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Comparison of Nutritional Quality of Lacto-Vegetarian and Non-Vegetarian Diets of Diabetic Patients

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ABSTRACT

The aim of the study was to compare the nutritional quality of diets in lacto-vegetarian and non-vegetarian diabetic patients. A total of 100 Type 2 Diabetic patients between the ages of 50-60 years (males and females) who were willing to be a part of the study were enrolled for the study. The participants were further grouped as 50 lacto-vegetarians and 50 non-vegetarians. A primary questionnaire was designed to seek information about their background, their dietary pattern, the food choices along with their management and physical activity pattern. The respondents were also asked to maintain 3-day diet record through which the quality of the diet in both groups was assessed using a scale based on ICMR/API-ICP guidelines and each diet was scored accordingly. Based on data collected and analyzed it was found that lacto-vegetarians had a better dietary pattern than the non-vegetarians. The study also showed that the dietary quality score of both the group were lower and thus no significant difference ($p>0.05$) was found between the mean dietary quality score between both the groups.

Key words: *Type 2 Diabetes, Lacto-vegetarians, Non-vegetarians, Dietary quality score*

INTRODUCTION

India with highest number of diabetic subjects earns the dubious distinction of being termed the "diabetes capital of the world". According to the Diabetes Atlas 2006 published by the International Diabetes Federation, the number of people with diabetes in India currently around 40.9 million is expected to rise to 69.9 million by 2025 unless urgent preventive steps are taken[1]. A growing body of scientific evidence indicates that wholesome vegetarian diets offer distinct advantages compared to diets containing meat and other foods of animal origin. The benefits arise from lower intakes of saturated fat, cholesterol and animal protein as well as higher intakes of complex carbohydrates, dietary fiber, magnesium, folic acid, vitamin C and E, carotenoids and other phytochemicals. Since vegetarians consume widely divergent diets, a differentiation between various types of vegetarian diets is necessary. Vegetarian diets have been described as being deficient in several nutrients including protein, iron, calcium, vitamin B12 and n-3 fatty acids.

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In most cases, vegetarian diets are beneficial in the prevention and treatment of certain diseases, such as cardiovascular disease, hypertension, diabetes, cancer, osteoporosis, renal disease and dementia, as well as diverticular disease, gallstones and rheumatoid arthritis. The influences of these aspects of vegetarian diets are the subject of the new field of nutritional ecology that is concerned with sustainable life styles and human development[2]. A recent approach to assess the overall dietary quality is the use of indices analyzing a dietary pattern instead of the more reductive nutrient methodology. As reviewed by Hu[3] recently, dietary pattern analysis has emerged as an alternative and complementary approach to examining the relationship between diet and the risk of chronic diseases. Instead of looking at individual nutrients or foods, pattern analysis examines the effects of overall diet. Conceptually, dietary patterns represent a broader picture of food and nutrient consumption, and may thus be more predictive of disease risk than individual foods or nutrients. In addition, there is growing interest in using dietary quality indices to evaluate whether adherence to a certain dietary pattern or current dietary guidelines lowers the risk of disease. Various dietary quality indices has been developed like The Healthy Eating Index (HEI) which represents the degree to which a dietary pattern conforms the official guidelines summarized in the United States Department of Agriculture Food Guide Pyramid, using a 10 or 12 component score[4]. The most recently released HEI (HEI-2010) uses an energy-adjusted approach, limiting the possible confounding effect of total energy intake[5]. The Mediterranean Diet Score (MDS) uses 10 components to express the agreement with the Mediterranean dietary pattern by 7 desirable and 2 undesirable components (meat and dairy) and 1 moderation (alcohol) component[6] thus these dietary scores where used as a reference and a new criteria was form to evaluate the dietary scores for this study.

Thus the aim of the present study was to analyze and compare the nutrient intake and the diet quality of lacto-vegetarians and non-vegetarians diabetes patients between 50-60 years of age. The quality of the diet in both groups was assessed using a scale based on ICMR/API-ICP guidelines and each diet was scored accordingly.

MATERIALS AND METHODS

The study group included a total of 100 Type 2 Diabetic patients between the ages of 50-60 years (males and females). The respondents who were willing to be a part of the study were included. The participants were further grouped as 50 lacto-vegetarians and 50 non-vegetarians. A questionnaire comprising of questions related to background information, medical history, anthropometric measurement, nutritional assessment and exercise pattern was use to collect data.

Dietary habits were assessed by taking 24 hour dietary recall and food frequency questionnaire and the quality of the diet in both groups was assessed using a scale based on ICMR/API-ICP guidelines and each diet was scored accordingly.

The Indian Diabetes Guidelines given by Indian Council of Medical Research (ICMR) 2005 and The Association of Physician of India and the Indian Colleges of Physician (API-ICP) Guidelines on Diabetes 2007 were studied and on the basis of both these guidelines, criteria were formed for evaluating the quality of the diet. The criteria used for evaluating the diet in the present study are given below:

1. Energy intake - 20-30kcal / IBW / day
2. Carbohydrate – 55- 60% of the total energy /day
3. Protein – 0.8gms /IBW /day
4. Fats – 20-25% of total energy /day
5. SFA – less than 7%/ day
6. Rest MUFA and PUFA
7. Fibre – 30-40gms / day
8. Percentage of high biological value protein
9. Percentage of simple carbohydrate
10. Consumption of 5-6 meals /day
11. Breakfast to be consumed
12. Bed times to be consumed
13. Regular timing of meals

These guidelines were then scored (0-12) as shown in table below to evaluate the quality of diet

Table 1: Evaluation of Quality of Diet in the Study Group

	Criteria for Assessing quality of diet	Adequate	More/less than adequate
1.	Energy	1	0
2.	Protein	1	0
3.	Carbohydrate	1	0
4.	Fats	1	0
5.	Fibre	More than 30gm =1	Less than 30gm = 0
6.	Simple carbohydrate	No consumption =1	Consumption = 0
7.	High biological value protein	More than 30% =1	Less than 30% = 0
8.	Saturated fats	Less than 7% =1	More than 7% = 0
9.	No of meals	4 -6 =1	2-3 = 0
10.	Breakfast	Yes =1	No = 0
11.	Bedtime	Yes =1	No = 0
12.	Regular meal timing	Yes =1	No = 0

RESULT AND DISCUSSION

The study was undertaken to assess the dietary pattern, food choices, quality of diet and effect of counseling in lacto-vegetarians and non-vegetarians diabetic patient between 50-60 years of age. 50 diabetic patients from each of the group i.e. lacto-vegetarians and non-vegetarians were enrolled for the study.

The participants enrolled were 25 males and 25 female respondents in the lacto-vegetarian group and 21 males and 29 females in the non-vegetarian group. The mean height in lacto-vegetarians and non-vegetarians was 158 cms and 158.9 cms respectively. The mean weight in lacto-vegetarians was 65.8 kgs and in non-vegetarians 68.7 kgs, the mean BMI of lacto-vegetarian group was 27.50 kg/m^2 and of non-vegetarians was 26.07 kg/m^2. No significant difference was found in the BMI between both the groups using the t-test.

Using the World Health Organization BMI classification no underweight subjects were found in both the group. 48% of lacto-vegetarians were in the overweight category as compared with 40% non-vegetarians and 26% lacto-vegetarians as compared to 14% non-vegetarians were in the obese category. Thus more number of lacto-vegetarians in the study group had extra weight as compared to non-vegetarians, though the difference was not significant.

It was observed that the average years since diagnoses of diabetes was 6.6 years in lacto- vegetarians and 5.4 years in non-vegetarians and 77% of respondents from both the groups managed their diabetes with hypoglycemic drugs. Respondents from both the groups reported having one or more co – morbidities. It was observed that 54% of lacto-vegetarians and 56% of non-vegetarians were suffering from high blood pressure. High cholesterol and heart problem where seen commonly in lacto-vegetarians whereas in non-vegetarians eye problem and high cholesterol were reported. 22% and 24% of lacto-vegetarians and non-vegetarians respectively did not have any co-morbidities.

Simple questions pertaining to their dietary pattern were asked and it was observed that dietary pattern of lacto-vegetarians was better than that of non- vegetarians. In lacto-vegetarians, not only 40% adherence to diets prescribed by the dietician but also 12% regularly followed the prescribed diet whereas only 2% adherence was observed in non-vegetarians. 62% of lacto-vegetarians had regular meal timing than 50% of non-vegetarians. 28% had adjusted their meals in accordance to medicines or insulin as compared to 18% of non- vegetarians.

It was also observed that 42% of lacto-vegetarians and 82% of non-vegetarians were not involved in any kind of physical activity. While in those who were exercising, walking was the common form of exercise and only 4 % percentage of respondent were involve in yoga.

Table no 2: Average Nutrient Intakes of Study Group

Nutrients	Lacto-vegetarians	Non-vegetarians
Energy(Kcals)	1534	1368
Carbohydrate (gms)	212.37	204.71
Protein (gms)	47.80	44.82
Fats (gms)	47.80	39.04
Fibre (gms)	14.16	8.22
HBV Protein(gms)	7.79	8.61
Simple Carbohydrate(gms)	41.71	36.22
SFA	7.95	4.98
MUFA	7.37	8.55
PUFA	9.44	11.12

When the mean intake was compare between both the group a significant differences ($p<0.05$) between the mean intake of fats, fiber and SFA was found with higher intakes of nutrients in lacto-vegetarians as compared to the non-vegetarians.

Whereas to understand if the nutrient intakes were sufficient between both the groups nutrients intakes were calculated based on their ideal body weight and compare to their mean intake.

Table 3: Comparison between the Mean Macronutrient Intake and Ideal Intakes

Nutrients	Lacto-vegetarians		Non-vegetarians	
	Mean Intakes	Ideal Intakes	Mean Intakes	Ideal Intakes
Energy (kcal)	**1534**	1392	1367	1394.85
Protein(gms)	47.80	44.53	44.82	44.63
Carbohydrate(gms)	212.37	201.10	204.71	199.80
Fats(gms)	**47.80**	30.92	39.04	30.99
Fibre(gms)	**14.16**	30	**8.22**	30

Using paired t-test it was seen that in lacto-vegetarians, there were significant differences ($p<0.05$) between the mean and ideal intake of energy and fats, with the mean intakes being higher than the ideal intake. The mean intake of fiber was found to be only 50% of what an individual should be consuming ideally.

In the non-vegetarian group, there was no significant difference between ideal intake and mean intake of the group, however a marked significant difference ($p<0.05$) was seen in the mean intake and ideal intake of fibre. It was observed that fibre intake was low in both the groups.

In the present study mean intake of proteins of lacto vegetarian was similar to the ideal intake indicating adequate protein intake. The 3-day diet record showed satisfactory consumption of dal, milk and milk products like curd, buttermilk on daily basis in the lacto-vegetarian than in the non-vegetarians.

To assess the quality of the diet, the criteria were used and the respondents were scored from 0 to 12.

In a study conducted by Murray, *et.al.* (2013) on "Dietary Quality in a Sample of Adults with Type 2 Diabetes Mellitus" stated that Type 2 Diabetes Mellitus was associated with a lower score when dietary quality was assessed using a number of validated indices[7]. Similarly in the current study it was seen that the dietary quality score of both the groups was low. The mean dietary score of both the group is shown in the table no 6.5.

Table no 4:- Mean Dietary Quality Scores of Lacto-vegetarians and Non-vegetarians

Lacto-Vegetarians	Non-Vegetarians
3.58/12	4.15/12

The dietary quality of lacto-vegetarians and the non-vegetarians it was observed that there was no significant differences ($p>0.05$) between the group though non-vegetarians scored higher as compared to lacto-vegetarians.

CONCLUSION

When the comparison was done between both lacto-vegetarians and non-vegetarians, it was found that lacto-vegetarians where having a better dietary pattern than the non-vegetarians Though the Non-vegetarian diets scored better than the Lacto-Vegetarian diets, the overall score was lower in both the groups and no significant difference was found in the dietary quality scores between Lacto-Vegetarian and Non-vegetarian . Thus there is urgent need for dietary counseling and nutrition education of diabetic patients for better management of diabetes

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