Volume-4, No. I, Feb-2017, pp. Eng.09-10

A Study of Anemia in Relation to Body Mass Index among School Going Adolescent Girls of Bahraich District of U.P. India.

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Abstract
The purpose of the present investigation was to study anemia in relation to Body Mass Index of school going adolescent girls of Bahraich District. Among adolescent girls, menstruation increases the risk of iron deficiency anemia at this stage. The population for this purpose was all the secondary schools of this district. A sample of 71 adolescent girls going to school was selected by purposive sampling technique. Hb concentration was estimated by cynmethomoglobin method. After measuring height & weight of all the subjects, BMI was calculated as weight/height in Kg/m^2. The data was analyzed by Chi-Square test of significance. The obtained Chi-Square value was only 10.0848, which was significant at .05 levels. Thus, it was inferred that obesity/over weight was inversely associated with anemia.
Key words: Anemia, Body Mass Index, Hemoglobin, Rural, Adolescent girls

Introduction

In our country adolescent girls face so many problems of health and nutrition due to gender discrimination, poverty and traditions etc. Anemia among girls and pregnant women is a major problem. The World Health Organization (WHO; 2008) [1] estimates that anemia affects over 2 billion people world wide. Anemia is a general term referring to the condition characterized by abnormally low levels of healthy blood cells or hemoglobin. The most significant contribution to the onset of anemia is iron deficiency. Due to this reason Iron Deficiency Anemia and anemia are often used synonymously. Adolescents are vulnerable to iron deficiency because of increased iron requirements related to rapid growth. Among adolescent girls, menstruation increases the risk of iron deficiency anemia throughout their adolescent and childbearing years. Several studies on the prevalence of anemia have been published, but a few of them have looked for its association with body mass index or weight status. Gupta A. et.al.(2013) [2] observed that BMI did not contribute significantly with anemia. Similar study was made by Kaur S.(2006) [3] in Wardha. Peter et.al. (2012) [4], Shatha S.(2003) [5] and Bulliyy et.al. (2007) [6] observed negative relationship between BMI and hemoglobin concentration. Attempts have been made to reduce weight with low energy and different diet strategies (Andreyeva et.al. (2010) [7] and Olivera et.al. (2008) [8]. Due to controversy in results of the studies available , I was interested to study the association between body mass index and anemia of school going adolescent girls of Bahraich District of U.P.

Objective of the Study

The objective of the study was to study the anemia of school going adolescent girls in relation with their Body Mass Index.

Methods

This study was carried out in the secondary schools of Bahraich District of U.P. The sample was selected by purposive random sampling technique. Initially 100 girls were selected having signs and symptoms of anemia. Hemoglobin concentration of these girls was estimated by Cynmethemoglobin method in Bawa Pathology Bahraich. Out of 100 subjects, only 71 subjects were found anemic. Anemia in this study was defined as Hb<12gm/dl in females according to WHO standards (WHO,1975).On the basis of Hb concentration three groups were prepared as severe anemic group having Hb concentration < 7gm/dl, moderate between 7 to 10gm/dl and mild anemic group Hb between 10 to 12gm/dl. The heights and weights were recorded without shoes. The height was recorded in meters and weight was in kgs. The Body Mass Index was calculated as

weight (kg)/height (meters)^2. BMI calculated in this way was used to form three groups as under weight below 18 kg/m^2, normal weight >18 and < 23 kg/m^2 and over weight /obese more than 23 kg/m^2.

Statistical Analysis of the Data

The data was analyzed by Chi-Square Test of significance. For this purpose, the investigator formed a 3x3 contingency table on the basis of each three groups of BMI and anemia. The numbers of adolescent girls of each group and the calculated value of chi square is given in the following table.

Table.1: chi-square value between anemia and body mass index of school going adolescent girls.

Anemia/BMI	Below 18 kg/m^2	18-23 kg/m^2	Above 23 kg/m^2	Chi-square value at df 4
Hb Below 7gm/dl	11	8	2	10.0848*
Hb Between (7-10) gm/dl	9	15	5	
Hb above 10gm/dl	4	8	9	

*Significant at .05 levels of significance.

Result and Discussion

Above table reveals that for under-weight adolescent girls, the level of Hb concentration was found up to 7 gm/dl in 11 girls, between (7 to 10) gm/dl in 9 girls and above 10 gm/dl only in 4 girls. It seems that majority of under weight girls suffered from severe anemia and the tendency of Hb concentration was found decreasing. On the other hand, for over-weight girls, it was observed that only 2 girls were found severe anemic, five moderate and 9 mild anemic. In this case the tendency of Hb concentration was found increasing. Only in the case of normal weight the tendency of Hb concentration was of mix nature. After analyzing the data the Chi-Square value obtained was only 10.0848. This value is found significant at .05 levels as the table value is 9.488 at 4 df. As the nature of Hb concentration for under weight girls was found decreasing, it may be said that there is positive relationship between anemia and BMI. In case of over weight /obese girls, the nature of Hb concentration was found increasing so, it may be said that there is appositive relationship between Hb concentration and BMI. In other words, it may also reveal that there is a negative relationship between anemia and BMI in case of over weight /obese girls. In other words ,it may be observed that anemia was found in higher degree among under weight adolescent girls, while obese or over weight girls were found mild anemic.

In a study made by Gupta A.(2013), it was observed that BMI did not contribute with anemia. On the other hand, Shatha S.(2003) revealed a negative relationship between BMI and Hb concentration in Iraqi adolescent girls. Similar results of negative relationship between BMI and Hb concentration were found by Bulliyy et.al. (2007) & Peter et.al. (2012). Only the results obtained by Qin et.al. (2012) [9] supports the results of the study in hand. They observed in their study that the obese group had the highest Hb concentration compared with other groups. Thus, it may be concluded that obesity/over weight was inversely associated with anemia.

Conclusion

The present study recorded an inverse association between obesity/over-weight and anemia. A significant association between BMI and anemia suggests a need to develop strategies for health education especially for under weight adolescents as they may gain normal weight. Attempts may also be put to eradicate anemia. Nutrition education campaign should be launched to develop the habit of taking seasonal salad, fruits and green leafy vegetables. In all the schools, health checkup programme should be launched every year.

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