ABSTRACT

The present study entitled “Effect of Iron and Vitamin A supplementation on pregnancy outcomes” has been conducted to explore the efficacy of supplementation of Iron, Iron rich food and β-carotene (precursor of Vitamin A) to the pregnant women who suffered from both Iron and Vitamin A deficiency as well as on their outcomes of pregnancy.

Experimental Plan: Hundred pregnant subjects who were deficient in both Vitamin A and Iron were selected and classified into four experimental groups (25 each). To the Groups: I, II and III, Iron tablet, Iron tablet + β-carotene rich food and Iron tablet + Iron rich food respectively were fed during second and third trimester of pregnancy. Before commencing the feeding trial, general information and reproductive history of the subjects were documented and in addition, height and weight were measured for calculating the Body Mass Index (BMI) of the subjects.

From the fasting blood sample, Haemoglobin (Hb), Serum Iron, Total Iron Binding Capacity (TIBC), Transferrin Saturation, Unsaturated Iron Binding Capacity (UIBC) and Serum Retinol were measured by following the standard methods before and after feeding trial.

Outcomes of the pregnancy of the selected subjects were adjudged by measuring gain in weight of the selected subjects, gestational age (in weeks) of neonates, birth weight (in kg), head and chest circumference (in cm) and length (in cm) of neonates. Term and type of delivery were also noted.

Iron and β-carotene content of the commonly consumed food were also determined.
**General Information:** Forty per cent of the subjects were having age range between 20-25 years. Primary education passed subjects were 26 per cent and same percentage of the subjects were secondary passed. Whereas only six per cent subjects have bachelor degree and remaining were illiterate. Majority (72%) of the subjects were housewives. The subjects having monthly income between Rs. 3000-7000, Rs. 7000-12000 and above Rs. 12000, respectively were 45, 22 and 15 per cent. Number of the subjects who became mother first time at the age group of 19-20, 20-25 years were 36 and 54 per cent, respectively. The subjects who suffered from one and two miscarriages were two and one per cent, respectively. The subjects having BMI less than <18.5 and between 18.5-22.9 were 54 and 46 per cent, respectively.

**Biochemical Parameter:** The mean haemoglobin (in g/dl) level increased from 8.0 to 9.0 in Group I (*Iron tablet supplemented fed Group*), from 8.1 to 10.0 in Group II (*Iron tablet + β-carotene rich food supplemented fed Group*) and 7.9 to 9.3 (g/dl) in Group III (*Iron tablet + Iron rich food supplemented fed Group*). The percentage increase of Hb in respective Groups was 12.27, 23.41 and 17.54 per cent. However, the subject of control group, to whom no supplementation was given the per cent Hb level decreased by 2.6 per cent. Increase in Serum Iron (µg/dl) was 97.77, 111.99 and 98.50, respectively in Groups I, II and III. However, in control group this level decreased to 6.38 per cent. The decreased value of TIBC (µg/dl) was 429.23, 418.53 and 426.51, respectively in Groups I, II and III and in Group IV the value of TIBC increased to 450.93 (µg/dl).

The values of transferrin saturation was increased from 18.48 to 22.79 in Group I, 18.25 to 26.77 in Group II, and 17.79 to 23.10
in Group III. However, in control group this level decreased from 19.30 to 18.31.

The mean increased in UIBC values were 36.55, 60.82 and 44.00 in the subjects of Groups I, II and III, respectively.

Initial values of Serum Retinol ($\mu$g/dl) was 15.44, 15.12, 14.72 and 15.08, respectively in Groups I, II, III and IV. On supplementation these figures increased to 16.24, 17.40, 15.88 and 15.16 in respective Groups I, II, III and IV.

The change in all the biochemical parameters was significant (P=0.000) in comparison to control and within the same group before and after completion of supplementation.

**Outcomes of Pregnancy:** The mean newborn baby weight of the mothers of the Groups I, II, III and IV was 2.61, 2.88, 2.80 and 2.40 respectively. The variation in weight of the new born belonging to different Group was found significant (p=0.000).

The mean head circumference (cm) was 33.48, 34.68, 34.16 and 31.76 of newborn of the mother who were belonging to Groups I, II, III and IV respectively. The mean chest circumference (cm) of neonates of the mothers related to Groups I, II, III and IV was 32.75, 35.63, 33.83 and 31.67, respectively. The new born who took pre-term birth were 12, 4, 8 and 56 per cent in Groups I, II, III and IV respectively and remaining were normal. The newborn who were born caesarean were 44% in control group and 56 per cent were born with normal delivery.

Maximum iron content among the studied leafy vegetables was found in carrot leaves (8.41 mg/100g) and minimum was found in coriander leaves (2.4 mg/100g) whereas among the studied cereals and pulses maximum iron content was found in rice flakes (21.7 mg/100g) and minimum was found in white wheat bread (1.84 mg/100g). The determined values of iron content for whole cereals,
pulses and leafy vegetables collected from the local market in district Kurukshetra were nearby the values of NIN. Nutrient content of β-carotene content (µg/100g) in locally available food in the samples of maize, soybean, amaranth tender, coriander leaves, mango and cow’s milk were 95.32, 425.54, 5400, 6921, 2749 and 60 µg/dl respectively. Among the studied vegetables maximum β-carotene content was found in carrot 1700 µg/100g and in coriander leaves (6921 µg/100g). Whereas, 425 µg/100g were found in soybean.

Variations in the iron and β-carotene content in foods of the present study in comparison to the values given by Gopalan et al. (2011) might have been attributed to the factors such as difference in variety of samples, climate conditions fertility of soil and maturity of vegetables.