Original article:

**Distribution of iron deficiency anemia in rural population: Survey based study**

1Dr.C.Ashokkumar *, 2Dr. M.C.Tayade, 3Dr.Nigavekar, 4Dr.Singla, 5Dr.Nitin Idgampalli

1,3,4,5 Department of Pediatrics, 2 Department of Physiology, Rural Medical College,
Pravara Institute of Medical Sciences, Loni, Tal. Rahata, Dist. Ahmednager, Maharashtra, India - 413736

*Corresponding author: Email: drchavvashok@gmail.com

Abstract:

**Introduction:** Anemia is very common in Indian subcontinent. This increase is largely due to a sharp increase in anemia among young children in rural areas; 90% of the cases being due to iron deficiency. With this background the present study was planned to study distribution of iron deficiency anemia in rural population.

**Material and methods:** The present study has been conducted on cases attending to OPD for various medical problems. Our aim was to evaluate incidence of iron deficiency anemia in rural population. The selected patients were subjected to a detailed history and thorough clinical examination as per the standard proforma prepared by our team. The history data was tabulated. Relevant investigations were done as per individual case requirement. The incidence was analyzed. The signs and symptoms were noted and analyzed by using SPSS , Version 16 with the help of statistician . Z test was applied to compare severity of signs and symptoms.

**Observations and results:** Maximum cases are seen in the age group of 1 to 5 years, males are more (33.33%) as compared to females (26.08%). Only 6 males are observed in more than 10 years of age. The average age for males is 3.22 years whereas for females it is 2.97 years.

**Conclusion:** From present study we may conclude that there is seen higher incidence of iron deficiency anemia in age of 1 to 5 years.

**Keywords:** Iron deficiency anemia, thrombocytosis

**Introduction:**

Anemia is very common in Indian subcontinent. Almost 7 in 10 children aged 6-59 months are anemic, including 40 percent who are moderately anemic and 3 percent who are severely anemic. The prevalence of anemia does not vary by the sex of the child. Anemia is considerably higher in rural areas, among children of women with no education, and among children in households in the lower wealth quintiles. Children’s anemia status is closely linked with the anemia status of the mother. Although state differentials in the prevalence of anemia are marked, a high prevalence of anemia is found in every state. The only states in which less than half of the children are anemic are Goa (38 percent), Manipur (41 percent), Mizoram (44 percent) and Kerala (45 percent). The prevalence of anemia among children 6-35 months has increased from 74 percent in National Family Health Survey (NFHS) 2 to 79 percent in NFHS-3. This increase is largely due to a sharp increase in anemia among young children in rural areas; 90% of the cases being due to iron deficiency 1.

Iron deficiency anemia (IDA) is a formidable health challenge in developing countries and remains persistently high despite national programs to control this deficiency 1, 2. IDA can impair energy metabolism, temperature regulation, immune function and work performance. However, the consequences of greatest concern in infants is the impairment of mental and psychomotor development that is associated with even mild IDA 3, 4. With this
background the present study was planned to study distribution of iron deficiency anemia in rural population.

**Material and methods:** The present survey based prospective study was conducted in Dept. of Pediatrics at Rural Medical College, Pravara Institute of Medical Sciences, Loni in Maharashtra over a period of two years from August 2010 to August 2012 after obtaining approval from the Institutional Ethics Committee as part of postgraduate dissertation work. The sample was collected by purposive sampling method. The sample size was calculated with the help of statistician by using sample and power calculator from Internet. The present study has been conducted on cases attending to OPD for various medical problems. Our aim was to evaluate incidence of iron deficiency anemia in rural population.

The subjects who satisfied the following inclusion and exclusion criteria were enrolled in the study after obtaining informed written consents from parents or legal guardians.

**Inclusion criteria:**
- Children with pallor detected among those attending out-patient department for common childhood illnesses and diagnosed to be due to iron deficiency.
- Children in the age group of 6 months to 12 years.

**Exclusion criteria:**
- Children with age less than 6 months or more than 12 years.
- Children with chronic illnesses of prolonged duration.
- Children with anemia due to causes other than iron deficiency.
- Children with thrombocytosis due to causes other than iron deficiency anemia.
- Parents/Lawful guardians not willing to give informed consent for the participation of the subject.

**Sample size:** Subjects were enrolled over a period of two years. Parents of 100 children who satisfied inclusion and exclusion criteria agreed to enroll their wards.

**Methodology:** The selected patients were subjected to a detailed history and thorough clinical examination as per the standard proforma prepared by our team. The history data was tabulated. Relevant investigations were done as per individual case requirement. The incidence was analyzed. The signs and symptoms were noted and analyzed by using SPSS, Version 16 with the help of statistician. Z test was applied to compare severity of signs and symptoms.

**Observations:**

**Table No.1: Age and sex wise distribution of the IDA cases:**

<table>
<thead>
<tr>
<th>Age in years</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1</td>
<td>18(33.33%)</td>
<td>12(26.08%)</td>
<td>30(30%)</td>
</tr>
<tr>
<td>1-5</td>
<td>27(50%)</td>
<td>25(54.35%)</td>
<td>52(52%)</td>
</tr>
<tr>
<td>5-10</td>
<td>3(5.55%)</td>
<td>9(19.57%)</td>
<td>12(12%)</td>
</tr>
<tr>
<td>&gt;10</td>
<td>6(11.12%)</td>
<td>0</td>
<td>6(6%)</td>
</tr>
<tr>
<td>Total</td>
<td>54(54%)</td>
<td>46(46%)</td>
<td>100(100%)</td>
</tr>
<tr>
<td>Mean ± SD</td>
<td>3.22±0.89</td>
<td>2.97±0.45</td>
<td>3.10±0.56</td>
</tr>
</tbody>
</table>
Maximum cases are seen in the age group of 1 to 5 years, males are more (33.33%) as compared to females (26.08%). Only 6 males are observed in more than 10 years of age. The average age for males is 3.22 years whereas for females it is 2.97 years.

Table No.2: Distribution of symptoms in cases of IDA:

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>No. of cases</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever</td>
<td>67</td>
<td>67%</td>
</tr>
<tr>
<td>Cough</td>
<td>21</td>
<td>21%</td>
</tr>
<tr>
<td>Swelling</td>
<td>3</td>
<td>3%</td>
</tr>
<tr>
<td>Irritation</td>
<td>9</td>
<td>9%</td>
</tr>
<tr>
<td>Breathlessness</td>
<td>15</td>
<td>15%</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>19</td>
<td>19%</td>
</tr>
</tbody>
</table>

By applying Z test of difference between two proportions of symptoms namely fever, cough, breathlessness and diarrhea are more significant than other symptoms in the cases of IDA (p<0.05)

Table No.3: Distribution of signs in cases of IDA:

<table>
<thead>
<tr>
<th>Signs</th>
<th>No. of cases</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pallor</td>
<td>94</td>
<td>94%</td>
</tr>
<tr>
<td>Knuckle Pigmentation</td>
<td>7</td>
<td>7%</td>
</tr>
<tr>
<td>Tremor</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Failure to thrive</td>
<td>11</td>
<td>11%</td>
</tr>
</tbody>
</table>

By applying Z test of difference between two proportions of pallor and failure of thrive are more significant than other signs in the cases of IDA (p<0.05)

Discussion:
The present study has been conducted on cases attending to OPD for various medical problems. Our aim was to evaluate incidence of iron deficiency anemia in rural population. In the present study (2012), the cases of IDA are maximum in the age group of 1 to 5 years with 52 cases (52%) while in the age group of more than 10 years, only 6 cases (6%) are affected with iron deficiency anemia. In the 3 studies cited above, which show the age wise distribution of IDA, it was found that the prevalence of , There are 54 males and 46 females in the present study. Males predominated in the age group of less than 1 year and more than 10 years. Only 6 males and no females are observed in more than 10 years of age.

A similar trend was seen in Dalal et al study (M:F = 67:33) & Sinha et al (M:F = 54:47). No specific reason can account for this difference in the present study; however some authors opine that a relatively increased growth in males, demanding more iron could be the reason for the disparity between the sexes. The average age for males is 3.22 years whereas for females it is 2.97 years. Socio-economic status wise distribution of cases shows higher percentage of cases coming from class III and class IV i.e. 37% and 60% respectively.

In the study population, thrombocytosis due to iron deficiency anaemia is seen mostly in the age group of
1-5 years with 31 cases (68.88%) out of a total of 45 cases falling in this group. This is in concordance with the study of Duzgun et al who concluded that thrombocytosis due to IDA is less common over 61 months of age. In our study, only 3 cases of thrombocytosis due to IDA are seen in the age group of 5 to 10 years and no case is seen in the age group above 10 years. New born infants have approximately 75 mg/kg of body iron, 75% of which is in the form of hemoglobin. On an average, infants almost triple their blood volume during the 1st year of life and will require the absorption of 0.4-0.6 mg daily of iron during that time to maintain adequate stores. Iron deficiency is the state in which the content of iron in the body is less than normal. It occurs in varying degrees of severity that merge imperceptibly into one another. The prevalence of iron deficiency anemia varies so much between age groups, between sexes, between economic groups and by geography that overall prevalence statistics are meaningless. Estimates are as many as 3/4th of the world population is iron deficient have been made but they are undoubtedly extravagant.

Our study was with an aim to find incidence of IDA in rural population with limitations mainly concern with sample size and duration of work. We only collected patients attending OPD rather than collection done thoroughly like household survey in particular area. This was major lacuna of this study. However as part of project we tried to analyze the signs and symptoms and assess their severity using statistics.

Conclusion:
From present study we may conclude that there is seen higher incidence of iron deficiency anemia in age of 1 to 5 years.

Abbreviations:
IDA: Iron deficiency anemia
M:F : Male – female ratio
OPD: Outdoor patient department
NFHS: National Family Health Survey

References: