical College, Katihar. The main objective of the study was to know the prevalence of anaemia and its associated risk factors among adolescent girls in this area.

METHODS

A community based cross sectional study was conducted at Hajipur village, a rural field practice area of Katihar Medical College, Katihar, Bihar. Initially, a pilot study was conducted among a small number of adolescent (10-19 years) girls in Hajipur village to have a rough estimate of the prevalence of anaemia. The prevalence was found to be 50 percent in this pilot study. On the basis of this, prevalence of anaemia was taken as 50%, the level of significance as 5%, the allowable error as 20% of prevalence and the design effect was 2. The sample size of the present study was calculated by adopting the following formula-

\[ n = \frac{Z^2 \times \pi \times (1-\pi)}{E^2} \]

\[ Z^2 = 1.96 = 2(\alpha = 0.05), \]
\[ P = \text{prevalence rate of the disease (here, P=50%)}, \]
\[ Q = 1 - P, \]
\[ E = \text{Allowable error 20% of P = 0.10, } E^2 = 0.0100 \]

Then, \[ n = \frac{4 \times 0.50 \times 0.50}{0.0100} = 100 \]

Here, degree of confidence is 95% allowing design effect 2, n = 100 x 2 = 200.

Houses were numbered serially where one or more adolescents were present. Total 583 houses were found where one or more adolescents were present. Then the houses were selected systematic random sampling technique where one or more adolescents were present. In this present study the total sample size was 202 adolescent girls. The necessary information regarding socio-demographic characteristic and risk factor related to anaemia were collected with the help of predesigned and pre tested questionnaire after taking written informed consent. A female attendant was present during the examination. Adolescents in the present study who were apparently healthy on general physical examination were included in this study. Adolescent pregnant mothers were not included in this study. Blood haemoglobin examination was done with the Sahli’s method in a Rural Health Training Centre. After testing Haemoglobin levels of all the study subjects, those with Haemoglobin level less than 12 were labelled as anaemic. The collected data was numerically coded and entered in Microsoft excel 2007 and then transferred to SPSS version 20. Chi Square (\( \chi^2 \)) was used for statistical analysis and P value <0.05 was considered significant.

RESULTS

The overall prevalence of anaemia was to be found to be 75.74% (153/202) among study subjects. On the basis of severity nearly one third of subjects 38.12% (77/202) were found to be mild anaemic, 32.18% (65/202) of girls had moderate anaemia while 5.44% (11/202) girls were severely anaemic.

<table>
<thead>
<tr>
<th>Age Group (in Years)</th>
<th>Total</th>
<th>Anaemic</th>
<th>Non-Anaemic</th>
<th>% of Anaemia</th>
<th>( \chi^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-13</td>
<td>91</td>
<td>61</td>
<td>30</td>
<td>67</td>
<td>7.133, df=2, p&lt;0.05</td>
</tr>
<tr>
<td>14-16</td>
<td>68</td>
<td>56</td>
<td>12</td>
<td>82.3</td>
<td></td>
</tr>
<tr>
<td>17-19</td>
<td>43</td>
<td>36</td>
<td>7</td>
<td>83.7</td>
<td></td>
</tr>
</tbody>
</table>

Table 1. Prevalence of Anaemia According to Age Group

From table-1 it can be observed that as age group increases the prevalence of anaemia also increases. The prevalence of anaemia was least in 10-13 years of age group and maximum in age group of 17-19. And it shows significant relation with anaemia. (p<0.05).

<table>
<thead>
<tr>
<th>Status of Menarche</th>
<th>No. of Girls</th>
<th>% of Girls</th>
<th>Anaemic</th>
<th>Non-Anaemic</th>
<th>% of Anaemia</th>
<th>Mean Age at Menarche (in Years)</th>
<th>( \chi^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Attained</td>
<td>62</td>
<td>30.6</td>
<td>41</td>
<td>21</td>
<td>66.12</td>
<td>12.47</td>
<td>df=1,p&lt;0.05</td>
</tr>
<tr>
<td>Attained</td>
<td>140</td>
<td>69.3</td>
<td>112</td>
<td>28</td>
<td>33.88</td>
<td>1.064</td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Prevalence of Anaemia According to Status of Menarche

It appears from table-3, that out of 202 adolescent girls 62 (30.6%) girls had not attained menarche and 140(69.30) had attained menarche. Among girls who had not attained menarche, the prevalence of anaemia was 66.12% and among girls who had attained the menarche, prevalence of anaemia was 33.88%. And the relation between status of menarche and anaemia was found statistically significant.

<table>
<thead>
<tr>
<th>Family Size</th>
<th>Total No.</th>
<th>% of Girls</th>
<th>Anaemic</th>
<th>Non-Anaemic</th>
<th>% of Anaemia</th>
<th>( \chi^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-5</td>
<td>83</td>
<td>41.1</td>
<td>54</td>
<td>29</td>
<td>65</td>
<td>9.067, df=2, p&lt;0.05</td>
</tr>
<tr>
<td>6-7</td>
<td>82</td>
<td>40.5</td>
<td>67</td>
<td>15</td>
<td>81.7</td>
<td></td>
</tr>
<tr>
<td>≥8</td>
<td>37</td>
<td>18.4</td>
<td>32</td>
<td>05</td>
<td>86.4</td>
<td></td>
</tr>
</tbody>
</table>

Table 4. Prevalence of Anaemia According to Family Size

As can be seen from Table-5, 83(41.1%), 82(40.5%) and 37(18.4%) subjects belongs to family size 3-5, 6-7, and ≥8 respectively. And the prevalence of anaemia is 65%, 81.7% and 86.4% respectively.
In this study, it was observed that the maximum number of anaemias was found in labour class and least number of anaemias was found in Business class. It shows a significant relation with anaemia.

<table>
<thead>
<tr>
<th>Dietary Habit</th>
<th>Total No. Girls</th>
<th>% of Girls</th>
<th>Anaemic</th>
<th>Non-Anaemic</th>
<th>% of Anaemic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetarian</td>
<td>32</td>
<td>15.8%</td>
<td>25</td>
<td>07</td>
<td>78.13</td>
</tr>
<tr>
<td>Non-Vegetarian</td>
<td>170</td>
<td>84.2%</td>
<td>128</td>
<td>42</td>
<td>75.29</td>
</tr>
</tbody>
</table>

\[ \chi^2 \leq 0.117, \quad df = 1, \quad p < 0.05 \]

Table 6. Prevalence of Anaemia According to Dietary Habit

It appears from Table-7 that 23/32 (15.8%) were vegetarians, and out of this 25/202 girls (12.3%) were found anaemic. And in non-vegetarians 75.29% girls were found anaemic. And the relation was not found significant. (p>0.05)

DISCUSSION

In the present study, 153 (75.74%) girls were found to be anaemic. Srivastava A et al. also found almost similar prevalence of anaemia (69.2%) in his study.7 In the present study age of the girls was found to have a significant relation with anaemia. The prevalence of anaemia was 67%, 82.3% and 83.7% in the age group 10-13 years, 14-16 years and 17-19 years, respectively. So, it can be observed that as age increases the prevalence of anaemia also increases. This may be accounted for as repeated menstrual blood loss with each cycle and use of low bioavailability of iron which results in drainage of iron reserves ending in anaemia. We can also observe that the maximum number of mild anaemias was to be found in age group 10 to 13 years and the prevalence of severe anaemia was found to be minimum in this age group. The percentage of severe anaemia was found more (11.6%) in age group 17 to 19 years and least (2.1%) in 10 to 13 years of age. Singh R observed in a study that the prevalence of anaemia was 37.6% in the age group 15-18 years as compared to 35.4% in the age group 10-14 years.8 Present study shows a significant association between status of menarche and anaemia among adolescent girls. The prevalence of anaemia was found 66.12% (41/62 girls) and 80% (112/140 girls) in girls who had not attained the menarche and who had attained the menarche respectively. Kaur S et al.3 mentioned in their study that prevalence of anaemia in adolescent girls was found to be 60.4% for girls who had already attained the menarche as compared to 56.25% for girls who had not attained the menarche. A statistically significant relation exists between family size and anaemia. The prevalence of anaemia was 65%, 81.7% and 86.4% in family size 3 to 5, 6 to 7 and ≥8 respectively.

Prevalence of anaemia increases as the size of family increases; this may be because of both quality and quantity of food consumption gets affected by number of member in the family especially with limited income sources. Dutta V et al. documented in a study that family size were significantly (p<0.01) associated with anaemia in adolescent girls.10 In the present study father’s occupation has been found a significant relation with anaemia. Higher prevalence of anaemia was to be found in those adolescent girls whose father were working as labourers (85%) and least percentage of anaemia was found in businessmen (61.7%), probably because they were able to give better quality, quantity of food and life to the children. Singh R, in a study found that the prevalence of anaemia was maximum 48.1% in adolescent girls whose fathers worked as labourers while it was 41.8% in private service, 27.5% in business, 38.4% in government service and minimum 17.8% in professionals (p<0.005).8 A non-significant relation has been found between Dietary habit and anaemia. Prevalence of anaemia was found more in vegetarian group (78.13%) compare to non-vegetarian group (75.29%), because in India people take predominantly cereal based diet, rich in phytate, oxalates, phosphates, fiber and other inhibitors of iron absorption. Thakur A et al. also quoted that vegetarians were more anaemic than non-vegetarian.11

CONCLUSIONS

WHO has suggested that the problem of anaemia is of very high magnitude in a community when prevalence rate exceeds 40%. In the present study 75.74% prevalence considered serious calls for an action. Effective public health intervention is needed to address the problem of anaemia in adolescent girls. Present study shows that age, status of menarche, father’s occupation, family size, and dietary habits are the various risk factors which contribute to the prevalence of anaemia among adolescent girls. So, it is not feasible to single out any particular factor affecting anaemia in adolescent girls. It was felt during the study that there is need to promote family planning measures to reduce the family size and nutrition education to improve dietary intake in the family.

REFERENCES


