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IMPACT OF MODIFICATIONS IN INDUSTRIAL CANTEEN MENU ON BMI, CHOLESTEROL AND TRIGLYCERIDES STATUS OF THE CORPORATE EXECUTIVES

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ABSTRACT

The present study was conducted at Mahindra and Mahindra, one of the Asia's largest tractor manufacturing plant in Central India. About 178 executives were selected using judgemental sampling method. The quasi experimental design was selected. The impact of modified canteen menu on BMI, serum cholesterol and triglycerides of executives were studied. Under pre test the in house dietician computed the fat and calorie contents of the of meals served in canteen similarly executives were assessed for BMI, serum cholesterol and serum triglycerides. The amount of oil used for cooking meals were also recorded. Intervention steps included modification in recipes to reduce fat content and the training to cooks. The Executives were given nutrition education on importance of fat reduction and its role in prevention of lifestyle disease. Post intervention impact of modified menu was observed on BMI, serum cholesterol and triglycerides levels at the end of six months. Results indicated the significant decrease in mean fat contents of lunch/ dinner ($p< 0.05$) after modification in meals. The oil consumption reduced by almost 20 %. Employees started adapting the changed menu and availability of healthy options. The post test results showed significant ($p=0.000$) reduction in mean BMI, serum cholesterol and triglycerides from the pre test means. It can be concluded from the study that healthier food served in industrial lunchrooms-canteen have a greater impact on improving the dietary habits of the executives.

Keywords: Corporate executives, Industrial canteen, BMI, serum cholesterol and serum triglycerides.

INTRODUCTION

Corporate India is sitting on ticking time-bomb in terms of lifestyle diseases such as diabetes and occupational hazards like chronic back pain. Elevated cholesterol levels due to unhealthy eating habits seem to be the norm rather than the exception. Workplaces are important settings

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for health promotion and disease prevention. People need to be given the opportunity to make healthy choices in the workplace in order to reduce their exposure to risk. Further, the cost to employers of morbidity attributed to non-communicable diseases is increasing rapidly. Workplaces should make possible healthy food choices and support and encourage physical activity".The influence of diet on health status is well established The economic burden is also significant with food-related ill-health estimated to cost the National Health Service (NHS) about £6 billion annually. Workers' meal programmes are good for workers, good for business and good for the nations (*Wanjek, C. 2005*).

Mahindra and Mahindra is one of the the Asia's largest integrated tractor manufacturing plant in central India. Food service is being provided to this industry by Durga Caterers, an ISO 22000 certified company one of largest industry meal provider in central India. In year 2014, in span of three months 3 dealths occurred due to myocardial infarction and hence management decided to bring the changes the food served in canteen of Mahindra and Mahindra and reduce the fat content of diet.Another major complain of executives were related to gastro esophageal reflus-acidity complain after consuming canteen meal. Nagpur city famous for oranges, heart of India and is also famous for specialty cuisine saoji food. Hence, employees were relishing the oily and spicy food. Overall fat and spices of the food served in the canteen was more as per the RDA suggested 2010. Management decided to change the complete menu reduce the oil and spices of the cooked meal and introduced more healthy options to fried foods. Hence, in view of the above, the present investigation was undertaken.

The objectives of the study were:

1. To study and calculate the total fat and calorie content of canteen meal served industrial canteen.

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2.To assess the BMI, serum cholesterol and serum triglycerides of executives working in Industry.

3. To modify canteen meals and impart nutrition education to the executives of the industry.

3. To study the impact of modified canteen meals on BMI, serum cholesterol and serum triglycerides of executives working in Industry.

METHODOLOGY

For the present study, the quasi experimental design was selected. Mahindra and Mahindra,Nagpur Plant, which is one of the the Asia's largest integrated tractor manufacturing plant in central India was selected. The food service to this plant has been outsourced to Durga caterers, Nagpur. Initiative was planned by inhouse dietician, doctor, employee relation team, representatives from union and food committee members. Implementation of change in canteen food was the activity driven by management and it was executed by Durga caterer.

About 175 executives consuming two major meals at canteen were selected by judgemental sampling method. 135 executives were working in morning shift and 43 were in second shift. Morning shift employees were consuming breakfast and lunch and second shift employees were having snacks and dinner in the plant. Night shift employees were not selected in the study.

Pre test: In house dietician first calculated fat and calorie content of the pre initiative meal for all four meals viz., breakfast, snacks, dinner and lunch. The quantity of cooking oil used per month was also recorded. The selected executives were assessed for BMI, serum cholesterol and serum triglycersides.Blood samples were tested at NABL approved laboratory. An attempt was also made to maintain the record of executives visiting the dispensary for complain of acidity.

Nutrition Intervention: The steps were taken to modify the recipes and reduce the fat content of food preparation in order to reduce oil consumption on an individual

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basis. The cooks were imparted training for recipe modification and method of cooking to introduce the more healthy options of cooking food. The method of preparing food was changed and hidden fat content ingredients were reduced in quantity or reduced its use.

Nutrition Education plays an important role in creating the awareness amongst the employees to have better food choices and continue those food choices at home as well. Nutrition Education was conducted in two stages. The selected executives were imparted nutrition education regularly through the display of posters, and conducting lectures. An attempt was made to educate and conduct wellness and diet intervention lectures to spouse in order to create awareness amongst entire family.Diet exhibitions were organized for better understanding.

Post test: The fat and calorie content ofthe modified meal was computed. The selected executives were assessed for BMI, serum cholesterol and serum triglycersides after and interval of six months.

Statistical interpretation: The data was analysed using mean, standard deviation, student t test and paired t test.Theconfidence interval was set at 95 %.

RESULTS AND DISCUSSION

Age : Age is one of the most important non modifiable risk for all most all non communicable diseases. Mahindra and Mahindra being the tractor manufacturing plant the percentage of female employees working is negligible, hence only male executives were included in study. The agewise distribution of the selected executives has been presented in Table 1.

The maximum employees were in age group of 30-50years (Table 1)and mean age was found to be 37 ± 3.57years. Hence as the employees were heading towards the middle age, modification and implementation of healthy eating habits is one of main pillar to prevent the incidence of non communicable disease.

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CANTEEN MENU

Initially breakfast which was served in the canteen comprised mostly of fried items at least 5 days in a week. The breakfast and snacks menu consistently served was *samosa, kachori, batatawada, wada sambar, moong pakora, bhajiya* and *missal.* Standard menu for lunch and dinner served in the canteen was roti, rice, one vegetable, one pulse and *usal*, curd, pickle and fried *papad*. Lunch and Dinner menu too use to have fried papad, pickle and gravies preparation too had oil rich popularly known as *Tari* in local language. *Tari* is excess oil, which floats on top of gravy when complete preparation is done.All the vegetables were mostly fried first and then added to gravy. Gravy too contained lots of oil, and mostly made from high fat sources like *Kaju kani*(Cashew), magaz seeds, groundnuts, dry coconut.

Oil consumption per month in the form of tins used for cooking were also recorded to understand the overall reduction in usage of oil. One tin is equal to 15 litres of the oil. Before the implementation of modified menu, approximately 380 tins were used per month and use of 8-11 tins were per day usage depending on the type of menu.

During intervention, the healthy options were provided for breakfast and snacks like *vegetable upma, poha, idli sambar, uttapa sambar* and *ussal pav*. Instead of making gravies using high fat sources like cashew, magaz seeds, groundnuts, dry coconut, the use of tomato, onions, gourds were advised. Pickles were replaced by healthy cut salads or *raita* like cucumber, redpumpkin. Fried papad was replaced by roasted papad. The cooks were trained on different methods of cooking.

The amount of cooking oil used before and after intervention has been presented in Table 2.

It can be very well observed from the Table 2, that the usage of oil at the end of six months after the implementation of modification, the usage of oil was reduced by almost 16.67%. The

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mean oil consumption of tins for period of six months was 348 ± 15.70 tins. It indicates the cooking methods adopted and changed menu showed the appreciable reduction in amount.

The pre and post mean calorie and fat contents of meals have been presented in Table 3.

The Table 3 shows that the mean calorie content of recipes served at breakfast and snacks was 428 ± 56.3 kcals per serving and the mean fat content was 18 ± 2. 06 gm. The mean calorie content of lunch or dinner menu was 680 ± 83.5 and fat content was 25 ± 3.69 gm. Calorie content of lunch and dinner ranged from 545 to 720 calories and mostly contributed through the fat, similarly fat content ranged from 20-28 gm.

As elicited from the Table 3 that the mean calorie content of breakfast and snacks were decreased to 395 ± 32.5 kcal from 428 ± 56.3 kcal and fat was reduced to 12± 2 from 18 ± 2.06 gm. Similarly the calorie content of lunch and dinner was decreased from to 680 ± 83.5 kcal to 626 ± 42.8 kcal and and fat from 25 ± 3.69 gm to 19 ± 1.5 gm. The reduction in mean fat content of lunch was found to be significant ($p < 0.05$) in post intervention. The pre and post test mean calorie and fat contents of breakfast and evening snacks and mean calorie contents of lunch did not show significant difference with respect to reduction in the calorie contents ($p>0.05$).

Executives Health Benefits

Poor nutrition is an important contributor to several serious health conditions, such as Type 2 diabetes and cardiovascular diseases. Estimations of the global burden of disease attributable to nutrition-related risk factors (excess body weight, low fruit and vegetable intakes, high blood pressure and high blood cholesterol levels) demonstrates that they are leading causes of loss of healthy life, causing approximately 17 million deaths *Cliona Ni Mhurchu 2010. W*orksite interventions have significant potential to improve dietary habits

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and promote weight loss. In addition, effective interventions may lead to secondary improvements in lifestyles of employees and their families outside of the worksite.

In the present study, the BMI, serum cholesterol serum triglycerides levels and the incidence of acidity amongst the executives were recorded. The intervention was implemented with nutrition education to executives on how high fat and high calorie meal pose the extra burden and risk factor for the development of mostly obesity and associated complications of noncommunicable diseases. The prime objective of developing of the dietary intervention was to raise healthy eating habits among the executives. Since resistance to change in the eating habits was the first hurdle. Initially executives were little resisitance to change, however as they started understanding the benefits of healthy eating habits and major risk of eating high fat meals, which was started reflecting on their blood lipids, weight was gradually increasing and regular complain of acidity. Executives adapted the change and accpetablity of menu shown by the feedbacks management started receiving through mailers. Almost 75% of employees through their feed backs started giving postitive response towards modified menu.

The first positive health benefit was observed by reduction in incidence of regular complain of acidity. The reduction in incidence of acidity as per the data maintained by in house dispensary is presented in Table 4.

Initially before implementing the changed menu employees persistently complained the problem of acidity after consuming meals from the canteen. After the reduction of oil and spices in the cooking incidence of acidity was reduced by almost 20.22% as the data revealed from the dispensary.

The impact of modified menu on BMI, serum cholesterol and triglycerides is presented in Table 5.

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The data presented in Table 5 shows that the pre mean BMI of the executives before initiating the change in canteen menu was 24.85 Kg/m^2, which was heading towards overweight category. Similarly, the mean pre serum cholesterol levels was found to be 196.17 mg which indicates the borderline range, and serum triglycerides was found to be 166.17 mg , which was higher than the normal. Due to high fat and spices content of menu, executives mostly complained of sluggishness and acidity after consuming meals.

Further the results of post tests showed that the significant differences (p = 0.000) were observed in means of all the three important parameters. The mean BMI of executives decresed to 24.57 Kg/m^2, serum mean cholesterol was reduced to 186.92 mg and mean serum triglycerides was reduced to 151.27 mg. Highest difference was observed in serum triglycerides.

As per the evidence base reports serum triglycerides can modified by change in the quantity of fat intake and type of fat consumed. As per evidence based reports and studies, reduction in total fat content of menu helps to reduced the cholesterol and triglycerides. Federico Leighton *et. al* (2009) reported similar findings. The diet high in vegetables, low in fats a meditiareean diet of worksite canteen helped industrial employees to reduce the few metabolic components like serum cholesterol and serum triglycerides of the selected executive. It is also important to mention here that nutrition education which ws imparted during the course of investigation and intervention helped executives to adapt healthy changes. Hence nutrition education is also considered as an important tool which helped employees for adapting healthy lifestyle. Similar kind of study was reported by Doirairaj Prabhkaran *et.al* (2009) who stated that worksite intervention is one of most important tool which helps employees to adapt healthy lifestyle and consequently reduce

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the risk of cardiovascular disease profile.

CONCLUSION

Since the executives were having two major meals in company it is important to mention here their habits and nutritional intake largely depends on the food served in the canteen. It can be concluded here that reduction in energy density along with reduction in total fat content of meal with emphasis on includion of healthy salads and healthy way of cooking gravies helped executives significantly to reduce their BMI, serum cholesterol and serum triglycerides levels.

It is important to mention here that healthier food served in industrial lunchrooms-canteen have a greater impact on improving the dietary habits of the executives. Nutrition education imparted persitently helped executives to adapat and implement healthy lifestyle and healthy eating. Dietitians available at worksite helps to keep a track on nutritional content of meals served and provide healthy options to avoid monotony in meals. It can be concluded that Workplace dietary intervention seems to be effective in reducing cardiovascular risk factors.

Table 1: Distribution of subjects according to age

Age (in years)	Executive	
	No.	%
20-30	24	13.5
30-40	53	29.7
40-50	58	32.5
50-58	25	14.0
55-60	18	10.1
Total	178	100

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Table 2 : Mean cooking oil consumption in canteen

Oil consumption	Pre intervention oil usage	Post intervention oil usage	
		After 3 month	After six months
Number of tins	360 tins	330 tins	300 tins
Percentage reduction in tins	-	8.3%	16.67%

Table 3: Pre and Post tests mean calorie and fat contents of meals per serving

Meals	Pre test Mean Calorie (kcal)	Post test Mean Calorie (kcal)	Post test Mean Calorie(kcal)	Post test Mean Calorie (kcal)
Breakfast /Evening Snack	428 ± 56.3 kcal	395 ± 32.5 kcal	18 ± 2.06 gm	12 ± 2.0 gm
	t = 1.24 (p>0.05)		t =1.67 (p>0.05)	
Lunch	680 ± 83.5 kcal	626 ± 42.8 kcal	25 ± 3.69 gm	19 ± 1.5 gm
	t = 1.19 (p>0.05)		t= 3.02 (p<0.05)	

Table 4: Effects on incidence of acidity among executives after intervention (N=178)

Pre test cases of acidity		Post test cases of acidity		Chi Square Value and Sig Value
No. of subjects	Percentage	No of subjects	Percentage %	
88	49.4	36	20.22	x^2= 29.63 P< 0.01

Table 5: Mean BMI, serum cholesterol , serum triglycerides of executives (N=178)

Parameters		Mean	Std. Deviation	t	Sig. (2-tailed)
BMI (kg/m^2)	Pre	24.85	3.65	7.932	0.000
	Post	24.53	3.50		
Serum Cholesterol (mg)	Pre	196.17	39.211	8.082	0.000
	Post	186.92	32.190		
Serum Triglycerides (mg)	Pre	166.03	43.134	10.306	0.000
	Post	151.27	43.731		

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