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Impact of soya multigrain panjiri supplementation on haemoglobin level among women in Raipur

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Abstract
The present study was undertaken to assess the effectiveness of group based supplementation of soya multigrain panjiri. In this two randomized group design, experimental and control group consists of 80 female women suffering from anaemia. The subjects belonging to experimental group were given supplementation of soya multigrain panjiri for three months. The haemoglobin estimation was done by cyanmethemoglobin method. Before and after of subjects was recorded prior to the commencement of study as well as after three months of study period. The result reveals that haemoglobin levels of anaemic patient belonging to experimental group has increased significantly as compared to their counterpart belonging to control group. It was concluded that dietary supplementation given to anaemic women in the form of soya multigrain panjiri is useful in boosting their haemoglobin levels.

Keywords: Haemoglobin level, dietary supplementation, soya multigrain panjiri.

1. Introduction
Anaemia is one of the most common health problems in India. The problem is much more in rural than the urban areas high – risk groups for anaemia are pregnant and lactating females and in children the prevalence of anaemia is disproportionately.
High in developing countries, due to poverty, inadequate diet, certain diseases, pregnancy/ lactation and poor access to health services.
The nutritional anaemia in woman attributes to high MMR, high incidence of low birth weight babies, high perinatal mortality and fetal wastage and consequent high fertility rates.
Anaemia is caused by an inadequate number of healthy red blood cells. These results in a low level of haemoglobin, the iron rich protein found in red blood cells that transports oxygen from the lungs to the rest of the body. For this reason, bodies with anaemia don't get enough oxygenated blood. Without oxygen, organs and tissues can be damaged. In an effort to counteract the effects of anaemia, the heart must work harder to make up for the lack of haemoglobin in the blood. This extra effort can have a negative impact on the heart, sometimes even causing heart failure. Anaemia may be mild and therefore easily treated but it can also be a chronic problem with severe, long lasting effects.
There are a variety of reasons your body may become short on red blood cells. Blood loss, as through trauma or heavy menstruation, is one possibility. The most common type of anaemia, iron deficiency anaemia (IDA), occurs when blood loss depletes your system of iron. Instead of simply loosing blood, the body may have problems making red blood cells. A fairly common type of anaemia called foliate deficiency anaemia occurs when your body lacks folic acid, which is necessary to make red blood cells. Some diseases can inhibit your body's production of red blood cells. With kidney disease, for instance, the kidney fails to produce enough of the hormones responsible for telling the body to make red blood cells. In some cases of anaemia, the red blood cells are breaking down so rapidly that the body can't replace them quickly enough. This occurs with sickle cell anaemia, which causes red blood cells to be hard and curved. These cells can become lodged in blood vessels, creating a blockage. While the body is able to destroy sickle red cells very quickly, it is unable to replace them fast enough, causing anaemia.
One of the major reasons women become anaemic is poor diet. The risk becomes more pronounced in vegetarians, as they avoid a major source of iron – red meat. Vegetarians don't always develop anaemia, however.

A thoughtful diet including vegetables that contain iron, like spinach, can prevent anaemia from ever appearing. Women taking menopausal hormone therapy (MHT) may require more iron if they are still getting periods during this time. Intrauterine device (IUD) may cause excess bleeding and increase chances of anaemia. Other risk factors include blood loss (caused, for example, by peptic ulcer disease or colon cancer) and chronic inflammatory conditions (such as rheumatoid arthritis), which suppress bone marrow. Some types of anaemia, such as sickle cell anaemia, are due to inherited defects.

The primary symptom of anaemia is fatigue, although weakness is also very common. Other symptoms include dizzy spells, headaches, shortness of breath, numb or cold hands and feet, a pale complexion, brittle nails and chest pain. Anaemic people tend to find it difficult to concentrate and are often irritable.

National Family Health Survey statistics reveal that every second Indian woman is anaemic and one in every five maternal deaths is directly due to anaemia.

Hyder SM *et al.* [4]. Has done a study to test the effect of multiple micronutrient fortified beverage on haemoglobin concentrations, micronutrients status, and growth among adolescent girls in rural Bangladesh. The results showed fortified beverage increased the Haemoglobin and serum ferritin, retinol concentration, body weight, MUAC and BMI over 6 months.

A study conducted by Mir (MA) and *et al.* [8]. on protein fortification of mango bar using soya protein concentrate showed that additional of 4-5% SPC (soya protein concentrate) to the pulp raised the percentage of proteins, food energy value, calcium, phosphorus and iron contents of the mango bar.

Very few studies have been done to find the impact of soybean supplementation on Haemoglobin level and cardiovascular efficiency. So the investigators are interested to investigate on this topic so as to reduce anaemia in CHATTISGARH state with this cost effective strategy.

Chakrborty J. and Gurwara N. (2015) [1] in their study regading anaemia among women found that dietary counseling and demonstration helped to increase the haemoglobin level among the subjects.

A study of Kawaljit Kaur in these study Anaemia is the most prevalent nutritional deficiency disorder in the world. It affects all age groups but the most vulnerable are preschool-age children, pregnant women, and non-pregnant women of childbearing age. Globally, anaemia affects 1.62 billion people, which corresponds to 24.8% of the population. The highest prevalence of anemia exists in the developing world where its causes are multi-factorial. National Family Health Survey statistics reveal that every second Indian woman is anaemic and one in every five maternal deaths is directly due to anaemia. This review will focus on recent advances in our understanding of the burden of anemia in specific sub-groups, the causes and consequences of anemia among women

Rohini Jain *et al.* (2015) [5] Malnutrition and under-nutrition are serious problems in the developing countries of the world. As majority of population is vegetarian, the availability of good quality nutrition is reduced. Oilseeds are next to cereals in importance and are more energetic providing superior quality protein, essential fatty acids, vitamins and minerals. Oilseed protein is successful in combating protein energy malnutrition. Oilseeds like Soybean, Groundnut, Flaxseed, Sesame seeds and Niger seeds are utilized as food and in the preparation of value added and nutritious food products. They even have nutraceutical value. Various deadly diseases such as cardiovascular diseases, hypertension, diabetes and cancers can be prevented by the supplementation of oilseeds in regular diet. This article reviews the potential health effects of oilseeds. Oilseeds will gain greater attention in future as they are renewable and biodegradable in nature.

K. Jothilakshmi and *et al.* (2013) [6] The increasing interest in healthy foods causes a change in the buying behavior of the consumer. When watching the baker's shop window, more browner and whole-wheat bread with a healthy image can be seen. As millets are nutritive foods, when it is mixed with whole wheat flour for preparation of bread is satisfies the need of consumers. Hence, the multigrain mixes were used for the preparation of breads with an improved the nutrient content. High fibre bread containing wheat, millet, pulse and purified dietary fiber namely inulin has been standardized. The standardized wheat based multigrain bread contained kodo millet, Bengal gram, horse gram and inulin (fructooligosaccharide). The rheological properties, nutrient content, cellular structure and sensory characteristics such as colour and appearance, flavor, texture, taste and over all acceptability of the multigrain bread was evaluated and highly accepted. The most acceptable proportion was used for animal study to assess the hypoglycemic and hypolipidemic effects. The study was conducted on Wistar rats. The effect of wheat based multigrain bread on the glucose levels in diabetic induced rats after a feeding trial of 28 days was studied. There was a statistically significant reduction in the blood glucose level at the end of four weeks. The initial glucose levels reduced from 204.16 ± 3.57 to 121.16 ± 3.4 mg/dL which is a 40.65 per cent reduction. The HDL level was found to be 22.2± 0.68, LDL 22.08 ± 0.95 mg/dL and atherogenic index was 2.18 ± 1.13 respectively at the end of the study. Further, from the study it was found that the multigrain mixes can be used to develop bakery, extruded, convenience foods which will provide both therapeutic and nutraceutical benefits.

Objectives

- To know the impact of soya flour supplementation on Haemoglobin level of blood.
- To find out the effect on increased Haemoglobin level.

2. Method and procedure

A pre- test post - test control group design was adopted for the study. The study was conducted on 80 anaemic women in Raipur City. At first the haemoglobin estimation was done by Cynamet haemoglobin method for the purpose of collection of samples in the next step of the research, an iron rich nutritious soya multi grain panjiri was prepared for the purpose of supplementation to the experimental group. 75 g (one small katorie) of panjiri measured on electronic weighing machine and packed for each sample per day. The supplementation was given for the period of three months and also for control group 75 g Rava panjiri prepared and given to three months. After the supplementation period, again the haemoglobin estimation of experimental and control group was done to find out the impact of soya multigrain panjiri and rava panjiri supplementation on them and found that experimental group haemoglobin level has change low to normal, normal to high and control group was not showing such type of significance

Methods followed for undertaking the study

Estimation of haemoglobin: Haemoglobin levels of the samples was estimated by Cyanmet Haemoglobin method.

Supplementation: For the purpose of providing iron rich supplementary food to the experimental subject to see its impact on haemoglobin level and cardiovascular efficiency, a low cost Soya Bean+Multigrain panjiri was prepared. It was a modified wheat flour panjiri which was highly nutritious. The soya flour used in the preparation was free of anti-nutritional factors, which are present in raw Soya Bean+Multigrain because during commercial processing. It is standard practice to apply controlled heat to the Soya Bean+Multigrain which inactivates the anti-nutritional factors. Daily 75gm provided to each subject in experimental group conditioned to consume it on that particular day.

Post-estimation of haemoglobin: After 3 months of giving supplementation, again haemoglobin levels of the samples was estimated for founding the impact of soya multigrain panjiri.

3. Result and Discussion

In table# 1, pre-post mean haemoglobin scores of subjects belonging to experimental and control group are depicted. The comparison of pre-post mean hemoglobin of selected subjects was done by paired sample‘t’ test.

Table 1: Pre Post Mean Haemoglobin level among selected womens belonging to Experimental and Control Group

Groups	Haemoglobin		‘t’
	Pre Test Mean±S.D.	Post Test Mean±S.D.	
Experimental Group (N=40)	10.70 ± 1.07	13.10 ± 0.92	37.88**
Control Group (N=40)	11.17 ± 0.78	11.48 ± 0.90	8.21**

** Significant at.01 level; $t_{(df=79)}$ =1.96 at.05 level; $t_{(df=79)}$ =2.63 at.01 level.

A perusal of table # 1 indicate a significant increase in post-test mean haemoglobin scores (M=13.10) among selected subjects belonging to experimental group as compared to their pre-test mean Hb (M=11.17). The calculated t=37.88 is statistically significant at.01 level.

Similarly findings were obtained for control group. A significant increase in post-test measures on haemoglobin (M=11.48) occurred among subjects belonging to control group as compared to their pre-test mean haemoglobin values (M=11.17). The calculated t=8.21 is statistically significant at.01 level.

To compare changes in pre-post test scores on haemoglobin levels between experimental and control group, gain scores was calculated and compared between these two groups with the help of independent sample ‘t’ test.

The same is depicted in table 2.

Table 2: Comparison of Gain Scores on Haemoglobin Level between Experimental and Control Group

Groups	N	Gain Score (Weight)		Mean Difference	't'
		Mean	S.D.		
Experimental Group	40	2.40	0.40	2.09	28.43**
Control Group	40	0.31	0.23		

** Significant at.01 level; t (df =78) =1.96 at.05 level, 2.63 at.01 level

The statistical calculation in terms of t=28.43 shown in table #2 indicate a significant difference in mean gain scores between two groups. It shows that mean gain in haemoglobin levels is significantly higher in subjects belonging to experimental group (M=2.40) as compared to the pulmonary tuberculosis patients belonging to control group (M=0.31).

4. Results

The supplementation of soya multigrain panjiri was found to be effective in increasing the haemoglobin levels low to normal, normal to mild and mild to high of selected subjects and control group was not showing such type of significance.

5. Conclusion

The study concluded that group-based supplementation helps to improve the haemoglobin level and also health of women. These programmes if continued persistently for longer duration will definitely have significant changes in health status. Such group – based supplementation helps to create awareness among the women regarding the importance of nutrition which will improve the nutritional status of the entire society and all together will help to achieve our millennium development goals.

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