Original Research Article

A study of nutritional anemia among urban primary school children of Katihar

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ABSTRACT

Background: Children health is an important concern for all societies since it contributes to overall development. The present position with regards to health and nutritional status of children is not satisfactory despite of mid-day meal programme running in government run schools. This study is conducted to assess the proportion of children, aged between 6 year to 11 years having anemia and socio demographic factors associated with iron deficiency anemia among selected children.

Methods: For the purpose of study a list of all government primary schools of Katihar had been prepared and equal numbers of students were examined from randomly selected schools. By taking the prevalence of anemia 50% among school children for confidence level 95% with 10% relative precision with sample size comes out to be 384. The sample size was doubled to cover both boys and girls in the study. A total of 800 students (426 boys and 374 girls) in the age group of 6-11 years were interviewed and examined.

Results: Out of 800 children total 343 (42.88%) were anemic. The prevalence of anemia was 37.96% among boys and 48.07% among girls. The prevalence of mild and moderate anemia among boys was 32.05% and 67.95% and 70.8% and 29.2% among girls respectively. The prevalence of anemia was high among lower and upper lower socio-economic status (100% and 45.32%). The proportion of anemic children showed a significant association with education of mother and nutritional status. Proportion of anemia decreased significantly with increase in education status of mother.

Conclusions: The prevalence of anemia was found high among primary school children. Major factors which influence the prevalence of anemia were socioeconomic status, mother education and nutritional status of children.

Keywords: Anemia, Socio economic status, Dietary habit, Nutritional status

INTRODUCTION

Globally, anaemia affects 1.62 billion people, which corresponds to 24.8% of the population, the highest prevalence being in preschool-age children. Of these 293 million anemic children, 89 million live in India.[1] Previous global estimates made by DeMaeyer indicated that 43% of preschool-age children were anemic, whereas, current estimates show this figure to be 47.4%, denoting a significant rise.[1,2] In India the scenario is quite similar. Compared to the NFHS-2 data which showed

that 74% of pre-school children were anemic, in NFHS-3 this figure was 79%.[3] Other studies on prevalence of anaemia in India show this rising trend.[3-10]

Anaemia has a variable impact on physical development and children show poor attentiveness, memory and academic performance.[11] Children who suffer from anaemia have delayed psychomotor development and impaired performance; in addition, they experience impaired coordination of language and motor skills, equivalent to a 5-10 point deficit in intelligence

quotient.[12-15] Anaemia is associated with socioeconomic, biological, environmental and nutritional factors.

Low economic status, less education, and poor health of mothers due to meagre dietary intake are the main causes of anaemia. Anaemia is the most predominant factor for morbidity and child mortality, and, hence, it is a critical health issue for children in India. Iron deficiency affects cognitive and motor development and increases susceptibility to infections. The prevention as well as timely management of anaemia is essential to attain Sustainable Development Goal-3 (SDG) on ensuring healthy lives and promoting wellbeing for all at all ages. Further actions are required to reach the World Health Assembly target of a 50% reduction of anaemia in women of reproductive age by 2025.

The aim and objectives of this study is to study the prevalence of anaemia in urban primary school children of Katihar and the socio-demographic factors associated with anaemia.

METHODS

Study setting

The present study was conducted in the primary school children in urban area of Katihar district. Apparently healthy school age children (6–12 years) were included in the study.

Study design

Cross- sectional study.

Study period

June 2016 to May 2017.

Sample size

By taking the prevalence of anaemia 50% among school children for confidence level 95% with 10% relative precision with sample size comes out to be 384.The sample size was doubled to cover both boys and girls in the study. A total of 800 students (426 boys and 374 girls) in the age group of 6-11years were interviewed and examined.

Inclusion criteria

Children of age group 6 years to 12 years studying in Government primary school of urban area and willingly participated in study.

Exclusion criteria

We excluded children who received blood transfusion within last two months, and those with evidence of apparent chronic infection (tuberculosis, malaria etc.). Children having medication in the past fortnight prior to data collection and unwilling individuals were excluded from the study.

Data collection and analysis

A pretested questionnaire was applied to obtain relevant information of demographic and socioeconomic data.A list of all government primary schools of Katihar Urban was taken and equal numbers of students were examined from randomly selected school/ schools. All the children in the age group 6-12 years from selected schools constituted the unit of study.

Either finger prick or venous blood was collected according to the agreement of the participants. Hemoglobin estimation was done by Sahli's haemoglobinometer.

The WHO criterion (haemoglobin <11 g/dl) was used to diagnose anaemia. To categorize the degree of anaemia, the following cut-off points were used: 10.0-10.9 g/dl, mild anaemia: 7.0-9.9 g/dl, moderate anaemia: <7 g/dl, severe anaemia.[16]

Data was compiled and analyzed by using epi info 7 statistical software.

RESULTS

In the present study the total sample size was 800 and out of these 343 (42.88%) children were found anemic.

The prevalence of anaemia was high among female child (48.07%). There was a significant difference in the prevalence of anaemia among both sex (p<0.01) (Table 1).

There is no statistical difference between sex and severity of anaemia (p>0.05) (Table 2).

The prevalence of anaemia was 100% among children belonging to lower socio economic status. Only 8.33% children belongs to upper socio economic status were found anaemic. There is statistically significant association between socio economic status and prevalence of anaemia among children (p<0.0001) (Table 3).

The prevalence of anaemia was 46.47% among vegetarians and 40.57% among non vegetarians. There was no significant association between dietary habit and prevalence of anaemia (p>0.05) (Table 4).

A statistically highly significant association of anaemia was found with the mother's educational status (p<0.0001). More than half (51.03%) children were anaemic among illiterate mothers (Table 5).

Table 1: Prevalence and relationship between sex and anaemia.

Anaemia	Boys		Girls		Total	
	No	%	No	%	No	%
Present	156	37.96	187	48.07	343	42.88
Absent	255	62.04	202	51.93	457	57.13
Total	411	100.00	389	100.00	800	100.00

$\chi 2$=7.94, df=1, p<0.01.

Table 2: Relationship between sex and severity of anaemia.

Anaemia	Boys		Girls		Total	
	No.	%	No.	%	No.	%
Mild	50	32.05	54	28.88	104	30.32
Moderate	106	67.95	133	71.12	239	69.68
Total	156	100.00	187	100.00	343	100.00

$\chi 2$=0.27, df=1, p>0.05.

Table 3: Association between socio economic status and anaemia.

Social class	Total	Anaemia present		Anaemia absent	
	No.	No	%	No	%
Upper	12	1	8.33	11	91.67
Upper-middle	111	19	17.12	92	82.88
Lower-middle	170	44	25.88	126	74.12
Upper-lower	417	189	45.32	228	54.68
Lower	90	90	100.00	0	0.00
Total	800	343	42.88	457	57.13

$\chi 2$=176.89, df=4, p<0.0001.

Table 4: Association between dietary habit and anaemia.

Dietary habit	Total	Anaemia present		Anaemia absent	
	No.	No	%	No	%
Vegetarian	312	145	46.47	167	53.53
Non-vegetarian	488	198	40.57	290	59.43
Total	800	343	42.88	457	57.13

$\chi 2$=2.47, df=1, p>0.05.

Table 5: Association between mother's education and anaemia.

Mother education	Total	Anaemia present		Anaemia absent	
	No.	No	%	No	%
Illiterate	390	199	51.03	191	48.97
Secondary	335	124	37.01	211	62.99
Higher secondary	61	17	27.87	44	72.13
Graduate and above	14	3	21.43	11	78.57
Total	800	343	42.88	457	57.13

$\chi 2$=23.51, df=3, p<0.0001.

Table 6: Association between nutritional status and anaemia.

Nutritional status	Total	Anaemia present		Anaemia absent	
		No	%	No	%
Not-undernourished	228	78	34.21	150	65.79
Undernourished	572	265	46.33	307	53.67
Total	800	343	42.88	457	57.13

$\chi 2$=9.29, df=1, p<0.01.

There was a significant association between prevalence of anaemia and nutritional status of children (p<0.01). 46.33% undernourished children were found anaemic (Table 6).

DISCUSSION

Nutritional anemia is a very common cause of morbidity in children in a developing country like India in the pre-school age group. It shows a clear male preponderance. Despite the existence of an effective control measure since as early as 1970 (Nutritional Anemia Prophylaxis Programme) and constant updating by Government e.g. as in 1991 (National Nutritional Anemia Control Program) and later on as a part RCH programme, the prevalence of nutritional anemia is on the rise in the pre-school children, both in India and abroad.[3-10]

In present study we tried to explain the anaemia among primary school children (6-11 years) in terms of prevalence and its determinants.

The prevalence of anemia in present study was 42.88% among 800 school children aged between 6-11 years of age. A study conducted in Kattankulathur by Sudhagandhi et al, found the prevalence of anemia to be 52.88%.[17] Similarly 37.6% prevalence of anemia was found in Assefa et al.[18]

Sahu et al found severity of anemia (35.2% mild, 59.4% moderate), which was similar to findings of our study (30.32% mild, 69.68% moderate).[19]

In present study there was significant difference between the prevalence of anemia in males (37.96%) and females (48.07%). Studies done by Sudhagandhi et al, and Bekele et al, found that the prevalence of anemia was higher in females.[17,20]

Present study showed that incidence of anemia was high in class V (lower) children (100%), followed class IV (upper lower) children (45.32%), class III (lower middle) children (25.88) and class II (upper middle) children (17.12%). Similar finding was recorded by Jain et al, in a study done in Uttarakhand which showed that anemia was more common in lower socio-economic class (90.6%) and 37.5% in class III and Class II.[21] Incidence of anemia was found to be more in lower socioeconomic class than upper socioeconomic class by Bekele et al, and Ullah et al.[20,22] This high incidence is because of low level of educational status which may affect the nutrition status negatively. Low income limits the type of amount of food available and higher incidence of infections among them.

It was found that prevalence of anemia was more in undernourished children (26.11%) Study done by Sudhagandhi et al, Djokic et al and Bekele et al, also found that incidence of anemia was more in undernourished children than normal nourished even though the incidence was more compare to present study.[17,20,23] This shows that anemia is influenced by nutritional status of the children. It can be due to the poor availability and intake of high nutrient diet and rising trend of consuming junk and snack food which supplies fewer calories.

CONCLUSION

The overall prevalence of anemia was very high among school children. Major factors which influence the prevalence of anemia were nutrition, socioeconomic status, and parent's education.

Recommendations

A regular health check-up should be organized along with lab estimation of Hb% to screen anemia in school children and appropriate measures should be taken up by school authorities in coordination with parents. Further evaluation of anemia is needed to detect nutritional deficiencies and other treatable aetiologies to prevent the anemia. Mid-day meal programme with proper balanced dietary supplements as part of school health programmed to improve nutritional status and to decrease the prevalence of anemia among urban school children.

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