EFFECT OF CAULIFLOWER GREENS PORIYAL SUPPLEMENTATION ON BLOOD HAEMOGLOBIN LEVELS OF ANAEMIC ADOLESCENT GIRLS"

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Abstract

Introduction

　　　　Adolescence is the transition period between childhood and adulthood. Adolescence is characterized by the **growth spurt**, a period in which growth is very fast. The hemoglobin level of the adolescence 11-14g/dl. The fresh cauliflower leaves contains 4o mg/100g of iron. Prevention of anemia in adolescents is important as they are the future mothers. Among the green leafy vegetables cauliflower greens (*Brassica oleracea varbotrytis*) which has a high amount of iron. The study was carried out with the following **objectives :**

- ✓ To gather general information and socio economic status of the subjects.
- ✓ To study food habits and dietary pattern of the subjects.
- ✓ To prepare cauliflower greens poriyal (food waste as a functional food for Environmental safety).
- ✓ To supplement cauliflower greens poriyal to the selected samples.
- ✓ To assess the anthropometric measure of the subjects.
- ✓ To measure the hemoglobin level of the selected   samples before and after supplementation.

Methodology: The present study was carried at Pattukkotai in Thanjavur district to anemic adolescent girls (16 to 18 years)**.** 100 subjects of anemic adolescent girls were selected for this study. Anthropometric Assessment Biochemical Assessment clinical Assessment, Dietary pattern and nutritional assessment were identified to the anemic adolescent girls. Twenty sub-samples were selected for the supplementation of greens poriyal for a period of 90 days. Questionnaire method was used to collect data regarding general information, life style pattern of the subjects, health status of the subjects, assessment of nutritional status of the subjects etc., Hemoglobin level was estimated before and after supplementation of Cauliflower greens poriyal.

Findings: The mean blood hemoglobin of the sample before supplementation was found to be 8.3mg/dl and mean blood hemoglobin of the sample after supplementation was found to be 12.9mg/dl. The study was concluded that supplementation of cauliflower greens will certainly help to overcome anemia and thereby improve the Hb level of the **adolescent girls.** People must be sensitized the functions of cauliflower leaves to improved the Hb level as well as to save the environment.

Key Words: cauliflower greens, blood hemoglobin level, nutritional status, Adolescent girls.

INTRODUCTION

The term adolescence meaning to 'emerge or achieve identity' is a relatively new concept especially in development and thinking. WHO defines adolescence both in terms of age (spanning the age between 10 & 19 years) and in terms of a phase of life marked by special attributes. These attributes include rapid physical growth and development, physical, social and psychological maturity but not all the same time sexual maturity and the onset sexual activity experimentation development of adult mental process and adult identity and transition from total socio economic dependence to relative independence.

Iron deficiency is the most common micronutrient deficiency found in the industrialized countries. It is particularly common among all age groups. Adolescent girls are at risk because of a number of factors including puberty and low dietary intake. It is the most widespread specific nutritional deficiency in the world which affects approximately two billion people and 80 percent in the developing countries.

Cauliflower leaves are rich in folate, vitamin C vitamin E and beta carotene and contain some important nutrients like indole -3-carbinol and phytonutrient sulforaphane. It can be cooked raw, boiled or even roasted. It contains several medical properties. It contains folate which help in making and stimulating the blood and prevents symptoms of anemia.

In India edible leafy vegetables like amaranth, mint, coriander are available these are cheap and within the reach of common man. These green leafy vegetables increase the nutritional quality of food. Cauliflower leaves which are generally way as waste are rich source of iron and betacarotene. The glucosinolates and thiocynates present in cauliflower leaves act as blood and liver detoxifier.

The present study entitled **"Effect Of Cauliflower Greens Poriyal Supplementation on Blood Haemoglobin Levels of Anaemic Adolescent Girls''t** and gather general information and socio economic status of the subjects, food habits and dietary pattern of the subjects, collect information regarding life style pattern and health status of the subjects, prepare cauliflower greens poriyal, supplement cauliflower greens poriyal to the selected samples, assess the anthropometric measure of the subjects, food consumption pattern and assess the nutritional profile of selected anaemic adolescent girls.

MATERIALS AND METHODS

Selection of subjects

The present study was conducted on 100 adolescent girls in the age group of 16 to 18 belonging to the undergraduate classes from a rural area in veppankulam at Thanjavur district. Blood haemoglobin level of all the 100 subjects was estimated and 50 adolescent girls who had blood haemoglobin level less than 11 g/dl were considered. Out of the 50 subjects 20 adolescent girls were selected for the study.

Conduct the study

Socio economic data such as age, class, studying, type of family, family composition, occupation and monthly income were collected using on interview schedule.

Dietary pattern of the selected subjects were also assessed using the interview schedule. The type of diet consumed Meal pattern, frequency of food consumption, eating away from home and consumption of each food items was elicited and recorded. Nutrient intake was calculated by adopting 24 hours food recall method for three consecutive days.

The height, weight, waist circumference and hip circumference of the selected subjects were measured by following stardard procedure. From these values Body Mass Index and Waist Hip Ratio were calculated.

The method of collecting data through direct interview is usually carried out in structured way. Direct interview involve the use of a set of pre determined questions and of high standardized techniques of recording. **(Kothari.C.R., 2014)**

Blood Haemoglobin level

Blood Haemoglo bin level of the subject was estimated before and after supplementation.

preparation of cauliflower greens poriyal

Cauliflower greens were procured from the local market for the study. These leaves suitable for human consumption and posses high nutritional value but poorly consumed us food by the people. Among all the green leafy vegetables , Cauliflower greens (*Brassica olercealvar botrytis*) was found to have the maximum amont of iron such as

40mg/100g.Several recipes were developed with Cauliflower greens. The recipes were subjected to sensory evaluation by the consumer and based on scores, cauliflower greens poriyal was selected for supplementation. The cauliflower greens poriyal standardized for supplementation is given below.

Preparation of cauliflower greens

TABLE -I

Ingredients	Quantity
Cauliflower greens	100 g
Onion	10 g
Green chilly	2g
Coconut	5 g
Oil	5 ml
Salt	To taste

Fresh cauliflower greens was washed thoroughly with warm salt water and chopped finely. Finely chopped onion and green chillies were fried in oil. Chopped cauliflower greens were added and cooked with little water and salt in low fire. Finally grated coconut was added mixed well and removed from fire**.** Simmering method is used as a cooking medium.15 minutes is taken for cooking cauliflower greens poriyal.

Supplementation of the study

50 g of cauliflower greens poriyal is supplemented to the selected 20subjects in lunch time. The primary aim of supplementation is to increase the hemoglobin level. Cauliflower greens poriyal are supplemented to the selected 20 subjects for a period of 90 days.

G) Assessment of Nutritional status of the subject before and after supplementation:

(i) Anthropometric Measurement

Anthropometric deals with comparative measurements of the body. It used to measure body thickness to estimate fat and lean tissue mass. It is the simplest and most quantitative measure of nutritional status. The measurement most commonly used for length or height, weight, skinfold thickness & mid arm circumference**.**

Height

Standard height is preferably measured for all subjects. The measurement is measured against a fixed scale. The subject are asked to stand erect with feet together and heel back against the wall. Then the measurement is taken. **(Robinson., 2010)**

Weight

Weight is preferably measured for all subjects. It is measured by using weighing machine. The subject asked to standard on weighing machine with bare foot weight of the subject is measured and note. Body weight is one of the most convenient and useful indicators of nutritional status. The weight should be measured using a beam or lever balance type scale**.**

Body mass index

BMI is accepted as a better estimate of body fat and health risk than body weight

$$BMI = \frac{weight\ (kg)}{Height^2(m)}$$

(ii) Clinical assessment of the subject

Clinical assessment was making by observing the external factors like nails, eyes, hair, face, appetite, general appearance for 100 subjects. Clinical examination is an essential part in the assessment of nutritional status. Clinical examination provides direct information of the signs and symptoms, dietary deficiencies prevalent among the people.

(iii) Biochemical assessment of the subjects

Laboratory evaluation can identify specific nutrition related abnormalities such as anemia, iron deficiency or protein deficiency. The packed cell volume of whole blood (hematorit) is often used to diagnose iron deficiency. The direct determination of iron and the degree of saturation of transferring are extremely useful detection iron deficiency status.

10 sample were selected from groups and their blood hemoglobin levels were estimated before and after supplementation of cauliflower greens poriyal. There values are given the accuracy of the biochemical tests depend upon the standard of collection**.** The blood hemoglobin level was associated by cyanmet hemoglobin method.

(iv) Food habits and dietary pattern

Twenty four hours recall method were done to find out food habits and dietary pattern among the 100 subjects in rural areas. The nutrient intakes of selected subjects were also calculated.

Food habits of the subjects were collected from interview method. It is the sample method to know the food habits of the subjects. Dietary pattern was identified through 24 hours recall method**.**

(v)Food consumption pattern

Food consumption pattern of the subject were collected through the duration of using different food groups by them. The duration is splitted into daily, weekly, monthly, rarely, and never and then the information was collected from the selected subject**.(Sardesai.R.,2010)**

H) Analysis and interpredation of data

The collected data was then completed and interpredated successfully.

RESULTS AND DISCUSSION

Socio Economic Status of the Subjects

TABLE - I

1. Age distribution of the subjects

Variables	Percentage of the subjects
Age(Yrs)	
16 years	34
17 years	38
18years	28
Type of family	
Nuclear	88
joint	12
Type of meal	
Vegetarian	72
Non -Vegetarian	28
Fast food eaters	
Noodles	28
Fried Rice	26
Chilli chicken	38
No	14

Table-I indicates that the selected adolescent girls between the age group of16-18 years. The majority 38 percent of the subjects were in the age group of 17 years and 34 percent subjects were in the age group 16 years and 28 percent subjects were in the age group of 18 years. Majority of the subjects was Nuclear family.

Dietary pattern indicated that 82 percent were Vegetarian and 18 percent were Non- vegetarian. Though they were non vegetarians they consumed non vegetarian foods only once in a week or rarely. All the subjects followed three meal pattern. It was found majority of the subjects had the habit of consuming fast food. Only 14 percent of the subjects had not consumed fast food.

TABLE - II

Food Intake of the Selected Subjects

Food Stuffs	Amount gm	Daily	Weekly		15 days once	Monthly once	Rarely	Never
			Once	Twice				
Rice	100	100	-	-	-	-	-	-
Ragi	100	-	-	-	-	10	13	77
Wheat flour	100	-	32	48	8	12	-	-
Rice flour	100	-	12	10	22	28	12	16
Rice flakes	100	-	-	-	-	-	8	92
Black gram dhal	100	-	-	48	22	20	10	-
Bengal gram dhal	100	-	-	11	15	29	21	24
Green gram dhal	100	-	18	-	24	36	10	12
Red gram dhal	100	-	32	24	24	16	-	-
Amaranth	50	-	22	18	31	15	14	-
Drumstick leaves	50	-	28	12	21	18	21	-
Mint leaves	50	-	19	24	16	19	10	12
Coriander leaves	50	-	33	40	18	-	9	-
Curry leaves	50	-	31	25	10	7	-	27
Beetroot	100	-	12	24	16	8	22	18
Potato	100	-	32	48	20	-	-	-
Carrot	100	-	38	31	7	5	19	-
Raddish	100	-	34	20	10	10	18	8

The table II indicates that expert cereal and cereal products consumption, roots and tubers all the other foodsinadequateandshowed deficit when compared with RDA. Potato was mainly consumed among the Roots andtubersthrough junk foods likes potato chips, Chocolates, Candies. This added to Calorie intake without any micronutrients

TABLE -III

MEAN NUTRIENTS INTAKE OF THE SUBJECT

| S.NO	NUTRIENTS	MEAN AND NUTRIENT INTAKE OF SUBJECT	RDA	SUFFICIT/DEFICIT
1	Energy (kcal)	1914.92	1970	55.08
2	Protein (gm)	47.91	67	9.09
3	Fat (gm)	31.14	22	9.14
4	Carbohydrate (gm)	290.746	-	-
5	Calcium (mg)	558.54	60.0	41.46
6	Iron (mg)	19.5	28	-7.5
7	Vitamin-A(mg)	498.52	600	-101.5

The tables -III indicates that mean nutrients intake of the 100 subject calculated from 24 hours recall method, the mean value of energy intake 1914-92 kcal. The mean value of protein intake 47.91 gm the mean value of fat intake 31.14 gm, the mean value of carbohydrate intake 290.746 gm, the mean value of iron 24.454 mg , the mean value of calcium 558.54 mg, the mean value of vitamin-A 498.5mg . The table reveals that all the nutrients were consumed in inadequate amount when compared with RDA

Anthropometric assessment of the subjects:

`Anthropometric measurements namely height, weight, waist and hip circumference were calculated and presented in figure- I. Body Mass Index indicated that majority of the subject was under weight.

ANTHROPOMETRIC ASSESSMENT OF THE SUBJECCTS

FIGURE-I
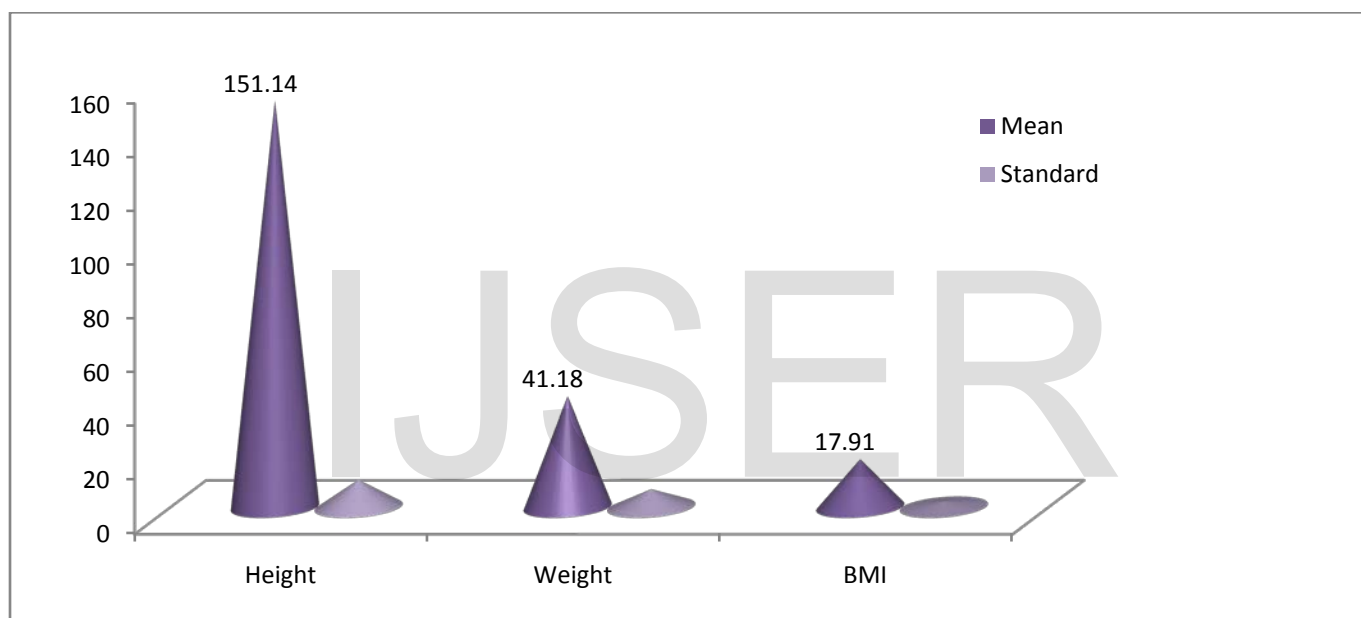
CLINICAL STATUS OF THE SUBJECT

Clinical examination of the selected subjects revealed majorityof the percent were affected by mild and moderate anaemia.pale skin and pale conjunctiva were observed in majority of the subjects.

Out of 100 subjects during menstruation 32 percent of the subjects were suffered by stomach pain and 28 percent of the subjects were suffered by vomiting and 24 percent of the subjects were suffered by back pain and 16percent of the subjects were suffered by headache

BIOCHEMICAL ANALYSIS OF THE SUBJECT :

TABLE -IV

S.No	Mean Biochemical Analysis (Gm/Dl)	Normal (Gm/Dl)	Before Supplementation (Gm/Dl)	After Supplementation (Gm/Dl)
1	Hemoglobin	12-16	8.35+0.7060	12.5+0.9163

Impact of supplementation of cauliflower greens

Mean blood haemoglobin level of the selected 20 subjects before and after supplementation of cauliflower greens is presented in Table -V

The mean haemoglobin level of the selected 20 subjects had increased from 12 to 12.5 g / dl after supplementation of 50g cauliflower greens poriyal for 90 days. The increase was statistically significant at five percent level. These results indicate more beneficial effect of cauliflower greens.

CONCLUSION

The study was undertaken to find out the impact of cauliflower greens in raising the blood haemoglobin levels in anaemic adolescent girls. A group of 20 anaemic adolescent girls were selected for the study. 50 g of cauliflower greens poriyal was administered to the anaemic adolescent girls for the period of 90 days. Blood haemoglobin level of the subjects was estimated before and after supplementation.

The result brought out Cauliflower greens poriyal is a promising strategy to combat the highly prevalent problem of iron deficiency and anemia in adolescent girls. Although intermittent iron supplementation is an effective strategy iron rich food supplementation takes an edge over it with respect to sustainability of effects. If the adolescent girls are not well nourished and in poor health, the synergistic relationship between deprivation, poor health and malnourishment dilutes the benefits of any investments in education. Efforts are needed to eradicate iron deficiency to realize the potential adolescent girls of to become adults.

Though cauliflower greens were used to reduce iron deficiency anemia. It is also useful to the economically weaker section of the society. The cauliflower leaves are not consumed by the population and is under exploited. If this leaves is harvested and regularly included in the diets of anemic population the problem of anemia could be overcome which would enhance the work efficiency of the population and aid in the development of the nation at large.

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