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EVALUATION OF ANTIOXIDANTS RICH JUICE ON NUTRITIONAL STATUS AND FOOD HABITS OF COLLEGE GOING GIRLS, RAIPUR CHHATTISGARH

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ABSTRACT

Background: College going girls are very important segment of our society especially as a youth population of our country. Positive health of this segment is essential for proper development of country. In India 57.5% girls are suffering from major health problems like anemia, CVD, low immunity power and low physical fitness due to malnutrition, unhygienic environment and lack of knowledge about nutrition. **Objectives:** The present study was carried out to develop an antioxidant rich drink using tomato, carrot and beet root and supplement it to college going girls and portray their demographic profile, impact of drink on nutritional status and physical fitness. **Methodology:** A cross sectional study, using food frequency questionnaire and anthropometry measurements was carried out to elicit the data. 200 college going girls (100 as experimental and100 as control group) were purposively selected from the hostel. Fruit veggie juice was developed using tomato, carrot and beet root and supplemented to anemic girls (experimental group) for three months. The impact of fruit-veggie juice supplementation was evaluated by using anthropometric indices height, weight, BMI, MUAC, and skin fold thickness during pre and post intervention period. **Results:** Overall findings reveals that supplementation of antioxidant juice improved the nutritional status of college going girls. We found positive relationship between existing nutrition knowledge and nutrition education on dietary habits of college going girls.

KEYWORDS: College going girls, nutritional status, BMI, MUAC, skin fold thickness.

INTRODUCTION

College going age is the stages of completion of growth and sexual maturation. The timing of growth spurt and onset of sexual function varies in individual, which causes unhappiness and embarrassment among them. This wide individual range gives some vagueness in setting age borders to college going girls. Positive health of this segment is essential for proper development of country. In India 15% population consist young people, having their studies in higher institutes, but the health status of this segment is alarming in term of deficiency disease by which they are suffering. In India 57.5% girls are suffering from major nutritional problems like anemia, CVD, low immunity power and low physical fitness. Proper nutrition in this period can work as a pillar for a lifelong good health.

Nutritional anaemia mainly caused due to absence of important nutrients in diets, which involved in haemoglobin formation and poor absorption of important nutrients by the body. Several studied have investigated nutritional status of college going girls in different parts of India and confirmed that poor dietary practices and lack of knowledge about nutrition are major factors responsible for malnutrition among young population (.N. Arlappa et al.2015), (A. saibaba 2002) and (P.V. Kotecha et al. 2009).

Physical activity is an important part of daily life. It is more important for college going girls for maintaining a healthy weight. A physical activity builds and maintains healthy bones and muscles. Regular activity also helps to promote a healthy body. It has been observed that the due to change in life style pattern young population are facing several health problems like obesity, anaemia and even Vitamin-D deficiency. So nutrition education and health awareness about importance of balanced diet is needed in this period, to maintain the health (Recep Kurkcu and Sanliurfa-Turkey 2010).

Govt. has initiated several health policies with nongovernment agencies to combat health issues of this segment, but these policies are not yet properly implemented in urban and rural areas of country (Leonie Nzefa Dapi, 2005). Polices and initiated strategies for the well-being of college going girls can be successful only with public-private participation.

The concepts in the field of nutrition are expanding and emphasizing on the use of foods to improve health and reduce the risk of diseases. It has been well established through researches that food acts as a remedy for several diseases like obesity, diabetes, cardio diseases and cancer etc. (James F. Sallis, Thomas L.1997). The present study was carried out

to develop an antioxidant rich drink using tomato; carrot and beet root and supplement it to college going girls and to assess the impact of drink on nutritional status and physical fitness.

METHODOLOGY

This study was conducted in Raipur city of Chhattisgarh. 200 college going girls pursuing under graduated and post graduated programs were selected for the study. As a first step of investigation personal information about age, cast, type of family, birth order, no. of family members, educational status of parents, occupation of parents, monthly income of parents, type of house were collected as demographic profile**.**

To maintain study protocol the proposed work was approved by institutional ethical committee.

A pilot study was performed on five percent of the selected sample as suggested by Kothari (2005) before the final conduction of the survey.

Girls were divided into two groups one with controlled group (100) whose Hb was normal and second as experimental group (n=100) whose Hb was less than normal (11gm/dl). 150 ml antioxidants juice was daily supplemented to experimental group for three months. The combination of antioxidants juice provide 4.0 mg of lycopene.4.0 mg of bet-carotene and 2.0 mg of xenthosanin. Subjects were asked to consume the juice with between the two meal, subjects were advised to maintain their diet and physical activity levels.

Clinical examination was done to observe the presence or absence of deficiency symptoms of diseases among college going girls.

Assessment of nutritional status is one the first step in the formulation of any public health strategy to combat malnutrition, as the ultimate of nutritional assessments is to improve human health Mahtab S. Bamji, N. Pralhad Rao, Vinodini Reddy (1998). So Height in (c. m.), weight in (k.g.), were taken to get BMI for the assessments of nutritional status. The importance of these measurements are well established by (Elizabeth, 2000), (Ramalingaswami, 1993) and (Priyatomako *et al.,* 2001). The BMI (body mass index) (Quetlet index) was calculated by dividing the individual's weight (kilogram) by the square of height (meters). After the computation of BMI, subjects were classified according to the norms given by Mahtab S. Bamji, N. Pralhad Rao, Vinodini Reddy (1998).

$$BMI = \frac{\text{Weight (kg)}}{(\text{Height})\ 2\ (m)}$$

Dietary pattern of individual was collected through the interview and 3 days recall method. All the results were statistically analyzed using SPSS software (version16).

RESULTS AND DISCUSSION

Demographic profile gives clear picture of family's culture and customs. Total 10 variables were obtained from the background information. Out of 200 girls 65% girls were between the age group of 18-20 years of age. 20% girls were between the ages of 21-23 years and only 15% girls were between the age group of 24-26 years respectively. While gathering data of educational status of adolescent's girls, it was observed that 83% girls were under -graduate and 17% girl was post graduate student. Birth orders of as per affect the health status, so it was collected cautiously. Out of 200 girls 50% girls had birth order between 1-2, 25% girls were between the 3-4 and 25% girls were between the 5-6 numbers of birth order.

Table No. 1: Demographic profile of college going girls.

S No.	Particulars	Number	%
Total		200	100
1.Age			
a. 18-20		130	65
b. 21-23		40	20
c. 24-26		30	15
Total		200	100
2.	Category of college going girls	-	-
a. General		50	25
b. O.B.C.		100	50
c. ST		25	12.5
d. ST		25	12.5
Total		200	100
3.	Types of family	-	-
a. Joint family		120	60
b. Nuclear family		80	40
		50	25
Total		200	100
4.	Education of college going girls		
a. Under graduate		165	83
b. Post graduate		35	17
Total		200	100
5.	Birth order of girls		
a. 1-2		100	50
b. 3-4		50	25
c. 5-6		50	25

Total	Education of fathers	200	100
6.		-	-
a. Higher secondary		120	60
b. Graduated		50	25
c. Post graduated		30	15
Total		200	100
7.	Education of mothers	-	-
a. High school		70	35
b. Higher secondary		60	30
c. First years appeared in college		50	25
d. Post graduated		20	10
Total		200	100
8.	Types of houses		
a. Pakka house		75	37
b. Kachha house		125	63
Total		200	100
9.	Number of family members	-	-
a. 5-10		80	40
b. 11-20		120	60
Total		200	100
10.	Monthly income	-	-
a. 5000<		40	20
b. 5000-9999		40	20
c. 10,000-14999		20	10
d. 15000-24999		40	20
e. 25000-50,000		60	30
f. 100000-500000		-	-
a. >500000		-	-
		200	100

The educational qualification of a family reflects the clear picture of existing knowledge and importance of nutrition in their life. It was observed that 60% fathers were higher secondary educated, 25% fathers were graduate and only 15% were post graduate while analyzing mother's education 35% mothers were high school pass, 30% were higher secondary, 25% were appeared in college and only 10% mothers were post graduate.63% girls were found living in kachha house and 37% girls were living in pakka house.

While analyzing family it was observed that 40% girls were having 5-10 family members and 60% girls were having 11-20 family members. Out of 200 college girls were 60% living in joint family and 40% girls were living in nuclear family in present study.

The monthly income of girl's family was noted, it shows that out of 200 parents, income of 20% parents had income <5000 Rs. ,20% parents had income between the 5000-9999 Rs.,

10% parents were between the 10000-14999 Rs., 20% were 15000-24,999 Rs. and 30% parents were between the 25,000-50,000 Rs. The category of cut was the last variable obtained in presents study 50% girls were belonging to general category, 25% girls were belonging to other beck warred classes (OBC) and 12.5% girls were SC & 12.5% Were ST category.

Nutritional status of college going girls

While analyzing BMI categories of experimental group, it was observed that the mean BMI levels were increased by 20.70 to 21.34. While categorizing girls as per their grades of obesity it was noticed that 58% girls were normal, 23% were under weight, 13% were overweight and only 6% had obesity. It can be concluded that there was a positive impact of juice supplementation on nutritional status of college going girls, as 87% girls were shifted from various grades of BMI to normal BMI **(Table No.2).**

Table No. 2: Distribution of girls as per their BMI category*

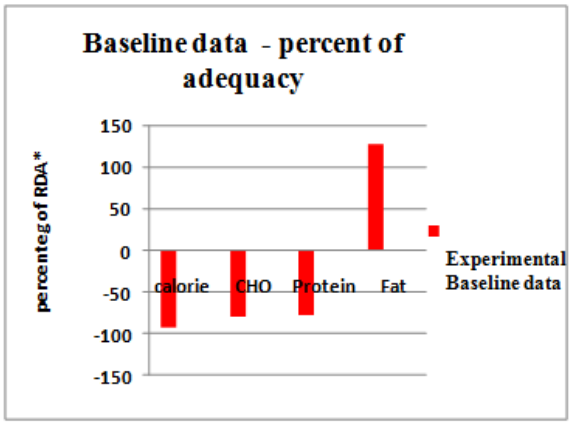
Category of BMI	Experimental Group						Control Pre data	Control Final Data
	Baseline Data			Final Data				
	N	%	Mean+-SD	N	%	Mean+-SD	Mean+-SD	Mean+-SD
Normal	58	58	19.70+-1.78	87	87	20.45+-1.15	23.87+_3.77	24.88+-3.89
Underweight	23	23	16.76+- .93	00	00	00		
Overweight	13	13	23.98+-2.51	10	10	23.58+-2.50		
Obesity I	6	6	26.06+-3.22	3	3	26.58+-3.55		
Total	100	100	20.70+-1.782	100	100	21.34+- 3.45		

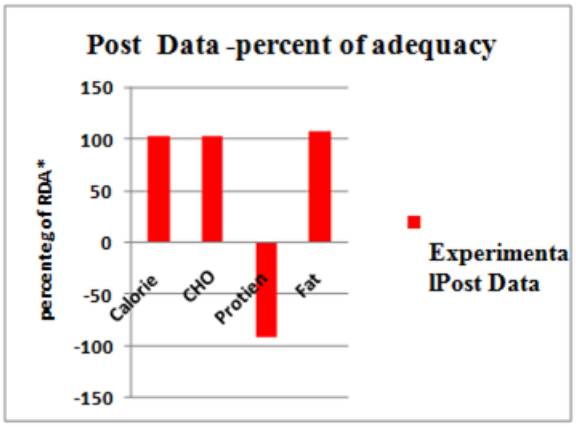
Table No. 3: Comparative analysis of BMI category of girls.

Groups	Experimental Group		t-value	Level of Sig.
	Baseline Data mean+-SD	Post data mean+-SD		
Experimental Group(N=100)	19.70+_1.782	21.34+_ 3.45		
Control Group (N=100)	23.87+_3.77	24.88+_3.89	32.12	.01*

Table No-3 depicts the comparative analysis of pre and post mean score of BMI, of 200 college going girls. It was observed that BMI levels were increased from 20.70 to 21.34 in experimental group and in control group it was increased by 23.87to 24.33. The result shows positive impact of juice supplementation. The results were significant at .01*level (**Table No.3).**

Comparative analysis of Nutrient intake percent of * of college going girls





*Suggested Allowance of RDA by ICMR (RDA 2010)

While analyzing nutrient intake percent of adequacy of college going girls, it was observed that in experimental group the nutrient intake was enhanced after nutrition education as final data for percents of adequacy of total calorie found excess +102.24, carbohydrate was enhanced by +101.89 and fat +107.32. The consumption of protein was found to be in deficit when compared against the suggested allowance (RDA 2010) (Figure No.1).

Table No. 4: Food intake pattern of Adolescences College going girls.

Food stuff (g)	Actual intake	Per cent adequacy	Suggested allowance*
Cereals	350	+129.9	270(gm)
Pulses	46	-66.6	60(gm)
Green leafy vegetables	17	-11.33	150(gm)
Other vegetables	75	-37.5	200(gm)
Roots and tubers	150	-75	200(gm)
Fruits	35	-17.5	2009(gm)
Milk and milk products	400	+133.3	300(ml)
Sugar	25	+125	20(gm)
Fats and oils	35	+175	20(gm)
Calcium	500	-83.3	600mg/dl
Iron	15	-71.4	21mg/dl

(RDA 2010)*

Consumption of cereals, milk and milk products and fats and oils, sugar and sugar products were found to be excess and the percentage adequacy of these food stuffs included+129.9 per cent, +133.3 per cent and +175per cent respectively.

The consumption of pulses, green leafy vegetables, other vegetables, root vegetables calcium, iron and fruits were found to be in deficit. When compared against the suggested allowance

given by RDA (2010) and the percentage inadequacy of pulses, green leafy vegetables, other vegetables and fruits were -66.6 percent,-11.33 percent,-37.5 percent, -75 percent, -83.3 percent,-71.4 percent and -17.5percent respectively.

DISCUSSION

There are no previous studies that characterize the evaluation of antioxidant juice on nutritional status of college going girls. To the best of our knowledge, this is the first study based on evaluation of nutrition intervention on nutritional status of college going girls from Raipur city. The college going girls are very important segment of society in terms of vulnerability who did not give proper attention towards their nutritional needs.

The data on demographic profile and dietary survey of girls were comparable with other studies conducted in India for the assessment of nutritional status of college going girls. The overall result of present study shows that after nutrition supplementation 87% girls fall in normal BMI category, the results were close to the study conducted by **A. saibaba (2002)** and **varun gaikli et al. (2014**).

The consumption of food stuff of 42% college going girls was changed after juice supplementation. The present result support other previous study results **Leonie et al. (2005)** who worked on adolescents food habits and nutritional status in urban and rural areas in Cameroon, Africa.

The present study and data on prevalence of anaemia and impact of juice supplementation on nutritional status of college going girls can be recognized as mile stone in the field of nutrition. Public private partnership and parent's role can improve the nutritional status of girls.

CONCLUSION

Fruit veggie drink containing multi antioxidants was developed with a view to improve health and physical fitness of college going girls and can be sold at commercial level. Based on the results it can be concluded that addition of salt, sugar and lemon juice can increase the acceptability of drink. Further studies are required on sports person to improve their sport performance and reduce the oxidative stress.

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