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## PREVALENCE OF NUTRITIONAL ANAEMIA IN SCHOOL AGED CHILDREN IN SCHOOLS OF MANDIGOBINDGARH POPULATION: A CROSS-SECTIONAL STUDY

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### Prevalence of nutritional anaemia in school aged children in schools of mandigobindgarh population: a cross-sectional study

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**Purpose:** To study the prevalence and risk factors of nutritional anaemia in School Aged Children.

**Methods.** 372 children were included in the study after obtaining consent from parents and school teachers.

**Results.** The purpose of this study was to know the prevalence and risk factors of nutritional anaemia in School Aged Children. The results seem to be statistically significant when compared with the age and BMI of children's. There was significant relation between anaemia and Body mass index i.e., 32 (61.53%) had low BMI. Out of 372 children studied, 34(9.1%) had mild anemia (Hb- 10-12 gm/dl) and 18 (4.8%) had moderate anemia (Hb- 7-10 gm/dl), with the total prevalence of anemia being 13.9%.

**Conclusion.** The overall improvement in prevalence of anaemia in school aged children could be attributed to regular deworming and Iron and Folic acid supplementation by the School Authorities and counseling to the parents through proper channel

**Keywords:** anaemia, supplementation, ferritin, prevalence, awareness

### Мандигобиндгарх жері мектептерінің мектеп жасындағы балаларында тамақ анемиясының таралуы: көлденең зерттеу

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**Мақсаты:** мектеп жасындағы балалардағы алиментарлы анемияның таралуы мен қауіп факторларын зерттеу.

**Әдістері:** зерттеуге ата-аналар мен мектеп мұғалімдерінің келісімін алғаннан кейін 372 бала енгізілді.

**Нәтижелер.** Бұл зерттеудің мақсаты мектеп жасындағы балалардағы алиментарлы анемияның таралуы мен қауіп факторлары туралы білу болды. Нәтижелер балалардың жасы мен ДСИ-мен салыстырғанда статистикалық маңызды болады. Анемия мен дене салмағының индексі арасында айтарлықтай байланыс болды, яғни 32 (61,53%) төмен ДСИ болды. Зерттелген 372 баланың 34 - (9,1%) жеңіл анемия (Hb - 10-12 г/дл) және 18 (4,8%) орташа анемия (Hb - 7-10 г/дл) болды, анемияның жалпы таралуы 13,9% құрайды.

**Қорытынды:** мектеп жасындағы балалар арасында анемияның таралуының жалпы төмендеуі мектеп әкімшілігінің тұрақты дегельминтизациясымен



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және темір мен фолий қышқылының қоспаларымен, сондай-ақ ата-аналарға тиісті канал бойынша кеңес беруімен байланысты болуы мүмкін. Қорытынды: мектеп жасындағы балалар арасында анемияның таралуының жалпы төмендеуі мектеп әкімшілігінің тұрақты дегельминтизациясымен және темір мен фолий қышқылының қоспаларымен, сондай-ақ ата-аналарға тиісті канал бойынша кеңес беруімен байланысты болуы мүмкін.

**Негізгі сөздер:** анемия, қоспалар, ферритин, таралым, хабардарлық

### РАСПРОСТРАНЕННОСТЬ ПИЩЕВОЙ АНЕМИИ У ДЕТЕЙ ШКОЛЬНОГО ВОЗРАСТА В ШКОЛАХ НАСЕЛЕНИЯ МАНДИГОБИНДГАРХ: ПОПЕРЕЧНОЕ ИССЛЕДОВАНИЕ

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**Цель:** изучить распространенность и факторы риска алиментарной анемии у детей школьного возраста.

**Методы.** В исследование были включены 372 ребенка после получения согласия родителей и учителей школы.

**Результаты.** Целью данного исследования было узнать о распространенности и факторах риска алиментарной анемии у детей школьного возраста. Результаты статистически значимы с учетом возраста и ИМТ детей. Между анемией и индексом массы тела была значительная связь, т.е. 32 (61,53%) имели низкий ИМТ. Из 372 обследованных детей 34 (9,1%) имели анемию легкой степени (Hb- 10-12 г/дл) и 18 (4,8%) - анемию средней степени (Hb- 7-10 г/дл), с общей распространенностью анемии, составляющей 13,9%.

**Выводы.** Общее снижение распространенности анемии среди детей школьного возраста может быть связано с регулярной дегельминтизацией и добавками железа и фолиевой кислоты администрацией школы, а также консультированием родителей по надлежащему каналу.

**Ключевые слова:** анемия, добавки, ферритин, распространенность, осведомленность

Anaemia is a global public health problem affecting both developing and developed countries with major consequences for human health as well as social and economic development. Estimates of anaemia prevalence by themselves are only useful if they are associated with a picture of causal factors that contribute to the development of anaemia in specific settings. It is surprising that given the public health importance of anaemia, there are numerous countries lacking national prevalence data. Moreover, most survey data are related to the three population groups: preschool age children, pregnant women and non-pregnant women of reproductive age [1]. Anaemia is known to be a significant global problem affecting 305 million School Aged Children [2]. National Family Health Survey (NFHS-3) reveals the prevalence of anaemia to be 70-80% in children [2]. In developing countries, prevalence rates of 29.2% to 79.6% have been reported, with 13.6% in South East Asia [3]. In School Aged Children, this may reflect inadequate nutritional iron intake, generalised malnutrition or low iron bioavailability of diet. Furthermore, it is well confirmed that increased risk of iron deficiency in School Aged Children of 12-14 year old adolescents is associated with incremented iron demands because of rapid growth [4].

#### Historical perspective

Pallor characterizing anemia, dyspnoea and edema was described in about 1500 BC in Papyrus Ebers, and Egyptian manual of therapeutics, believed to be the oldest complete

manuscript existing. The knowledge of iron deficiency anemia and therapeutic use of iron was mentioned in Greek Mythology in the story of "Iphiclus"[5].

Iron was introduced as a therapeutic agent with an idea that Iron meant strength and protection. The sufferers hoping to assume some strength were given wine or water in which a rusted sword was kept. It was of value in the treatment of persons who suffered from weakness regardless of its cause. Iron was used to treat a wide variety of ailments in ancient Egypt and the Roman Empire [6].

In 1830, Hoefler noted that the blood in iron deficiency anemia patients was lighter than normal person [7]. Popp noted that the individual corpuscles were of a paler colour. Foedisch described that it was due to lack of iron in blood [8].

#### Methods

This cross sectional observational study was approved by the institutional ethical committee and was carried out on in schools of Mandi Gobindgarh, Punjab, India. All the patients received verbal information regarding the study protocol and a written informed consent was obtained from each patient for participation in the study.

#### Inclusion Criteria

School children in the age group of 5-15 years both boys as well as girls.

#### Exclusion criteria

Children suffering from any chronic illness or on any medications are not taken into the study.

Those who did not give consent for blood sampling are excluded.

Exclusion criteria were based on the relevant information from the parents /guardians with complete physical examination.

**Method of Collection of Data**

About 372 children were included in the study after obtaining consent from parents and school teachers.

Relevant history and complete physical examination was done in all.

A Blood sample for investigation was collected in EDTA and Plane vaccutainers with 2 ml disposable syringes. Hemoglobin and total count estimation was done by Automated Machine (Auto analyzer) within 12 hours of blood sampling. Serum ferritin was done in all children by automated.

Chemilumiscent method. Collection of the blood is obtained through a proforma given to the students completed by parents or guardians and also by taking help of teachers.

Data regarding the socio economic status and informed consent for the collection of the blood is obtained through a proforma given to the students completed by parents or guardians and also by taking help of teachers. Collection of the blood is obtained through a proforma given to the students completed.

Height was measured by wall mounted fiber glass tape and weight was measured with mechanical weighing scale and BMI was calculated using the formula BMI = Weight in Kgs/ Height in metre<sup>2</sup> [7]. BMI was categorized as low when it was less than 15 and normal when 15-22 and over weight when 22-25 kg/m<sup>2</sup> Children were categorized to have anaemia based on WHO criteria. Children between 6 months to 6 years – less than 11 gm% of hemoglobin. Children between 6 years to 14 years– less than 12 gm% of hemoglobin [3].

Anaemia was graded as:

<b>Mild</b>	Hb% above Hb% between 7 gm/dl and
<b>Moderate</b>	10gm/dl.10gm/dl and less than 12gm/dl.
<b>Severe</b>	Hb% lesser than 7 gm/dl.6
Serum Ferritin was said to be low when levels were below 15 mcg/L.	

**Data analysis**

After the completion of the study, statistical analysis was carried out. The results of the study were subjected to statistical analysis by applying Chi-square/ Fisher Exact test The Statistical software namely SAS 9.2, SPSS 15.0, Stata 10.1, MedCalc 9.0.1 , Systat 12.0 and R environment ver.2.11.1 were used for the analysis of the data.

**Results**

Out of the 372 children studied, 58.1% belonged to the age group of 10-15 years with the rest 41.9% belonging to the age group of 5-10 years. The age proof of all children was obtained from school documents.

Table 1: Age distribution of subjects studied

Age in years	No of Children	%
5-10 years	156	41.9
10-15 years	216	58.1
<b>Total</b>	<b>372</b>	<b>100.0</b>

Table 2: BMI (kg/m<sup>2</sup>)

BMI(kg/m <sup>2</sup> )	No of Children	%
Low	228	61.3
Normal	144	38.7
<b>Total</b>	<b>322</b>	<b>100.0</b>

Among 372 children most of the children (61.3%) had low BMI as compared to the others (38.7%).

Table 3: Regular breakfast consumption

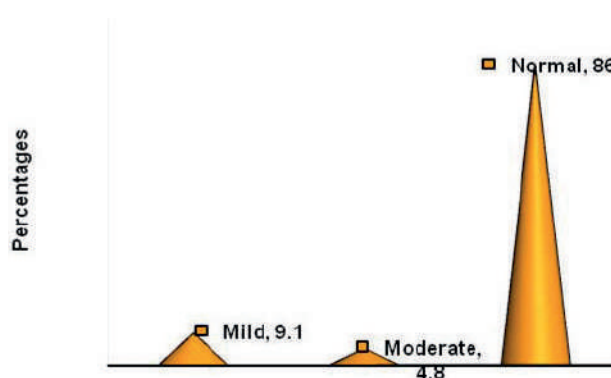
Regular breakfast consumption	No of Children	%
Yes	288	77.4
No	84	22.6
<b>Total</b>	<b>372</b>	<b>100.0</b>

Out of 372 subjects, 288 children (77.4%) had regular breakfast consumption with the rest having skipped their breakfast. Most common reason (66.7%) when asked was having no time to eat in the morning as classes begin early.

Table 4: Hemoglobin

Hemoglobin	No of Children	%
Mild Anaemia	34	9.1
Moderate Anaemia	18	4.8
Normal	320	86.0
<b>Total</b>	<b>372</b>	<b>100.0</b>

Out of 372 children studied, 34 (9.1%) had mild anemia (Hb- 10-12 gm/dl) and 18 (4.8%) had moderate anemia (Hb- 7-10 gm/dl), with the total prevalence of anemia being 13.9%.



Graph 8: Hemoglobin

Graph 1: Hemoglobin

Table 5: Serum ferritin

Serum ferritin	No of Children	%
Normal	258	69.4
Low	114	30.6
<b>Total</b>	<b>372</b>	<b>100.0</b>

Among 372 children studied, 114 children (30.6%) had low serum ferritin (<15 mcg/l).

Table 6: Serum Ferritin and Age wise distribution

Variables	Serum ferritin		P value
	Normal (n=258)	Low (n=114)	
<b>Age in years</b>			
5-10 years	120 (46.5%)	36 (31.6%)	0.057+
10-15 years	138 (53.5%)	78 (68.4%)	

Out of 372 children, significant number i. e. 114 were in iron deficient state out of which 78 (68.4%) were aged 10-15 years and 36 (31.6%) were aged 5-10 years.

Table 7: Anaemia and Body Mass Index

Variables	Anaemia			P value
	Mild (n=34)	Moderate (n=18)	Normal (n=320)	
<b>BMI (kg/m<sup>2</sup>)</b>				
Low (<15)	26 (76.5%)	6 (33.3%)	196 (61.3%)	0.099+
Normal	8 (23.5%)	12 (66.7%)	124 (38.8%)	

There was significant relation between anaemia and Body mass index i.e., 32(61.53%) had low BMI.

Table 8: Anaemia and Regular breakfast consumption

Variables	Anaemia			P value
	Mild (n=34)	Moderate (n=18)	Normal (n=320)	
<b>Regular breakfast consumption</b>				
Yes	30 (88.2%)	14 (77.8%)	244 (76.3%)	0.532
No	4 (11.8%)	4 (22.2%)	76 (23.8%)	

There was no significant correlation of regular breakfast consumption with anemia.

## Discussion

### References:

- Benoist B, McLean E, Cogswell M, Egli I, Wojdyla D. World-wide prevalence of anemia 1993-2005. WHO Global Database on Anemia. Geneva: World Health Organization; 2008.
- Addressing iron deficiency anaemia: [www.whoindia.org/en/Section6/Section324\\_1467](http://www.whoindia.org/en/Section6/Section324_1467).
- Djokic D, Drakulovic MB, Radojicic Z, Crncevic Radovic L, et al. Risk factors associated with anemia among Serbian school-age children 7-14 years old: Results of the first national health survey. Hippokratia 2010;14:252-60.
- Hioui ME, Farsi M, Aboussaleh Y, Ahami AOT, Achicha A, Seshadri Subadra, 1997. Nutritional Anaemia in South Asia. In Stuart Gillespie(ed.), Malnutrition in South Asia: A Regional Profile, Kathmandu: Regional Office for South Asia, UNICEF.
- Frazer JG. The golden bough. The magic art in the evolution of kings. New York; Mac Milan, 1935;158.
- Witts LJ. Simple achlorhydric anaemia. Guy's Hosp Rep 1930;80:253
- Kanwar O, Goel V, Chopra A, Goyal L, Parmoo R, Kaur A. Establishing the association of periodontal disease with obesity and overweight. J Dent Spec. 2017;5(1):58-62.
- Fowler WM. Chlorosis-an obituary. Ann Med Hist 1936;8:168.
- Mutthayya S, Thankachan P, Zimmermann M B, Andersson M, et al. Low anemia Prevalence in school-aged children in Bangalore, South India: Possible effect of School Health initiatives. E J Clin Nutr 2007;61:865-869.

The present study was planned to evaluate the prevalence of anaemia in school going children and to know the influence of factors like sex, socioeconomic status and diet in case of anaemia.

The age group studied was similar to the study done by S Mutthayya et al. Male: Female distribution was similar to all other studies quoted, with males being predominant in number. Out of total 372 children, 40 children (10.75%) who had anemia were aged 10-15 years, with the other 12 children (3.2%) being aged 5-10 years. This can be attributed to the increased demands during the pubertal growth spurt [3].

The prevalence of anaemia in our study was almost similar to that in study by Mutthayya et al. WHO study has included children worldwide where prevalence was 25.4%. In study by Djokic et al, most of children studied were non vegetarians. In our study there was improvement in prevalence rate i.e. 13.9%, similar to study by S Mutthayya et al. The reason for this low prevalence would be the regular deworming and Iron and Folic acid supplementation by the School Authorities since 2003. In combination with these interventions, the consumption of a simple rice-based lunch supplying roughly 300-400 kcal/day may not only improve the overall nutritional status of school aged children, but also contribute a small amount of iron each day [9].

It was found that prevalence of anaemia was more in children with low BMI and was similar to study by Djokic et al. This shows that anaemia is influenced by nutritional status of the children. Pallor was the predominant clinical manifestation in those with anaemia.

## Conclusion

The overall prevalence of anaemia in our study was less as compared to other Studies; however, iron deficiency state was significantly present as detected by Low serum ferritin levels. Major factors which influence the prevalence of anaemia were nutrition and socioeconomic status. The overall improvement in prevalence of anaemia in school aged children could be attributed to regular deworming and Iron and Folic acid supplementation by the School Authorities and counseling to the parents through proper channel.

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