

Original Article

OCCURRENCE OF IRON DEFICIENCY ANEMIA BETWEEN OVER WEIGHT AND NORMAL WEIGHT ADOLESCENTS IN SELECTED SCHOOLS IN UDUPI DISTRICT

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Abstract:

Background : Overweight has become one of the common health concerns. A few studies have noted a possible association between iron-deficiency anemia and overweight. As many as 3crore Indians are overweight, and obesity continues rise, says statistics revealed by the National Family Health Survey (NFHS 2010), Around 20% of school-going children are overweight.

Materials and Methods: In this study survey research approach and comparative descriptive design was adopted. The sample size was 300 adolescents. 300 adolescents were selected by convenient sampling technique, out of which 225 were normal weight adolescents and remaining. Among 225 normal weight adolescents 50 adolescents were selected by simple random sampling technique (lottery method) and out of 75 overweight adolescents, 50 overweight adolescents were selected by convenient sampling technique. Initially BMI identified, Talliquis method was used for identifying the anemia. Peripheral smear test used for identifying the iron deficiency anaemia.

Results : The data were analyzed by using descriptive and inferential statistics. The result shows that out of 300 adolescents 75 (25%) of adolescents were overweight. Out of 100 children (50+50) 19(38%) were anemic in adolescents with overweight and seven (14%) were anemic in adolescents with normal weight. Out of the total 26 adolescents with anemia (19 -overweight and 7- normal weight) no occurrence of iron deficiency anemia was found. There is no significant difference in occurrence of anemia between overweight and normal weight adolescence.

Interpretation and conclusion : The findings of the study indicates that majority of the overweight adolescents were anemic compare to normal-weight adolescents. There is no association between the occurrence of anemia and demographic variables like age, food habits, physical activity, menstrual problems etc.

Keywords : Adolescents, anemia, overweight, normal weight, Iron deficiency anemia.

Introduction :

Overweight has become one of the common health concerns. A few studies have noted a possible association between iron-deficiency anemia and overweight. The prevalence of overweight has been increased because of

the lifestyle and socioeconomic status, advancement in entertainment and technology such as television, computer, and videogames. The National health and Nutrition

examination survey reported that the prevalence of overweight children doubled and prevalence overweight adolescents tripled between 1980 and 2000.

As many as 3 crore Indians are overweight, and obesity continues rise, says statistics revealed by the National Family Health Survey (NFHS-2010), Around 20% of school-going children are overweight. And in Bangalore obesity is reaching epidemic proportions, with around 25% of city children between the age group of four to 12, suffering from obesity¹.

The prevalence of obesity has increased at an epidemic rate, and obesity has become one of the most common

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health concerns in the United States. A few small studies have noted a possible association between iron deficiency and obesity.

Obesity is associated with low-serum iron concentrations. The inverse relationship between iron status and adiposity was first reported in 1962, when Wenzel et al, unexpectedly found a significantly lower mean serum iron concentration in obese compared with non-obese adolescents²⁻³.

The incidence of overweight in adolescence rapidly rising throughout the world, and also they are prone to get iron deficiency anemia. In an article published in health news on October 5, 2004, reveals that adolescents with higher body mass index are prone for iron deficiency anemia⁴.

The incidence of overweight has increased at epidemic rate, over weight among adolescents has become one of the most common health concerns. The general public often perceives that overweight individuals are healthy, well-nourished and free from illness. A few studies have noted a possible association between iron deficiency anemia and overweight.

The prevalence of overweight has been increased because of the lifestyle, socioeconomic status, advancement in entertainment and technology such as television, computer, and video games. Now a days overweight is more common among adolescents. National health and Nutrition examination survey reported that the prevalence of overweight children doubled and prevalence overweight adolescents tripled between 1980 and 2000⁵.

The etiology of the hypoferrremia of obesity is uncertain. Among the proposed causes are deficient iron intake from an iron poor diet, and deficient iron stores owing to greater iron requirements in obese adults because of their larger blood volume⁶.

Objectives of the Study:

- To estimate the occurrence of overweight among adolescents.
- To estimate the occurrence of anemia among

overweight and normal weight adolescents.

- To estimate the occurrence of iron deficiency anemia among overweight and normal weight adolescents.
- To compare the occurrence of anemia between overweight and normal-weight adolescents.
- To find out the association between the occurrence of anemia and selected demographic variables.
- To find out the association between the occurrence of iron deficiency anemia and selected demographic variables.

Materials and methods

A) Study Design

Research Approach:

In this study survey research approach was adopted.

Research Design:

The research design adopted for the study was comparative descriptive design.

b) Subjects

The sample size was 300 adolescents.

c) Specific Methods

300 adolescents were selected by convenient sampling technique, out of which 225 were normal weight adolescents and remaining. Among 225 normal weight adolescents 50 adolescents were selected by simple random sampling technique (lottery method) and out of 75 overweight adolescents, 50 overweight adolescents were selected by convenient sampling technique.

d) Procedures

For identifying the BMI the following assessments were done.

✓ Measuring the height :

Adolescents were asked to remove their shoes and they were made to stand with their back to the height rule (against the wall). Standing in the Frankfurt, by using the inch tape measure the height.

✓ Measuring the weight :

Zero error corrected on the weighing scale. Adolescents were allowed to stand in the weighing machine without

shoe or any objects in hands. Then weight was measured and recorded.

✓ Determination of Body Mass Index :

BMI is identified by using the following formula,

$$\text{BMI} = \text{weight (kg)} / \text{height (m}^2\text{)}$$

For identifying the anaemia the following assessment was done.

✓ Hemoglobin estimation : (Talliquis method)

By using a spirit swab, fingertip was cleansed and allowed the spirit to dry. By using a lancet, a prick in the fingertip was made and a drop of blood was allowed into the Talliquis paper. Keep it for drying, check the color of the filter paper. From the Talliquis booklet it was compared and hemoglobin level was estimated.

For identifying the iron deficiency anaemia the following assessment was done .

✓ Peripheral smear test :

Adolescents who have Hb less than 10mg/dl were selected for peripheral smear test. Blood was collected in EDTA vaccutainer and sent to hematology lab for the peripheral smear checking to rule out the iron deficiency¹⁰.

Results :

Section I

Description of demographic characteristics

Majority, 70 (70%) of the adolescents was girls and 30 (30%) were boys. Most of the adolescents 42 (42%) study in the 11th standard. 74 (74%) of adolescents were consuming mixed diet. 50 (50%) of adolescents were coming to school by private bus. 51 (51%) of students spending the leisure time by watching television. 58 (83%) of adolescence were not taken iron supplementation and 69 (69%) didn't take de-worming tablets.

Section II

Estimation Of Over Weight Among Adolescents

Percentage of Overweight Adolescents

Out of 300 adolescents 75 (25%) of adolescents were overweight.

Identification Of Anemia Among Adolescents

Number of Anemic Cases Detected Among Overweight and Normal Weight Adolescents

19(38%) were anemic in adolescents with overweight and seven (14%) were anemic in adolescents with normal weight.

Identification of I D A Among Adolescents

Number of iron deficiency Anemia Cases Detected among Overweight and Normal weight Adolescents

26 anemic adolescents were found among Overweight and Normal weight Adolescents were not having iron deficiency anemia found after the peripheral smear investigation.

There were no iron-deficiency anemia found in the selected samples.

Comparison of the Occurrence of Anemia Between Overweight and Normal Weight Adolescents

Occurrence of Anemia between Overweight and Normal Weight Adolescents

Since t calculated value 1.432 is less than of table value {2.064} at 0.05 level of significance {p>0.05}, research hypothesis is rejected. There is no significant difference in occurrence of anemia between overweight and normal weight adolescence.

Section III

Association between Occurrence of Anemia and Selected Demographic Variables

The calculated chi- square values, which is less than the table values (p>0.05) at 5% level of significance.

Hence the research hypothesis H4 is rejected indicating that there is no significant association between occurrence of anemia and selected demographic variables, like age (1.790%), gender (0.356), education (2.552), income of the family(0.431), food habit (3.163), family history of overweight (0.253), mode of transportation (1.210), spending the leisure time (3.240).

Discussion :

The findings of the study indicates that majority of the overweight adolescents were anemic compare to normal-weight adolescents.

DEMOGRAPHIC VARIABLES	FREQUENCY	PERCENTAGE (%)
1. AGE		
15years	19	19%
16years	38	38%
17years	43	43%
2. GENDER		
Male	30	30%
Female	70	70%
3. EDUCATION		
10 th std	22	22%
11 th std	42	42%
12 th std	36	36%
4. EDUCATIONAL STATUS OF MOTHER		
No formal education		
High School	3	3%
Graduates	56	56%
5. EDUCATIONAL STATUS OF FATHER		
No Formal Education	4	4%
High School	39	39%
Graduate	57	57%
6. INCOME OF THE FAMILY		
Rs<3000	0	0%
Rs3001-5001	8	8%
Rs5001-7000	55	55%
Rs>7001	37	37%
7. FOOD HABIT		
Vegetarian	4	4%
Non-Vegetarian	22	22%
Mixed	74	74%
8. HISTORY OF ILLNESS		
Yes	35	35%
No	65	65%
9. FAMILY HISTORY OF OVERWEIGHT		
Yes	27	27%
No	73	73%
10. MODE OF TRANSPORTATION TO SCHOOL		
By Walking	7	7%
Cycling	15	15%
Private Bus	50	50%
School Vehicle	28	28%
11. SPENDING THE LEISURE TIME		
Play	33	33%
Exercise	2	2%
Watching Television	51	51%
Reading Books	14	14%
12. INTAKE OF DE-WORMING TABLETS		
Yes	31	31%
No	69	69%
ONLY FOR GIRLS n=70		
13. AGE OF MENARCHE		
13years	6	9%
14years	49	70%
>14years	15	21%

DEMOGRAPHIC VARIABLES	FREQUENCY	PERCENTAGE (%)
14. REGULARITY OF MENSTRUATION		
Regular	57	81%
Irregular	13	19%
15. PROBLEMS DURING MENSTRUATION		
Yes	6	9%
No	64	91%
16. INTAKE OF IRON SUPPLEMENTATION		
Yes	12	17%
No	58	83%

ESTIMATION OF OVER WEIGHT AMONG ADOLESCENTS

Percentage of Overweight Adolescents n=300

No. of adolescents	No. of overweight adolescents	Percentage
300	75	25.00%

IDENTIFICATION OF ANEMIA AMONG ADOLESCENTS

Number of Anemic Cases Detected Among Overweight And Normal Weight Adolescents

Overweight adolescents n=50		Normal weight adolescents n=50	
No	Percentage	No	Percentage
19	38%	7	14%

IDENTIFICATION OF IDA AMONG ADOLESCENTS

Number of iron deficiency Anemia Cases Detected Among Overweight and Normal weight Adolescents

ADOLESCENTS	ANEMIC CASES		IRON DEFICIENCY ANEMIA
	NO.	%	
Overweight n=50	19	38%	Nil
Normal weight n=50	7	14%	Nil

COMPARISON OF THE OCCURRENCE OF ANEMIA BETWEEN OVERWEIGHT AND NORMAL WEIGHT ADOLESCENTS

Occurrence Of Anemia Between Overweight And Normal Weight Adolescents

GROUP	N	MEAN	't' value	SD	df	LOS
Normal weight adolescents	7	10.6286	1.432	.74992	24	.165
Over weight adolescents	19	9.7105		1.61689		p>0.05

't' (tab) 24=2.064

Estimation of overweight among adolescents

From the 300 samples 75 (25%) adolescents were identified to be overweight.

Identification of anemia among adolescents:-

Out of the 50 adolescents with overweight 19(38%) were anemic and in 50 normal-weight adolescents 7(14%) were anemic. A supportive study was conducted among 317 adolescents (10- 19 years) Government school girls in Bhopal city. The adolescents were divided into three groups by random sampling method. Level of anemia was higher in early adolescents (10 – 13 years) age group (81%) as compared to the middle (58.3%) and late adolescents (17 – 19 years) age group girls (48.7%).

Identification of iron-deficiency anemia among adolescents.

There was no iron-deficiency anemia found in the 19 (38%) adolescents with overweight and seven (14%) adolescents with normal weight with anemia. So H1 hypothesis is rejected. So there is no significant difference in the occurrence of iron deficiency between overweight and normal weight.

A supportive study was conducted in Israel to identify the prevalence of iron deficiency anemia in overweight, obese and normal weight children. Data was collected from 321 adolescents. The study revealed that iron deficiency anemia was noted among 38.8% of the obese adolescents, 12.1% overweight adolescents and 4.4% of the normal weight adolescents⁷.

Another study conducted USA to identify Overweight children and adolescents: a risk group for iron deficiency, among 9698 adolescents.

The study revealed that out of 9698 children, 13.7% were at risk for overweight and 10.2% were overweight. Iron deficiency was most prevalent among 12- to 16-year-old subjects (4.7%), followed by 2- to 5-year-old subjects (2.3%) and then 6- to 11-year-old subjects (1.8%). Overweight 2- to 5-year-old subjects (6.2%) and overweight 12- to 16-year-old subjects (9.1%) demonstrated the highest prevalence of iron deficiency. Overall, the prevalence of iron deficiency increased as BMI increased from normal weight to at risk for overweight to overweight (2.1%, 5.3%, and 5.5%, respectively), and iron

deficiency was particularly common among adolescents (3.5%, 7.2%, and 9.1%, respectively)⁸.

A similar study indicated that the prevalence of anemia was 52.88% in the school children of Kattankulathur. The results of the study showed that 52.88% were anemic, the prevalence of anemia in girls (67.77%) was higher than in the boys (35.55%).The prevalence of anemia was very much higher in girls when compared to boys during between the age of 8 and 14 years. The anemia was graded according to WHO standards. It showed that 30.4% of girls were mildly anemic, 37.33% were moderately anemic and there were no severely anemic children diagnosed⁹.

It was observed that 77.7% of tribal children of Mysore District, Karnataka were suffering from anemia and also indicates similar results that the prevalence of anemia was significantly higher in girls when compared to boys (girls 83.33% and boys 70.89%)¹⁰.

The overall prevalence of anemia among school-going adolescent girls of urban Kathmandu, Nepal was 54.4%¹¹.

Another study of 393 children reported the prevalence of 66.4 % anemia amongst primary school children (6-11 years) in the national capital territory of Delhi¹².

Comparison of the occurrence of anemia between overweight and normal-weight adolescents.

According to independent 't' test there is no significant difference in occurrence of anemia between overweight and normal-weight adolescents. So H2 hypothesis is rejected.

Association between the occurrence of anemia and selected demographic variables

There is no association between the occurrence of anemia and demographic variables like age, food habits, physical activity, menstrual problems etc. So H4 hypothesis is rejected.

Conclusion :

The findings of the study indicates that majority of the overweight adolescents were anemic compare to normal-

weight adolescents. In our society majority of the parents believe that their young child's excess fat is normal, that it will disappear as the child grows, and that it isn't a real health concern. This is not the case for most overweight children, who are very likely to become overweight adults. Anemia is high among children heavier and more overweight. Further examination into the causes of anemia and overweight is warranted.

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