To study the prevalence of anaemia among school going children in rural area near Indore

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Abstract

Introduction: Anaemia is a global public health problem which affects both the developing and the developed countries. It is an indicator of poor nutrition and poor health with major consequences on human health, as well as for the social and economic development of a population. It has significant impact on cognitive function, behaviour and school performance. Anaemia is a common problem throughout the world and iron deficiency is the most prevalent nutritional deficiency in the world. It affects mainly the poorest segment of the population. The purpose of the study is to assess the prevalence of anaemia among school going children of rural area of three schools of Khudel Village in Indore District of Madhya Pradesh.

Methods: This study was conducted in the three schools of rural area near Indore District, of MP. A cross-sectional household survey was conducted in rural Schools from January 2017 to June 2017 on 500 children, aged 5-16 years, selected through systematic random sampling method. Study subjects were school children (<16 years). The students and school authority were assured for their confidentiality of their response. Hemoglobin level was estimated by Sahli's Hemometer by acid hemolysis method.

Results: The analysis of the obtained data was based on the objective of the study. Descriptive and inferential statistics was used for data analysis and data interpretation. Results of the study revealed that 56.4% of the samples are of males and 43.6% of the samples are of female. 50.8% of the samples are in the age group of 5 to 10 years, 36.4% of samples were in the group of 10-14 years and 12.8% of samples are more than 14 years of age. After analysis and interpretation of data, It was found that out of total boys, examined 91.1% males were anaemic and out of total females, examined 94.9% females were anaemic. Overall incidence of anaemia amongst girls and boys was found to be 92.8%.

Conclusions: The Prevalence of Anaemia in the developing countries tends to be three to four times higher than in the developed countries. Hence, improvement in sanitation, hand hygiene, dietary habits related to consumption of clean food, green leafy vegetables,` should be included in diet plan. Health education, seminars on menstrual hygiene, impact of anaemia on individual & society should be conducted at regular interval.

Keywords: Anaemia, Prevalence, Haemoglobin, Sahli's haemometer.

Introduction

Anemia is a global public health problem which affects both the developing and the developed countries and it is an indicator of poor nutrition and poor health with major consequences on human health, as well as for the social and economic development of a population.[1] Globally, anemia affects 1.62 billion people, which corresponds to 24.8% of the population.[2] Anemia is one of the most common health problems in India which is much more prevalent in the rural than in the urban areas.[3,4] Anemia is a nutrition problem worldwide and its prevalence is higher in developing countries when compared to the developed countries.[5,6] Young children and pregnant women are the most affected, with an estimated global prevalence of 43% and 51% respectively.[7] Anemia prevalence among children of school-going age is 37.70%, among non-pregnant women 35% and among adult males 18%.[8]

Anemia was defined according to World Health Organization (WHO) cut-off as Hb level <11 g/dL for girls and <12 g/dL for boys under 15 years old. Mild anemia was defined as hemoglobin level of 10-12.9 g/dL in males and 10-11.9 g/dL in females, moderate anemia was defined as hemoglobin between 7-9.9 g/dL and severe anemia as hemoglobin less than 7 g/dL.[9]

Numerous studies among children have shown that the prevalence of anemia ranges from 52-96.50% in India. Iron folic acid supplementation remains the main strategy for combating anemia and improving hemoglobin status of adolescent girls and nutritional supplements is a complementary strategy to improve it. The most important way to prevent anemia is to take good diet rich in iron. Adding vitamin-C or foods rich in vitamin C should also be provided for children, which can improve the absorption of iron. Numerous studies among children have shown that the prevalence of anemia ranges from 52 - 96.50% in India. Iron Folic Acid supplementation remains the main strategy for combating anemia and improving hemoglobin status of adolescent girls and nutritional supplements is a complementary strategy to improve it. The most important way to prevent anemia is to take good diet rich in Iron. Adding vitamin- C or foods rich in vitamin C should also be provided for children, which can improve the absorption of iron.[10]

Chart 1: Role of Iron
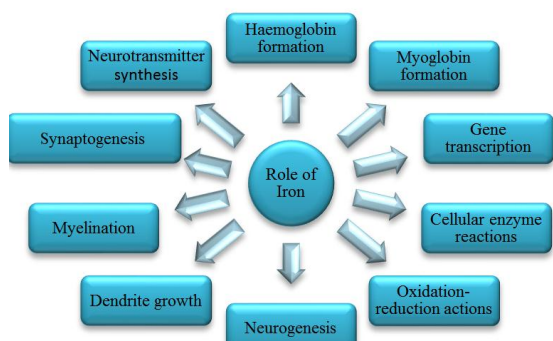
Methods

The present study was conducted in a rural area of district of Indore with the aim to find out prevalence of anemia among school going children.

Study Area: Private schools of rural area near Indore, MP.

Study Population: School going children from class 1 to class 8th.

Design: A cross sectional study.

Sample Size: In this cluster random sampling was used. A cross- sectional survey was conducted in rural Schools from January 2017 to June 2017 on 500 children, aged 5-16 years, selected through systematic random sampling method. Study subjects were school children (<16 years). The students and school authority were assured for their confidentiality of their response.

Methodology

A written permission from principles of schools was taken. Willingness to participate was asked from students. Hemoglobin was tested by Sahli's method under aseptic conditions. A preliminary visit was made in schools and consent of parents was also obtained after explaining them the importance of the study & its impact. School authorities were informed about the purpose of the study and then written informed consent of the parent and the student were taken for the study.

Results

In our study total 500 students were included. The age group was between 5 to 16 years. The selected schools were within 10 km radius of our hospital. These students were from class first to eight. The distribution of the students according to their age is evident in (Table 1). There were 50.8% students in the age group of 5 to 10 years, 36.4% students were in the age group of 10 to 14 years. Only 12.8% students were in the age group of more than 14 years. Out of 500 students 282 (56.4%) were males and 218 (43.6%) were girls (Table 2).

Table 1: Distribution of students according to age groups

Age in years	Frequency	Percentage
5-10	254	50.8%
10-14	182	36.4%
>14	64	12.8%
Total	500	100%

Table 2: Distribution of students according to sex.

Gender	Frequency	Percentage
Male	282	56.4%
Female	218	43.6%
Total	500	100%

Depending upon their hemoglobin, they were grouped into mild, moderate and severe anemia. In age group of 5 to 10 years more students had moderate anemia i.e. 37.6% and 4.4% had normal hemoglobin. In age group of 10 to 14 years 4.8% students had mild anemia, 28% had moderate anemia and 1% had severe anemia. The students in age group of more than 14 years, more children had moderate anemia i.e. 9.2%. It was found that 13.6% subjects were having mild anemia, 74.8% had moderate anemia and 3.4% had severe anemia. Out of 500 students only 41 subjects were with normal hemoglobin (Table 3).

Table 3: Degree of anemia levels according to age

Age in years	Anemia				Total
	Mild	**Moderate**	**Severe Anemia**	**No Anemia**	
5-10	35 (7%)	188 (37.6%)	9 (1.8%)	22 (4.4%)	254
10-14	24 (4.8%)	140 (28%)	5 (1%)	13 (2.6%)	182
>14	9 (1.8%)	46 (9.2%)	3 (0.6%)	06 (1.2%)	64
Total	68 (13.6%)	374 (74.8%)	17 (3.4%)	41 (8.2%)	500

On analyzing degree of anemia evaluation as per sex distribution, it was found that out of 282 males, 212 had moderate anemia and 6 boys had severe anemia. Out of 218 females 162 were suffering from moderate anemia and 11 girls were severely anemic (Table 4).

Table 4: Degree of anemia levels according to sex

	No Anemia	Mild	Moderate	Severe
Male (90%)	28	36	212	06
Female (94%)	13	32	162	11

Discussion

The exact figures for the prevalence of anemia vary from study to study, but anemia is an extremely serious and a chronic public health problem in India.This study was conducted to assess the prevalence of anemia among school children of rural area of age 5 years to 16 years. The overall prevalence of anemia was 91.8% in students of rural area of Indore, which is very alarming.

In present study, as per the age distributions of students more students were in the age group of 5 to 10 years. There were 50.8% students in the age group of 5 to 10 years. 36.4% students were in the age group of 10 to 14 years. Only 12.8% students were in the age group of more than 14 years (Fig. 1). This study showed that 56.4% of the samples were males /boys and 43.6% of the samples were females/girls as shown in (Fig. 2). In age group of 5 to 10 years more students had moderate anemia i.e. 37.6% (188) and only 4.4% (22) had normalhemoglobin. In age group of 10 to 14 years 4.8% (24) students had mild anemia, 28% (140) had moderate anemia and 1% (5) had severe anemia. The students in age group of more than 14 years, more children had moderate anemia i.e. 9.2% (46). It was found that overall in the total sample 13.6% subjects were having mild anemia, 74.8% had moderate anemia and 3.4% had severe anemia. Out of 500 students only 41 (8.2%) subjects were with normal hemoglobin. In all age groups, moderate degree of anemia was more common, whereas it was much more seen in the age group of 5 to 10 years. The prevalence of mild anemia was also seen in all the age groups though the percentage was less as shown in (Fig. 3). Also it was found that out of total 500 students, 254(50.8%) boys were anemic and 205 (41%) girls were anemic. Out of 282 males, 212 (75.1%) had moderate anemia and 6 (2%) boys had severe anemia. Out of 218 females, 162 (74.3%) were suffering from moderate anemia and 11 (5%) girls were severely anemic. Out of girls, 94% girls were anemic and out of total no. of boys, 90 % males were anemic as in (table 4). According to the WHO, if the prevalence of anemia at the community levels was more than 40%, it was considered as a problem of high magnitude.[11,12]
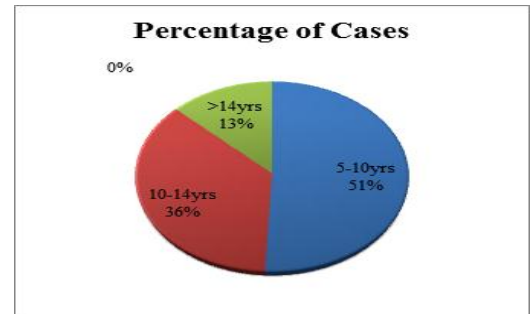

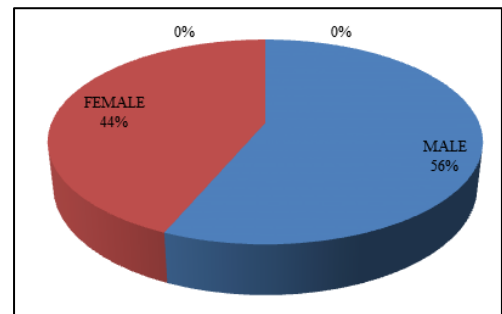**Fig. 1: Distribution of students according to age groups**

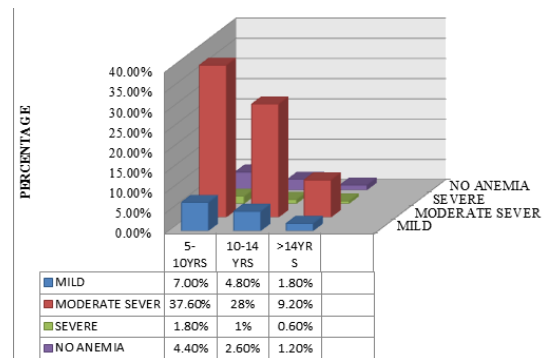**Fig. 2: Distribution of students according to sex**

Fig. 3: Degree of anaemia levels according to age (mild, moderate and severe)
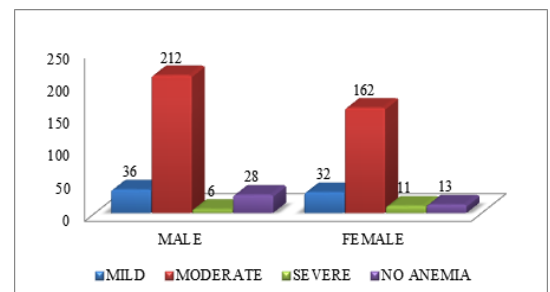

Fig. 4: Degree of anemia levels according to sex

The present study thus brings out the fact that the problem of anemia was prevalent in wider population rather than commonly considered group of the pregnant females and lactating females. The young male population was equally susceptible in Indore. It is seen that anemia was an indicator of poor nutrition and poor health, with major consequences on the human health and also on the social and economic development. Anemia was linked to a depressed mental state and motor development during infancy and early childhood, which may be irreversible.[13] Anemia during childhood also results in decreased physical activity and decreased interaction with the environment, with negative consequences on learning and school achievements.[14]

The prevalence of anemia in the developing countries tends to be three to four times higher than in the developed countries.[15] Recent studies on the prevalence of anemia have been on pre-schoolers only, so there is a need for more studies related to anemia in school.

Conclusion

Our study highlights the fact that the prevalence of anemia is very high in school going children. We suggest that there is a need for well- planned, systematic and large-scale studies by using standardized methodologies to estimate the prevalence of anemia as well as the causes of anemia at the community level among males and females in all the age groups, and the representation of the different regions of India.

Recommendations

The following recommendations are made;
1. Government should implement hemoglobin estimation in school.
2. Health program for all school children on a regular basis.
3. School teachers should give advice to both children and parents regarding advantages of balanced diet.
4. Monitoring and evaluation of government program like ICDS Supplementary Nutritional Program should be strengthened. Effectively monitoring of these programs is required.
5. They should be advised for improvement in dietary habits regarding consumption of green leafy vegetables should be included in diet plan.
6. Health education, seminars on menstrual hygiene should be conducted at regular interval.

Limitation of the Study

This study has several limitations. We did a descriptive study that reports the prevalence and severity of anemia in general. The study lacks detailed investigation of the morphological appearance of red blood cells to children. R[16,17] Anemia affects the physical and mental development of an individual leading to decreased working capacity, which in turn affects the development of the country.[18] differentiate anemia due to vitamin B12 and folic acid deficiencies from anemia due to iron deficiency.

Relevance of the Study

To assess the prevalence of anemia in rural population in schools so that we can treat this segment in time for proper growth of the society. It gives the ground reality and attention of the policy makers to review the gaps for correcting anemia.

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