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Contribution of Nutrition Education in Dietary Habits of Overweight and Obese Females in Hathras City (U.P.)

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Abstract: The present study was carried out (1) to provide nutrition education to the overweight and obese females and (2) to evaluate impact of nutrition education on their food habit and practices of physical exercise. The data were collected with the help of "Questionnaire cum Interview Technique." The questionnaire having all relevant information was pretested and pre designed the data were collected at two phases: one at initial phase of the study before implementation of nutrition education and secondly at post phase of the nutrition education. The base line study was conducted on 300 overweight and obese females purposely selected from four areas of the city. Equal number of subjects (one hundred each) were considered from high, middle and low income groups. Due to various constraints the nutrition education was imparted to 150 subject only. The inferences were drawn with the help of suitable statistical tools. Majority of the females were vegetarian (95.33%) at the initial phase of the study, but there was no change in this habit after imparting the nutrition education ($p>0.05$NS). So for as consumptions of food items and practices of physical exercise were concerned, there were significant changes ($p<0.05$). Practicing of good food habits were developed and consumption of sweet dishes, fatty fried items and cold drinks were discouraged.

Key words: Prevalence, nutrition-education, food habit, food consumption

INTRODUCTION

Obesity senses when the energy consumption exceeds the requirement to accomplish basic metabolism and physical activities of the subject. Additional factors causing obesity are genetic disorders, hypothyroidism, medication of psychotic drugs, insufficient sleep, stress, sudden smoking caseation, sedentary life style, eating disorders and intake of high glycemic diet (Barness *et al*., 2007; Wood House, 2008; Vaharatian, 2009).

Prevalence of obesity is increasing rapidly in developed as well as in developing countries of the world. The women in the middle and menopausal age groups are becoming easy prey of the disease in comparison to male counterparts. Further the prevalence of obesity in males and females is taking the form of epidemic requiring attention of the health care provides, policy makers and administrators of the affected regions (Sidhu and Tatla, 2002; Subramanyam *et al*., 2002; Sidhu *et al*., 2005).

The principle of reduction in extra energy by the obese subjects has been proved on effective method to eliminate obesity and nutrition education is helpful in dissemination of the messages regarding various aspects of prevention of the disease. The subjects are educated to reduce energy consumption by consuming low amount of carbohydrate and sugar diet. So far as production of energy is concerned, fat is the most energy densed macro-nutrient and it provides lows satiety feeling than other nutrients. In addition its great flavour and palatability lead to heavy consumption of fatty food items causing obesity. The obese subjects are also advised to use minimum amount of fat, if not zero; use of mustered oil or unsaturated fat as alternative of saturated fat (Duvigneaud *et al*., 2007; Mohanty *et al*., 1994; Krauss *et al*., 2000; Foster *et al*., 2003; Stern *et al*., 2004; Strycher, 2006).

In view of the aforesaid descriptions, the present study was formulated to accomplish following objectives:

- To provide nutrition education to the subjects and
- To evaluate impact of nutrition education on food intake habits and practices of physical exercise.

Consequently the hypothesis "the nutrition education has significant impact on knowledge of the nutrients, food habits and physical exercises practiced by the overweight and obese females" was framed.

MATERIALS AND METHODS

The data were collected with the help of questionnaire cum interview technique. A pretested and predesigned questionnaire having all relevant information was used for this purpose. The information were collected at base line period and secondly at post phase of the nutrition education. The base line information were collected from 300 overweight and obese females aged 30-50 years. These subjects were selected from 4

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representative areas of Hathras City. Purposive sampling technique was employed for the selection of overweight and obese subjects. Due to various constraints the nutrition education was imparted to 150 overweight and obese women from high, middle and low income groups considering equal number from the each group.

Inspite of large number of nutrition education programmes going on in our country, the nutrition and health status of our population in general and particularly in overweight and obese females are unsatisfactory requiring special attention in order to achieve atmost well being of the desired subjects.

The present study highlighted that the overweight and obese females were ignored about the need of nutritious diet for themselves. Generally females did not cook special low calorie and low fat diet, but they use to take a potion of food from the meals cooked for the whole family. The females were unaware about the detrimental effects of imbalanced and insufficient food intake. It was interesting that the females knew about the fatly food but still they were not accustomed about the correct methods of preparation of zero oil and low calorie recipe which is most necessary is the preparation of recipes for the ultimate reduction of fat in the body.

Designing and implementation of the nutrition education: The nutrition education packages were designed on the basis of the information collected during baseline survey. First of all, the components of nutrition education were identified from the finding of the base line survey. In identifying these components, the positive and effective procedures were adopted in view of following facts:

- Nutrients
- Cooking demonstration
- Diet chart according to BMI on low fat, low carbohydrate and low calorie diet

Techniques of nutrition education

Diet chart according to BMI: The diet chart provided to the subjects were 1000 Kcal, 1200 Kcal; 1400 Kcal and 1600 Kcal as per suitability to the subjects in view of their BMI.

Health and fitness tips: Tips given were easiest, most effective, simplest and the most economical method to impart education from person to person particularly to the smaller groups.

Cooking demonstration of low calorie and zero oil recipes: The females were grouped in batches of 5-10 and the venue and time were decided according to convenience of the females keeping in view of their occupation in the office, college, field and their routine domestic chores.

Statistical analysis of the data: The inferences were drawn with the help of suitable statistical tools where over felt necessary.

Background information: The overall prevalence of overweight and obesity in Hathras city was ascertained 42.3%. More then two fifth females from all the categories belonged to age group 45 to 50 years and meant±SD values of the age were assessed 42.5±5.77 years for overweight and 42.5±5.43 years for obese females. Nearly three fifth overweight females (57.14%) possessed university education, whereas 37.54% obese females were secondary educated. Majority of the obese (88.74%) females were housewives, while more than half (57.14%) overweight females belonged to business class. In addition majority of the subjects were Hindu.

RESULTS AND DISCUSSION

Effect of nutrition education has been evaluated in order to provide feed back to the beneficiaries. The data of the post-nutrition education period were compared with pre education period and the effect of nutrition education programme was worked out.

Change in food habit: As majority of the females (95.33%) were vegetarian at the initial phase of the study (Table 1), but this habit was not changed at the final stage (93.33%). The nutrition education has no impact to change the food habit of the females (Chi^2 = 0.792, df = 1, p>0.05NS). It was observed that there was change in meal requirement of the females. There were 97.33% females at part intervention period against 92.00% at pre-intervention phase who required meal after feeling hungry. The change was found statistically significant (z = 2.605, p<0.01**). In addition feeling hunger during tension was significantly deteriorated (Chi^2 = 9.968, df = 2, p<0.01**); drinking tea or coffee was reduced (Chi^2 = 11.056, df = 1, p<0.01**). Liking for sweets (Chi^2 = 13.996, df = 3, p<0.01**); use of cold drink (Chi^2 = 9.911, df = 2, p<0.025**); nibbling between meals (z = 7.358, p<0.001***); participation in lunch party outside of the house and taking meal (z = 9.068, p<0.001***) were significantly changed after the nutrition education. Further habit of taking meal slowly (Chi^2 = 12.811, df = 1, p<0.001***) and taking meal with family members (Chi^2 = 6.499, df = 2, p<0.05*) were significantly enhanced. Instead of throwing left out foods, it was given to needy and poor hungry persons (Chi^2 = 129.468, df = 2, p<0.001***) and it was the best utilization of the left out foods.

Above mentioned food practices regarding food consumption were developed in the subjects due to nutrition education proved to them. Further use of salad (Table 1) increased significantly from 68.00-78.67%

Table 1: Food habit of overweight and obese females during pre and post implementation period of nutrition education

	Period of nutrition education						
	Pre (300)		Post (150)		Total (450)		
Food habit	No.	%	No.	%	No.	%	Statistical significance
Vegetarian	286	95.33	140	93.33	426	94.67	Chi^2 = 0.792, df-1, p>0.05NS
Non-vegetarian	14	4.67	10	6.67	24	5.33	
Meal requirement after feeling hungry	276	92.00	146	97.33	422	93.78	z = 2.605, p<0.01**
Feeling hunger during tension							
• Absolutely no.	200	66.67	99	66.00	299	66.44	Chi^2 = 9.968, df = 2, p<0.001***
• Less hunger	34	11.33	31	20.67	65	14.44	
• More hunger	66	22.00	20	13.33	86	19.11	
Drinking tea or coffee							
• Once daily	56	18.67	37	24.67	93	20.67	Chi^2 = 11.056, df = 2, p<0.01**
• Twice daily	179	59.67	99	66.00	278	61.78	
• More than two times	65	21.67	14	9.33	79	17.56	
Consumption of salad	204	68.00	118	78.67	322	71.56	z = 2.485, p<0.02**
Consumption of fruit							
• Daily	70	23.33	39	26.00	109	24.22	Chi^2 = 176.428, df = 3, p<0.001***
• Twice a week	37	12.33	102	68.00	139	30.89	
• Once a week	127	42.33	6	4.00	133	29.56	
• Never	66	22.00	3	2.00	69	15.33	
Habit of breakfast							
• Daily	83	27.67	44	25.33	127	28.22	Chi^2 = 31.392, df = 2, p<0.001***
• Some times	125	41.67	94	62.67	219	48.67	
• Never	92	30.67	12	8.00	104	23.11	
Frequency of meal							
• Two times daily	295	98.33	129	86.00	424	94.22	Chi^2 = 27.941, df = 1, p<0.001***
• Three times daily	5	1.67	21	14.00	26	5.78	
Liking for sweets							
• No	112	37.33	70	46.67	182	40.44	Chi^2 = 13.996, df = 3, p<0.01**
• Some times	104	34.67	59	39.33	163	36.22	
• Once a week	58	19.33	19	12.67	77	17.11	
• Twice a week	26	8.67	2	1.33	28	6.22	
Use of cold drink							
• Mattha or lemon water	36	12.00	21	14.00	57	12.67	Chi^2 = 9.911, df = 2, p<0.025**
• Soft drink	61	20.33	13	8.67	74	16.44	
• Nothing	203	67.67	116	77.33	319	70.89	
Frequency of cold drink							
• Nil	203	67.67	116	77.33	319	70.89	Chi^2 = 4.586, df = 2, p>0.05NS
• Once a day	72	24.00	26	17.33	98	21.78	
• Twice a day	25	8.33	8	5.33	33	7.33	
Nibbling between meals	98	32.67	11	7.33	109	24.22	z = 7.358, p<0.001***
Taking meal outside of the house	88	29.33	4	2.67	92	20.44	z = 9.068, p<0.000***
Participation in lunch party out side of the house							
• Professional or service related	31	10.33	Nil		31	6.89	-
• Kitty party	12	4.00	Nil		12	2.69	
Use of left out food							
• Eat	121	40.33	12	8.00	133	29.56	Chi^2 = 129.468, df = 2, p<0.001***
• Thrown away	104	34.67	16	10.67	120	26.67	
• Give to other	75	25.00	122	81.33	197	43.78	
Speed of taking meal							
• Fast	130	43.33	39	26.00	169	37.56	Chi^2 = 12.811, df = 1, p<0.001***
• Slow	170	56.67	111	74.00	281	62.44	
Companion during taking meal							
• Alone	135	45.00	62	41.33	197	43.78	Chi^2 = 6.499, df = 2, p<0.05*
• With family members	141	47.00	84	56.00	225	50.00	
• During viewing TV	24	8.00	4	2.67	28	6.22	

N.B. Number of subjects is given in parenthesis; *Just significant; **Moderately significant; ***Highly significant; NS = Statistically insignificant (Not significant)

after the education programme (z = 2.485, p<0.02**). Even the use of fruits daily (26.00%) or twice a week (68.00%) elevated to this level from 23.33% (daily) and 12.33% (twice a week) respectively. This finding showed significant change in the habit of using fruits (Chi^2 = 176.428, df = 3, p<0.001***). In an earlier study Srivastava and Madhu (2005) suggested low carbohydrate diet in management of obesity by providing adequate quantity of salads and non-starchy vegetables. Davigneaud *et al.* (2007) mentioned that energy context of fibre per unit weight is low. Consequently, inclusion of fibre in a diet reduced energy density. Dietary fibre tends to reduce dietary intake by slowing digestion and absorption of nutrients and by increasing the production of gut hormones enhancing satiety feeling. Moreover, some types of fibre reduce the overall absorption of fat and protein.

Initially, nearly one third females (30.67%) were not taking breakfast (Table 1), but this habit was reduced to 8.00% at post phase of the nutrition education. More than three fifth females (62.67%); followed by 29.33% used to take breakfast frequently or daily at post phase instead of 41.67 and 27.67% respectively from the initial phase (Chi^2 = 31.392, df = 2, p<0.001***). Huenemann *et al.* (1996) noted a reduction in the number of breakfast eaten by the obese subjects.

The frequency of food consumption plays on important role in the genesis of obesity. It is known that taking one meal per day opposed to two or three has metabolic consequences independent of calorie intake. Epidemiological studies have shown a clear negative correlation between number of meals and obesity, therefore the meals, the greater the tendency toward obesity (Fabray *et al.*, 1966). The frequency of eating also changes the metabolism of glucose and concentration of Cholesterol. Cohn (1964) found that when normal volunteers ate several small meals a day, they had lower concentrations of cholesterol than when the same total intake was eaten in a few large meals. This reduction of cholesterol with frequent ingestion of small meals has been confirmed in other studies (Young *et al.*, 1972). Glucose tolerance curve were also improved when eating three or more meals as compared with one or two large meals. In brief it can be said that frequency of eating is inversely related with obesity Table 1 also shows that overwhelming majority of the overweight and obese subjects (98.33%) consumed meal two times in a day; followed by three times in a day before implementation of nutrition education. The re after providing nutrition education to these females, 1400% of them used to take meal three times daily. The figured showed that 12.33% more females adopted three times meal pattern instead of two times a day. This quality of meal diversion is found statistically significant (Chi^2 = 27.941, df = 1, p<0.001***). This habit will certainly prove a green signal towards improvement of obesity in the females.

Traditional life styles are generally associated with gain in body weight with age. However, modernization apparently has profound effect on body weight. Rapid urbanization and industrialization change in life styles and eating habits. Sedentary occupation contribute to energy imbalance. A sedentary life style favours a positive energy balance and weight gain. The relationship between physical inactivity and obesity however complex, several confounders are likely to complicate the picture such as physical fitness, opportunities for exercise, diet and temporal relationships between exercise and meals.

In the present study, it was observed that initially 59.00% subjects did not perform any kind of physical exercise, while after nutrition education 14.00% more females were encouraged to perform some sorts of physical exercise (Table 2). Consequently at post implementation period , walking, yoga, cycling and gym were performed

Table 2: Type and frequency of physical exercise practiced by the females during pre and post period of implementation of nutrition education

Type and frequency of physical exercise	Period of nutrition education: Pre (300) No.	Pre (300) %	Post (150) No.	Post (150) %	Total (450) No.	Total (450) %	Statistical significance
Type ≠							
Walking	69	23.00	40	26.67	109	24.22	Chi^2 = 7.531, df = 1, p<0.01**
Yoga	72	24.00	58	38.67	130	28.89	
Cycling and gym	3	1.00	4	2.67	7	1.56	
Sports	5	1.67	2	1.33	7	1.56	
Dancing	1	0.33	-	-	1	0.22	
None	177	59.00	68	45.33	245	54.44	
Frequency							
Daily	93	31.00	57	38.00	150	33.33	Chi^2 = 15.101, df = 3, p<0.01**
Five days in a week	2	0.67	8	5.33	10	2.22	
Two days in a week	28	9.33	17	11.33	45	10.00	
Never	177	59.00	68	45.33	245	54.44	

≠ Multiple responses were obtained; Number of subjects is given in parenthesis

by 26.67, 38.67 and 2.67% females in comparison to 23.00, 24.00 and 1.00% females at pre implementation period. The statistical analysis evidenced that there was significant increase in physical activities due to implementation of nutrition education programme (Chi^2 = 7.531, df = 1, p<0.01**). Even the frequency of physical activities were also increased (Chi^2 = 15.101, df = 3, p<0.01**). The frequency of physical activities at post intervention period reached to 38.00% for daily; 5.33% for five days in a week and 11.33% for two days in a week from 31.00, 0.67 and 9.33% respectively at pre intervention period. Sahlin *et al*. (2008) mentioned that with physical exercise muscles consume energy derived from both fat and glycogen. Due to large size of leg muscles walking, running and cycling are the most effective means of exercise to reduce body fats exercise effects macronutrient balance. During moderate exercise, there is a shift to greater use of fat as a fuel.

Conclusion: In the nut shell, the role of nutrition education was found significantly effective to enhance physical exercise (regular walking and practicing yoga); practicing good food habits along with adequate use of salad, fruits and green leafy vegetables; habit of taking breakfast regularly and required quantity of diet in more frequency by avoiding sweet dishes, fatly fried items and cold drinks.

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