A Study of Distribution and Prevalence of Anaemia in School Going Children of Ghaziabad

Authors
Dr Shikha Gautam[1*], Dr Rinku Garg[2], Dr Yogesh Tripathi[3]
[1]Assistant Professor, Department of Physiology, Santosh Medical College, Ghaziabad, India
[2]Professor, Department of Physiology, Santosh Medical College, Ghaziabad, India
[3]Professor, Department of Physiology, Santosh Medical College, Ghaziabad, India
*Corresponding Author
Dr Shikha Gautam
Email: *drshikhagautam@yahoo.co.in*, 9810557315

Abstract
Nutritional status is dependent on nutrient intake and utilization. Malnutrition is also expressed as various types of deficiency disorders. The present study was a cross-sectional study, conducted in Ghaziabad. Five hundred children of both sexes, in the age group of 3 -15 years were enrolled for the study. Age, height was measured, pallor assessed and BMI was calculated for all children in the study. The data was analysed by SPSS version 17.0 and ANOVA followed by Tukey test. The overall prevalence of anaemia was 22.2 %, 18.61 % boys and 31.43 % girls were pallor positive. Comparison of pallor positive children in different age groups of boys and girls showed that pallor was more widely present in girls of age group 12 – 15 years compared to boys of same age group. The present study brings out the fact that the problem of anaemia is present more widely in children than the commonly considered group of pregnant women. We suggest that large scale studies should be undertaken to assess the nutritional and anaemic status of our young population. Also, nutritional advice and supplementation needs to be given to improve the health status of children.
Keywords: *Malnutrition, Anaemia, Pallor, School children.*

Introduction

Nutritional status is dependent on nutrient intake and utilization. In children coming from families of lower socio economic status, malnutrition is a common problem. Malnutrition is also expressed as various types of deficiency disorders. In order to assess the health status of school children the government has introduced school health programme under the national rural health mission. This programme assesses the general health and nutritional status of school children and provides advice and treatment for common ailments. The programme is under the ministry of human resources and development.[1] Schools play an important role in the overall physical, mental and social development of a child. The school age period is very important physiologically for physical growth as the body's physical growth and development takes place during these crucial years. Physical growth of children is directly linked to their nutrition status. The high levels of under

nutrition in children in South Asia provide a major task for child survival and development.[2]

Anaemia is a widespread public health problem associated with an increased risk of mortality and morbidity, especially in pregnant women and young children.[3] Anaemia is a indicator for poor nutrition and poor health as well as for social and economic development of a population.[4] Anaemia is one of the most common health problems in India and is much more prevalent in rural than urban population. [5, 6]

Anaemia is defined according to World Health Organization as Haemoglobin levels <11 g/dl in girls and <12.9 g/dl in boys under 15 years old. Mild anaemia was defined as haemoglobin levels of 10 – 12.9 g/dl in males and 10- 11.9 g/dl in females, moderate anaemia was defined as haemoglobin of less than 7 – 9.9 g/dl and severe anaemia as haemoglobin less than 7g/dl. [7]

Haemoglobin assessment can be done by various methods; however in peripheral set up it is usually done by assessment of conjunctival, tongue, palmar or nail bed pallor. [8]

The present study was carried out in Ghaziabad with the following objectives:

1. To study the nutritional status of school going children of age 3 to 15 years.
2. To find out the prevalence of anaemia among these children.

Methods

The present study was a cross-sectional study, conducted in Ghaziabad. Ethical approval was taken from the research committee of the Institution before starting the study. The three schools were randomly selected. Five hundred children of both sexes, in the age group of 3 -15 years were enrolled for the study. The administrative staffs in the selected schools were contacted and the objectives of the study explained to them in detail. Also, a letter was sent to every parent explaining the procedure and seeking permission to evaluate the child.

Inclusion criteria: school going child in age group of 3 to 15 years present on date of study

Exclusion criteria: Students who were absent on day of study.

Age was taken as completed years on the school records**.**

Anthropometric Parameters

Height was measured using a standard stadiometer with the subject standing in erect posture with the heel and back against the wall without any footwear. The readings were taken to the nearest 0.1cm.

Weight was recorded in kg using a calibrated portable weighing machine (Avery) scale, with a capacity of 120 kg and a sensitivity of 0.05 kg. The students were weighed without wearing shoes and with minimal clothes.

The Body Mass Index was calculated as the ratio of weight in kilograms divided by the square of the height in meters $[weight(kg)/height(m^2)]$.[9] Children with BMI more than or equal to 85th percentile of reference data were considered overweight. [10]   Pallor was assessed by examining the lower palpebral conjunctiva.

Results

Statistical Analysis: Age, height, weight, BMI and pallor were noted for the whole study population. The data was analysed by SPSS version 17.0 and ANOVA followed by Tukey test to analyse the data. Table 1 gives the age, height, weight and BMI of whole group. Out of the 500 students, 360 were boys and 140 were girls. Table 2 shows the presence of pallor in boys of different age groups. It is seen that the presence of pallor is significantly higher in the age group of 12 – 15 years compared to 8 -11 years and again significantly higher in 8 – 11 year group as compared to 3 – 7 year group. In girls, presence of pallor was from 20.45 to 43.18% in different age groups and did not vary significantly between groups. (Table 3)

Table 4 shows the comparison of pallor between boys and girls in different age groups. The presence of pallor was significantly higher in girls in age group of 12-15 years as compared to boys of same age group while it was not significant between the other groups.

Table 1: Age and Anthropometric parameters of study group

Physiological Parameters	Male (360) (Mean ± SD)	Female (140) (Mean ± SD)	t-Value	P-value
Age	12.01 ± 3.28	10.56 ± 3.41	4.36	0.000
Height(cm)	147.15 ± 22.73	136.16 ± 21.87	4.90	0.000
Weight(kg)	36.13 ± 14.34	30.18 ± 12.28	4.33	0.000
BMI	15.99 ± 3.12	15.62 ± 2.90	1.19	0.23

Table 2: Pallor assessment in boys in different age groups

Age Group	Pallor Male		Chi-square Value	P-value
	+ 67 (%)	- 293(%)		
3 - 7	11 (16.42)	39 (13.31)		
8 - 11	25 (37.31)	51(17.41)	10.62	0.004
12 - 15	31(46.27)	203(69.28)		
Total	67 (100)	293 (100)		

Table 3: Pallor assessment in girls in different age groups

Age Group	Pallor Female		Chi-square Value	P-value
	+ 44(%)	- 96(%)		
3 - 7	9 (20.45)	22 (22.92)		
8 - 11	16 (36.36)	40 (41.67)	0.29	0.86
12 - 15	19 (43.18)	34 (37.50)		
Total	44 (100)	96 (100)		

Table 4: Pallor assessment between boys and girls in different age groups

Age Group	Pallor		Chi-square Value	P-value
	Male + 67(%)	Female + 44(%)		
3 - 7	11 (17.42)	9 (15.45)		
8 - 11	25 (38.31)	16 (33.36)	0.25	0.88
12 - 15	31(44.27)	19 (51.18)		
Total	67 (100)	44 (100)		

Discussion

Nutritional deficiency and anaemia is a very serious public health problem in India. This study was conducted to see the prevalence of anaemia among school children of Ghaziabad. The total number of participants in our study was 500. 72 % of the study population were boys and 28% were girls.(Table 1) The overall prevalence of anaemia was 22.2 %, 18.61 % boys and 31.43 % girls were pallor positive. In boys the presence of pallor is significantly increasing as the children are growing up. (Table 2) In girls the pallor was not significantly different between different age groups. (Table 3) However, comparison of pallor positive children in different age groups of boys and girls showed that pallor was more widely present in girls of age group 12 – 15 years compared to boys of same age group. (Table 4) This could perhaps be explained as the higher iron requirement in diet of girls after beginning of menstrual cycles.

According to the WHO if the prevalence of anaemia is more than 40% it is considered a problem of high magnitude.[11, 12] The present study brings out the fact that the problem of anaemia is present more widely in children than the commonly considered group of pregnant women. In a previous study, anaemia was linked with depressed mental state and motor development during infancy and early childhood which may be irreversible. [13]

Anaemia during childhood results in decreased physical activity which negative consequences on learning. [14] In a study of rural preschool children by Luxmi et al 99% of the children were found to be anaemic.[15] Another study of children in national capital region has shown a prevalence of anaemia of 66.4%.[16] Behera et al have documented prevalence of anaemia in 62 % kids in their study population in Orissa.[17] Anaemia affects the physical and mental development of children leading to decreased work capacity which in turn affects the development of the country. [7]

Iron deficiency is one of the most common causes of anaemia. [18] Other than iron other nutrients such as vitamin C, B12 and folic acid are involved in the formation of RBC.[19] Hence, decreased availability of any of these nutrients can produce anaemia. Low socioeconomic status and lack of health education of people is the main cause of high prevalence of anaemia in our country.

Although physical signs to detect anaemia are not perfect in terms of accuracy yet their advantage is that they can be elicited easily and fast and can be done without instrument. Kalantri et al have documented that physical estimation of pallor for detection of anaemia strongly correlates with laboratory estimation of haemoglobin. [20]

Conclusion

We conclude from our study that the prevalence of anaemia is very high in school going children. We suggest that large scale studies should be undertaken to assess the nutritional and anaemic status of our young population. Also, nutritional advice and supplementation needs to be given to improve the health status of children.

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Declaration

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