Iron deficiency anemia (IDA) is the most prevalent micronutrient deficiency among humans all over the world. In India, more than 75% of adolescent and young children suffer from IDA. Adolescent girls are a particularly vulnerable group as their requirements of iron as well as its losses from the body are high. Anemia during adolescence limits growth and delays the onset of menarche. Anemia is associated with an increase in complications in pregnancy and with poorer fetal growth and survival.

Iron and folic acid supplementation is an important intervention for the reduction of anemia amongst adolescent girls. Supervised iron folic acid (IFA) supplementation is known to reduce anemia. Furthermore, there is scientific evidence that the addition of vitamin C to IFA supplementation improves the hemoglobin (Hb) status. The addition of 25 mg of vitamin C in a meal doubles the iron absorption. Also, the addition of vitamin A mobilizes iron from stores and may have a synergistic effect with vitamin C on the hematological responses to iron supplementation. Limited data is available on the effect of supplementation of packaged iron, folic acid and vitamin C with a mega single dose of vitamin A on improving Hb status among adolescent girls. Therefore, the present study was conducted.

A randomized double-blind trial was conducted on 40 adolescent girls in a residential training school of peripheral health functionaries in NCT of Delhi. All the subjects were aged 17–18 years. Socioeconomic status was assessed using the Kuppuswamy classification. Nutrient intake of each subject was estimated by using a 24-h dietary recall method. Subjects were briefed about the objectives of the study, consequences of IDA, and the side-effects of consuming IFA. Written informed consent was obtained from each subject. The subjects were randomized into two groups. Group A received a mega dose of vitamin A (200 000 IU) at the beginning of the study and subsequently a daily dose of 100 mg iron, 500 μg of folic acid, and 60 mg of vitamin C. Group B received a daily dose of 100 mg iron, 500 μg of folic acid, and 60 mg of vitamin C. Both groups were administered a package of drugs under direct supervision for a period of 100 days. Those subjects experiencing side-effects were counselled daily and were motivated to continue their participation in the trial. Hemoglobin estimation was done at the time of enrolment, i.e., day 0, day 50, and day 100 of the study by using direct cyanmethemoglobin method. The statistical analysis was carried out by using paired t-test.

A total of 40 adolescent girls were included in the study. One subject left the training school after 15 days of initiation of the study and hence was excluded. All the enrolled adolescent girls belonged to the low-middle income group. The mean Hb concentration on day 0 in groups A and B was 11.6 ± 1.38 and 12.2 ± 1.1 g/dl, respectively. The mean Hb concentration after 50 days of supplementation in groups A and B was 13.4 ± 0.83 and 13.5 ± 0.9 g/dl, respectively. The mean Hb concentration after 100 days of supplementation in groups A and B was 13.4 ± 1.07 and 13.5 ± 0.9 g/dl, respectively. Only two girls complained of nausea as a side-effect, but they continued in the study. An increase of Hb status in group A by 0.5 g/dl was observed compared with group B (who did not receive vitamin A) after 100 days of intervention. This indicated the possibility of the synergistic role played by vitamin A in improving Hb status.

Daily supplementation of iron, folic acid with vitamin C, with or without a mega dose of vitamin A, for a period of 100 days resulted in an increased Hb status among adolescent girls in both groups. However, the increase was higher by 0.5 g/dl in the group that received the mega dose of vitamin A. Similar results have been observed elsewhere. This effect of vitamin A supplementation on improving Hb concentration and decreasing serum ferritin concentration may be due to increasing iron deficiency.
mobilization from body stores and increased erythropoiesis.\(^\text{13}\) A study done by Suharno, et al.\(^\text{14}\) showed that maximum Hb concentration was achieved by supplementation of both iron and vitamin A compared with iron alone. Enhanced iron absorption has been observed for diets in a food enrichment programme containing vitamin A.\(^\text{15}\)

Vitamin A deficiency and IDA are common in adolescent girls in India. There is a need to undertake large scale studies to assess the impact of administration of a mega dose of vitamin A along with the package of iron, folic acid and vitamin C, to substantiate further the results obtained in the present pilot study.

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References

Body Mass Index Values in Turkish Schoolchildren Aged 7–18 Years

Obesity is a significant public health problem for children and adults and body mass index (BMI) has consistently been recommended as the best simple method to evaluate obesity.\(^\text{1,2}\) Linear growth in childhood is dependent on genetic, nutritional, and environmental factors.\(^\text{3}\) Racial and ethnic differences in BMI in childhood and adolescence have been reported.\(^\text{3–5}\) The aim of this study was to evaluate BMI values in Turkish schoolchildren and to make comparisons between rural and urban children, boys and girls. The 95th percentile values of our study population were also compared to those of the first National Health and Nutritional Examination Surveys (NHANES-I),\(^\text{1}\) the International Survey of Cole, et al.,\(^\text{6}\) and the US Children

Study.\(^\text{5}\) Four thousand and twenty-six randomly selected schoolchildren (1961 boys, 2065 girls; 3067 from urban and 959 from rural areas) aged between 7 and 18 years who were attending 11 schools located in urban and rural regions of Eskisehir in Turkey, were included in this study. Height and weight of the children wearing minimum indoor clothing without shoes were measured. BMI was calculated as weight (kg)/height (m)\(^2\). The mean BMI values and standard deviations for age, sex, and location and percentile values were calculated. BMI values increased substantially with age in our study, similar to other studies in the literature. BMI values of girls were higher than those of boys at 14–16 years \((p<0.001)\). These differences may be explained with pubertal stage. We found no prominent statistical differences between urban and rural areas in most of the age and sex groups.