

Effect of Nutrition Counseling on Junk Food Intake and Anthropometric Profile among Adolescent Girls of Working Mothers

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Abstract- Sixty adolescent girls of working mothers aged 16-18 years who used to eat junk foods frequently were selected from two schools in Ludhiana and divided equally into two groups viz. Experimental (E) and Control (C). Nutrition counseling was imparted for a period of three months. The data on demographic information, junk food consumption pattern, food intake and anthropometric parameters were recorded before and after nutrition counseling. The mean monthly per capita income was Rs. 4432.2±3309.46 and Rs.7347.73±9068.23 in both the groups respectively. It was observed that 86.7 & 93.3 per cent of subjects spent their monthly pocket money on junk foods in group E & C and majority ate junk foods once a week. Junk foods contributed to 54 & 57 per cent and 50 & 54.32 per cent to total energy intake in group E & C before and after nutrition counseling respectively. The daily intake of cereals, pulses, roots & tubers, green leafy vegetables, other vegetables, fruits and milk & milk products increased, while intake of fat & oils decreased in group E after nutrition counseling. A significant ($P \leq 0.01$) reduction in weight i.e. 55.5 to 54.5 kg and BMI i.e. 22.09 to 21.06 kg/m² was observed in group E. The results of present investigation suggested that there is need to focus on nutrition counseling to facilitate the intake of healthy junk foods like fermented foods, wheat noodles by adding lots of vegetables, sprouted pulses, sprouted tikki, vegetable samosa & cutlets, wheat and multigrain bread.

Index Terms- Adolescent girls, food intake, junk food, nutrition counseling, weight

I. INTRODUCTION

Junk foods are unhealthy, contains chemical additives. School canteens are offering foods high in fat and sugar which actually contributing to the youth weight gain along with other problems like infections, food poisonings and dental diseases. Consuming junk foods might stop the children from taking healthy meals either at school or at home. The practice of high consumption of junk foods like maggi noodles, burgers, pao-bhaji, sandwiches, hot dogs, patties, pastries, pop-corn, potato chips, carbonated drinks, biscuits, muffins, toast, kulcha-channa, samosa, chocolates etc have become common feature of adolescent's diet throughout the world (Pathak 2010).

In India, adolescents account 20 per cent of the total population (UNICEF 2011). Erratic eating behaviors such as

unhealthy dieting or meal skipping are not uncommon. Adolescent's eating behaviors are strongly influenced by their social environments, which include family, peer networks, schools, advertising, religion and knowledge. They frequently overconsume fast foods and underconsume fruits, vegetables and dairy products (Gomathy and John 2008).

According to WHO, in India, more than 3 per cent of the population is in the obese category. Obesity is an emerging major public health problem throughout the world among adolescents. Poor dietary habits combined with decreased physical activity have led to an increase in overweight and obesity among adults and children (Singh 2010).

Nutrition counseling is a process by which beliefs; attitudes, environmental influences and knowledge about food and health are channelized into actual practices which are sound and consistent with the individual needs, purchasing power, food availability, health and socio-cultural background. It is one of the most effective tool of changing the food habits without affecting their sentiments (Monga et al 2008). Nutrition counseling regarding the importance of balanced diet, harmful effects of junk foods will help to curb the junk food addiction and improving their nutritional status. Keeping this in view, the present study has been planned to determine effect of nutrition counseling on junk food intake and anthropometric profile among adolescent girls of working mothers.

II. MATERIAL AND METHODS

A. Selection of subjects

A sample of 60 adolescent girls of working mothers aged 16-18 years who used to eat junk foods frequently were selected randomly from two schools and divided equally into two groups viz. Experimental (E) and Control (C). Nutrition counseling was imparted to group E, while group C was not be given any nutrition counseling.

B. Food intake and anthropometric parameters

Food intake of the subjects was recorded for seven consecutive days by "24 hour recall method" using standardized containers before and after nutrition counseling and was compared with ICMR (1999) recommendations. Height, Weight, Mid upper arm circumference (MUAC), Triceps skin fold thickness (TSFT) were recorded before and after nutrition counseling using

standard methods given by Jelliffe (1966). Based on the measurements, Body mass index (BMI) was calculated.

C. Nutrition counseling

Nutrition counseling was imparted to the subjects of group E in the form of modules, as well as lectures, visual aids like charts and posters and flash cards for a period of three months (fortnightly) on the balanced diet, cooking practices, ill effects of junk foods and also how to make junk foods healthy.

D. Statistical analysis of data

The data was analyzed statistically by using appropriate statistical tools such as mean, standard error and percentage. To test the significance, student's t-test was applied. The relevant correlation coefficient (r) was also computed (Singh et al 2004).

III. RESULTS AND DISCUSSIONS

Demographic information of the subjects

In the present study, the mean age was 17.00 ± 1.00 and 17.00 ± 1.00 years in both the groups respectively. It was also observed that majority of fathers (60 & 60 per cent) and mothers (80 & 50 per cent) were involved in service, while 13.3 & 33.3 per cent of fathers and 20 & 50 per cent of mothers were engaged in business and self employment like boutique, beautician, tutor, packing of tiffin system etc. The mean monthly income was Rs. 17220 ± 14273.71 and Rs. 28448.28 ± 31690 in both the groups respectively. It was observed that 50 per cent of subjects skipped breakfast daily due to lack of time in group E. Further, 33.3 per cent skipped lunch in group E due to lack of appetite. However, after nutrition counseling, majority of the subjects in group E started taking regular meals at proper time, instead of eating junk foods. It was also seen that majority of the subjects (86.7 and 93.3 per cent) spent their monthly pocket money on junk foods in group E and C respectively. Further, 53.3 & 23.3 per cent consumed junk foods at least once a week and 20 & 33.3 per cent thrice a week in both the groups respectively.

Junk Food Consumption Pattern

Consumption of various junk foods among adolescent girls before and after nutrition counseling is given in table 1. The results revealed that 50 & 40 per cent, 50 & 50 per cent and 20 & 20 per cent of subjects consumed south Indian foods like dosa, idli and uttapam once a week in group E & C before nutrition counseling respectively. The most common Chinese food items were noodles (60 & 50 per cent), macaroni (60 & 73.4 per cent), pasta (40 & 40 per cent) and magi (13.3 & 43.4 per cent) in both the groups respectively. Table 2 depicted that 100 & 100 per cent, 100 & 100 per cent, 100 & 73.4 per cent, 80 & 90 per cent, 63.4 & 73.4 per cent, 66.7 & 80 per cent and 43.4 & 40 per cent of subjects consumed fried foods like potato chips, kurkure, kulche/bhatura channe, paneer pakora, bread pakora, cutlets and samosa in group E & C before nutrition counseling respectively. It was observed that frequency of consumption of junk foods decreased after nutrition counseling in group E, as they were motivated to decrease the consumption of high fat foods, market foods, ready to eat foods, junk foods like pizza, burger, fried foods etc. and were taught to consume healthy junk foods like fermented foods, wheat noodles by adding lots of vegetables,

sprouted pulses, vegetable samosa, cutlets, wheat and multigrain bread and use of less oil in cooking to remain healthy and fit. However, negligible change was found among subjects of group

C. It was also observed that daily consumption of coffee was most common in 40 and 30 per cent in group E before and after nutrition counseling respectively. The subjects were taught to reduce the intake of caffeinated beverages as it directly affects the brain and also causes acidity. It was also observed that 43.3 and 36.7 per cent of subjects in group E preferred carbonated drinks with meals before and after nutrition counseling respectively. They were also taught to reduce the intake of carbonated drinks as it would increase the risk for obesity, tooth decay and bone fractures. The data revealed in the present study that 83.3 & 73.4 per cent and 13.3 & 20 per cent consumed chocolates and ice cream before nutrition counseling. In spite of nutrition counseling, the intake of ice cream was similar. Mahajan (2011) also observed that the frequency of consumption of fast food items like pakora, burger, macaroni, manchurian, magi, noodles, samosa significantly decreased after nutrition intervention.

Per cent contribution of junk foods to the total energy

As depicted in the table 2, junk foods contributed to 54 & 57 per cent and 50 & 54.32 per cent to total energy intake in group E & C before and after nutrition counseling respectively. Further, the results of the present study revealed that fat from junk foods contributed to total energy intake as 37 & 39 per cent and 33 & 38.52 per cent in both the groups respectively.

Food intake

The mean daily food intake by the subjects before and after nutrition counseling is given in table 3. It was observed that the mean intake of cereals among the subjects was 200 ± 1.00 & 175.04 ± 46.92 g and 236 ± 4.73 & 169.31 ± 45.84 g in group E & C before and after nutrition counseling respectively. The increased consumption of cereals in group E could be due to increase in intake of cereal foods which contains phenolic acid and phytoestrogens with antioxidant properties and decrease the intake of processed cereals. The mean daily consumption of pulses in group E & C were 45.04 ± 17.92 & 46.45 ± 14.71 g and 53.95 ± 19.42 & 45.30 ± 14.09 g before and after nutrition counseling respectively. A significant ($P \leq 0.01$) increase in intake of pulses was observed in group E, perhaps due to the more inclusion of sprouted pulse products like stuffed parantha, salad, chat, raita etc. after nutrition counseling. The intake of green leafy vegetables was only in missi roti and it was astonishing to see very little intake of green leafy vegetables in the subjects of both the groups because they did not like the taste of green leafy vegetables in vegetable form. The mean daily intake of green leafy vegetables was only 5.23 ± 10.26 & 12.52 ± 21.65 g and 8.08 ± 12.94 & 12.11 ± 21.38 g in group E & C before and after nutrition counseling respectively. After nutrition counseling, the subjects came to know about the importance of GLV's being cheap source of vitamins, minerals and fiber. The mean daily intake of roots & tubers by the subjects of group E & C before and after counseling were 79.60 ± 33.77 & 90.78 ± 2.22 g and 88.30 ± 29.14 & 91.71 ± 32.29 g respectively. The mean daily consumption of other vegetables was 21.76 ± 12.85 &

23.90±18.19 g and 26.00±12.18 & 23.52±16.32 g in group E & C before and after nutrition counseling respectively. However the intake was less than the suggested intake but a significant increase was reported in group E due to more intake of cucumber in the form of salads, other vegetables like cabbage, peas which are high in fiber and provide more satiety in their daily dietary meals.

The commonly consumed fruits by the subjects were apple, banana, orange and tomato etc. The mean daily intake of fruits in group E & C was 41.52±30.09 & 51.04±30.02 g and 55.76±36.44 g and 50.71±29.69 g before and after nutrition counseling respectively. An increase was reported in group E as the subjects used to take amla, ber, guava and papaya as their beneficial effects were taught during nutrition counseling sessions. Srivastava (2009) also suggested that soluble fiber found in legumes and fruits decreases fat absorption and recommended adequate consumption of fresh fruits and vegetables as they contain antioxidants which protect our body from harmful free radicals.

The consumption of milk & milk products was in the form of curd, butter milk, tea, coffee, cheese etc. The mean daily intake of milk & milk products was 213.19±113.52 & 246.00±107.90 g and 252.00±120.31 & 244.00±104.71 g in group E & C before and after nutrition counseling respectively. The subjects in group E who were not in habit of taking milk started consuming milk at least once a week. It was observed that the mean daily intake of non-vegetarian foods in group E & C was only 3.57±8.12 & 5.00±16.68g and 0.71±3.91 & 3.09±14.68 g before and after nutrition counseling respectively due to its high cost. Eggs were taken at least twice a week by only 10 per cent subjects in the form of omelette, boiled egg and scrambled egg, while 7 per cent consumed eggs occasionally. Fats & oils were consumed in the form of vanaspati, refined oil, butter and fried foods such as *pakor*s, *samosa*, *parantha*, *puri*, *bhatoora*, *pinni*, *panjeeri* and groundnuts as the subjects were in the habit of eating some of these items at lunch-break from school canteen. It was observed that the average intake of fats & oils in group E & C was 28.86±8.38 & 33.02±10.59 g and 25.5±4.39 & 32.50±10.56 g before and after nutrition counseling respectively. The intake of fats & oils in the group E was marginally less, while, it was higher in group C when compared to ICMR recommendations. The subjects in group E were taught about healthy junk foods and decrease intake of fried foods as it could lead to overweight or obesity. It was observed that the subjects shifted to *stuffed or plain roti* with curd or vegetables etc instead to take butter, ghee, cream along with *parantha* after nutrition counseling sessions. The sugar was mainly consumed in the form of biscuits, cakes, chocolates, *gajrela*, ice cream *pinni*, *panjeeri*, shakes, soft drinks, sweets, toffees and by addition in milk, tea, coffee etc. Statistically, no significant increase in intake of sugar was observed in group E as the subjects were taught to reduce the intake of sweet meats and sweet dishes as it resulted in overweight and obesity, diabetes, hypertension etc. Intake of sugar and jaggery was found to be lesser i.e 25 and 22 g among children of Jalandhar and Kapurthala was reported by Nahar *et al* (2009).

Anthropometric Measurements

Anthropometric measurements of the subjects are presented in table 4. The mean height of subjects in group E was 162.00±4.00 cm before nutrition counseling. The corresponding values after nutrition counseling were 162.15±3.35 cm in group E. It was observed that the mean weight of subjects recorded in group E & C was 55.00±10.00 & 45.00±3.35 kg before nutrition counseling respectively. The corresponding values after nutrition counseling were 54.5±5.03 kg in group E, while in group C, no significant change was observed. Subjects were advised to increase the consumption of whole cereals, multigrain and whole wheat bread, sprouted pulses, fermented products like *idli*, *dosa*, salad etc. for the maintenance of weight. It was observed that nutrition counseling cum physical activity, involvement in household chores, reduction in total energy intake from fats and sugars and consumption of processed/junk foods resulted in weight reduction in group E. Sikandra and Punia (2010) reported that mean weight was higher in obese respondents i.e. 62.53±1.71 kg as compared to non-obese (51.86±1.35 kg).

The mean BMI of subjects in group E decreased from 22.09±3.50 to 21.06±2.00 kg/m² respectively after nutrition counseling was due to reduction of body weight as the subjects were taught to control their body weight by improving their eating habits and life style pattern, while in group C, no change was seen in BMI of the subjects. The mean values of MUAC and TSFT in group E was 26.00±2.36 & 27.20±1.83 cm and 14.00±3.00 & 14.22±2.26 mm before and after nutrition counseling respectively. It was seen that MUAC and TSFT values were lower in both the groups than suggested value of 16.5 mm as reported by Jelliffe (1966).

Distribution of subjects according to grades of obesity

According to BMI classification, majority of subjects i.e. 76.6 and 86.6 per cent fell in the normal category followed by 20 and 13.3 per cent were pre obese and only 3.4 and 0.0 per cent were underweight in group E before and after nutrition counseling respectively. It was also noticed that majority i.e. 56.6 and 50 per cent were underweight followed by 40 and 46.6 per cent were come under normal category in group C respectively. Bisla *et al* (2009) reported that 29.22, 13.33 and 46.66 of girls in Rajasthan ranged BMI <18.5, 18.5-20 and 20-25 kg/m² respectively.

Coefficient correlation (r) between junk foods intake and anthropometric parameters

Table 7 showed that most relevant significant (P≤0.01) relationship between fried food vs weight (r=0.966 & 0.869) in group E & C, sweet meats vs weight (r=0.780), while Chinese foods was also highly significant (P≤0.01) and positively correlated to weight and BMI (r=0.573, 0.508) in group E respectively. The data in the table revealed that correlation coefficient were significant and positive between fried foods vs BMI (r=0.344, 0.794) in both the groups respectively. The relationship could be explained on the basis that adolescents with high intake of fat in the form of fried foods, fast foods, cakes, pastries.

Table 1 Consumption pattern of Junk foods before and after nutrition counseling

Food items	Group E(n=30)		Group C(n=30)	
	Before	After	Before	After
South Indian foods				
<i>Dosa*</i>	15(50)	8(26.7)	12(40)	12(40)
<i>Wada*</i>	10(33.4)	4(13.3)	4(13.3)	4(13.3)
<i>Idli*</i>	15(50)	6(20)	15(50)	15(50)
<i>Uttapam*</i>	6(20)	0(0)	6(20)	6(20)
Chinese foods				
Noodles*	18(60)	9(30)	15(50)	15(50)
Macroni*	18(60)	10(33.4)	22(73.4)	22(73.4)
Manchurian*	16(53.3)	8(26.7)	12(40)	12(40)
Pasta*	12(40)	8(26.7)	12(40)	12(40)
Spring rolls*	11(36.7)	6(20)	8(26.7)	8(26.7)
Chaupsy*	5(16.7)	2(6.7)	1(3.4)	1(3.4)
Magi*	4(13.3)	2(6.7)	13(43.4)	13(43.4)
Fried foods				
<i>Potato chips*</i>	30(100)	25(83.3)	30(100)	30(100)
<i>Kurkure*</i>	30(100)	25(83.3)	30(100)	30(100)
<i>Kulcha channa*</i>	30(100)	23(76.7)	22(73.4)	22(73.4)
<i>Paneer pakora*</i>	24(80)	18(60)	27(90)	27(90)
<i>Bread pakora*</i>	19(63.4)	8(26.7)	22(73.4)	22(73.4)
<i>Cutlets*</i>	20(66.7)	13(43.4)	24(80)	24(80)
<i>Tikki*</i>	13(43.4)	4(13.3)	16(53.3)	16(53.3)
<i>Samosa*</i>	13(43.4)	5(16.7)	12(40)	12(40)
<i>Pao – bhaji*</i>	11(36.7)	8(26.7)	8(26.7)	8(26.7)
<i>Kachori*</i>	8(26.7)	2(6.7)	4(13.3)	4(13.3)
Burger*	8(26.7)	5(16.7)	11(36.7)	11(36.7)
Bakery items				
Bread*	14(46.7)	8(26.7)	5(16.7)	5(16.7)
Cakes*	10(33.4)	3(10)	10(33.4)	10(33.4)
<i>Petties*</i>	9(30)	5(16.7)	5(16.7)	5(16.7)
Pastry*	7(23.4)	4(13.3)	7(23.4)	7(23.4)
Biscuits*	6(20)	4(13.3)	6(20)	6(20)
Pizza*	6(20)	4(13.3)	5(16.7)	5(16.7)
Sweet dish				
<i>Pinni*</i>	20(66.7)	13(43.4)	24(80)	24(80)
Chocolate*	25(83.3)	18(73.4)	22(73.4)	22(73.4)
<i>Gajrela*</i>	20(66.7)	13(43.4)	24(80)	24(80)
<i>Halwa*</i>	15(50)	8(26.7)	27(90)	27(90)
Sweet meats*	13(43.4)	8(26.7)	1(3.4)	1(3.4)
Ice-cream*	4(13.3)	3(10)	6(20)	6(20)
Beverages				
Tea *	19(63.3)	15(50)	25(83.3)	25(83.3)
Coffee*	12(40)	9(30)	10(33.3)	10(33.3)
Carbonated drink *	13(43.3)	11(36.7)	8(26.7)	8(26.7)

* Multiple Responses

Figures in () parenthesis are percentage

Table 2 Per cent contribution of carbohydrates, protein and fats to the total energy intake from junk food intake

Nutrient	Group E (n=30)		Group C (n=30)	
	Carbohydrate	54.00	50.00	57.00
Protein	9.00	11.00	9.80	9.50
Total fat	37.00	33.00	39.00	38.52

Table 3 Mean daily food intake of subjects before and after nutrition counseling (Mean ± SE)

Food group	Group E (n=30)			Group C (n=30)			References # (g)
	Before	After	t-value	Before	After	t-value	
Cereals	200±1.00	236±4.73	2.850*	175.04±46.92	169.31±45.84	1.431 ^{NS}	300
Pulses	45.04±17.92	53.95±19.42	2.518*	46.45±14.71	45.30±14.09	1.136 ^{NS}	60
Green leafy vegetables	5.23±10.26	8.08±12.94	1.988**	12.52±21.65	12.11±21.38	0.261 ^{NS}	100
Roots and tubers	79.60±33.77	88.30±29.14	2.061**	90.78±32.22	91.71±32.29	0.583 ^{NS}	100
Other vegetables	21.76±12.85	26.00±12.18	2.003**	23.90±18.19	23.52±16.32	0.441 ^{NS}	100
Fruits	41.52±30.09	55.76±36.44	2.222**	51.04±30.02	50.71±29.69	1.157 ^{NS}	100
Milk and milk product	213.19±113.5 2	252.00±120.3 1	2.321**	246.00±107.9 0	244.00±104.7 1	0.858 ^{NS}	500
Fats and oils	28.86±8.38	25.5±4.39	1.757**	33.02±10.59	32.50±10.56	1.100 ^{NS}	25
Sugar and jiggery	14.45±7.09	14.31±7.04	0.189 ^{NS}	15.67±6.13	15.48±6.37	1.393 ^{NS}	30
Meat, Fish and poultry	3.57±8.12	0.71±3.91	2.112**	5.00±16.68	5.00±16.68	-	30

ICMR (1999)

* Significant at 1%

NS - Non significant

**Significant at 5%

Table 4 Anthropometric profile of subjects before and after nutrition counseling (Mean ± SE)

Anthropometry	Variable	Group E (n=30)			Group C (n=30)			Reference standard
		Before	After	t-value	Before	After	t-value	
Height (cm)	Age (years)							¥
	16	162.09±5.49	162.45±4.77	1.490 ^{NS}	157.96±5.25	157.96±5.25	-	162
	17	164.5±3.58	164.5±3.58	-	151.68±3.45	151.68±3.45	-	163
	18	158.75±2.62	159.5±1.73	1.566 ^{NS}	158.83±3.20	158.83±3.20	-	164
Weight (kg)								¥
	16	57.54±5.49	55±2.89	2.772*	43.40±3.37	43.65±3.33	1.463 ^{NS}	53
	17	63.64±8.65	61.38±6.81	3.147*	42.52±3.19	42.77±3.04	0.175 ^{NS}	54
	18	45.25±15.90	50±5.41	0.446 ^{NS}	47.83±3.48	47.83±3.48	-	54.4
MUAC (cm)								@
	16	24.72±2.61	25.36±2.06	0.746 ^{NS}	23.25±1.93	23.25±1.93	-	28.5
	17	26.6±2.57	26.73±2.43	1.074 ^{NS}	23.12±2.37	23.12±2.37	-	28.5
	18	25.5±1.91	26.5±1.00	1.732 ^{NS}	24.00±2.00	24.00±2.00	-	28.5
TSFT (mm)								@
	16	14.49±1.99	14.56±1.53	0.467 ^{NS}	13.43±1.97	13.51±1.82	0.166 ^{NS}	16.5
	17	13.72±2.21	14.00±1.89	2.838*	14.46±2.31	14.58±2.05	0.175 ^{NS}	16.5
	18	13.5±4.2	14.1±3.35	1.000 ^{NS}	11.36±0.93	11.36±0.93	-	16.5
BMI (kg/m ²)								#
	16	21.92±1.90	20.86±1.07	3.266*	17.54±2.06	17.65±2.06	1.462 ^{NS}	18.5-24.99
	17	23.50±3.10	22.67±2.48	3.177*	18.47±1.33	18.58±1.30	1.000 ^{NS}	18.5-24.99
	18	20.85±5.45	19.66±2.02	0.645 ^{NS}	20.01±4.15	20.01±4.15	-	18.5-24.99

WHO (2005)

@ Jelliffe (1966)

¥ ICMR (1990)

*Significant at 1 %

NS - Non significant

Table 5 Distribution of subjects according to BMI classification before and after nutrition counseling

Categories of body mass index (Kg/m ²)*	Risk of co- morbidity	Group E (n=30)				Group C (n=30)			
		Frequency		Percentage		Frequency		Percentage	
		Before	After	Before	After	Before	After	Before	After
Underweight (<18.5)	Low (but risk of other clinical problems)	1	0	3.4	0	15	17	56.6	50
Normal (18.5-24.99)	-	23	26	76.6	86.6	12	14	40	46.6
Overweight (≥25.00)	Average	-	-	-	-	-	-	-	-
Pre obese (25-29.99)	Increased	6	4	20	13.3	1	1	3.4	3.4
Obese I (30-34.99)	Moderate	-	-	-	-	-	-	-	-
Obese II (35-39.99)	Severe	-	-	-	-	-	-	-	-
Obese III (≥40)	Very severe	-	-	-	-	-	-	-	-

* WHO (2005)

Table 6 Coefficient correlation (r) between junk foods intake and anthropometric parameters

Nutrient \ Anthropometric parameters	Group E (n=30)			Group C (n=30)		
	Weight	BMI	MUAC	Weight	BMI	MUAC
South Indian foods	0.040 ^{NS}	0.055 ^{NS}	0.152 ^{NS}	0.184 ^{NS}	0.186 ^{NS}	0.108 ^{NS}
Chinese foods	0.573*	0.508*	0.158 ^{NS}	0.145 ^{NS}	0.146 ^{NS}	0.132 ^{NS}
Fried foods	0.966*	0.344***	0.943*	0.869*	0.794*	0.212 ^{NS}
Bakery products	0.372**	0.254 ^{NS}	0.299 ^{NS}	0.163 ^{NS}	0.037 ^{NS}	0.180 ^{NS}
Sweet dishes	0.780*	0.092 ^{NS}	0.754*	0.039 ^{NS}	0.188 ^{NS}	0.034 ^{NS}

*Significant at 1 %

** Significant at 5%

*** Significant at 10 %

NS- Non Significant

IV. CONCLUSION

In the light of above discussion, the scrutiny of the data indicated that faulty food habits, more intake of junk foods, inadequate intake of fibrous foods resulted in increased incidence of obesity. Therefore, all the subjects if given proper guidance and counseling regarding food choice and lifestyle modifications could help in maintaining weight. Nutrition counseling helps in improving feeding pattern of adolescents.

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