



## Association of Dietary History and Type 2 Diabetes Occurrence in Patients Visiting A Tertiary Care Centre of Eastern Nepal

### KEYWORDS

Diet, Diabetes type II, eastern Nepal.

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**ABSTRACT** Diabetes mellitus is not only associated with obesity but the quality and quantity of food intake may also take part in the causation of diabetes mellitus. The main aim of this study was to determine the association between major dietary patterns and risk of type 2 diabetes mellitus among men and women visiting a tertiary care hospital of eastern Nepal. Participants included 250 males and females with type 2 DM and 50 persons as control group. Study participants were interviewed using a structured questionnaire to elicit a lifetime history of a variety of lifestyle factors. Standard diet questionnaire was also used to evaluate the usual diet in cases. The results were statistically analyzed using ANOVA. Our findings showed that there was significantly lower consumption of fruit and vegetable groups and higher consumption of meat group in patients compared with control group ( $p < 0.05$ ). There was no significant difference in consumption of dairy and cereal groups among patients and control group. Our finding indicates that lower consumption of fruit and vegetable and high intake of meat (especially red meat) had considerable role in type 2 diabetes development in patients visiting a tertiary care centre of eastern Nepal.

### Introduction

Non-insulin dependent diabetes mellitus is a metabolic disorder that is characterized by high blood glucose in the context of insulin resistance and relative insulin deficiency.<sup>1</sup> Type 2 diabetes makes up about 90% of cases of diabetes.<sup>2</sup> Obesity is thought to be the primary cause of type 2 diabetes in people who are genetically predisposed to the disease.<sup>3, 4</sup> Type 2 diabetes is initially managed by increasing exercise and dietary modification.<sup>5, 13</sup> Rates of diabetes have increased markedly over the last 50 years in parallel with obesity. Diet has a significant part in development of several physiological or clinical disturbances.<sup>5, 6</sup> Studies have shown that saturated lipid in meat and dairy products can lead to chronic diseases such as diabetes and chronic vascular diseases.<sup>8, 9, 10</sup> There is also significant association between high fiber diet and prevention of diabetes mellitus.<sup>11, 12</sup> This study was conducted to investigate the biomedical role of diet in type 2 diabetes occurrence in the area.

### Materials and Methods

#### A. Participants

This study is a retrospective, cross-sectional study to evaluate cases from a retrospective chart review of males and females with type 2 diabetes. Participants included 300 persons (130 females and 120 males with diagnosed type 2 diabetes and 50 healthy persons as control group). Patients who were admitted to this hospital and in whom type 2 diabetes were found by fasting blood sugar test performed either routinely or for a specific purpose.

#### B. Questionnaire

After written informed consent was obtained, study partici-

pants were interviewed in person by trained interviewers using a structured questionnaire to elicit a lifetime history of a variety of demographic, medical, and lifestyle factors. Standard diet questionnaire was also used to evaluate the usual dietary pattern in cases. Dietary intake information was collected by FFQs designed to assess average food intake over the previous year. A standard portion size was given for each food item. Participants were asked to choose from 9 possible frequency responses, ranging from "never" to "more than 6 times a day" for each food.

#### C. Statistical Analysis

All values are presented as mean  $\pm$  SD. Statistical significance was evaluated by one-way analysis of variance (ANOVA) using SPSS 19. Significance was measured using Game-Howell significant for the exact P values and significant differences are noted in the results. Differences with  $P < 0.05$  were considered significant.

#### Results

Table I represents daily consumption of food groups in patients and control group.

Statistical analysis suggests that the mean daily consumption of fruit group in female patients with D2 was significantly lower compared with control group ( $P < 0.05$ ). The mean daily consumption of vegetable group was significantly lower in male patients compared to control group ( $p < 0.05$ ). Furthermore the daily consumption of meat group was significantly higher in both male and female patients than control group ( $P < 0.001$ ). There was no significant difference in consumption of dairy and cereal groups among patients and control group.

**TABLE I DAILY CONSUMPTION OF FOOD GROUPS IN PATIENTS AND CONTROL GROUPS.**

	Dairy Products	P	Fruit	P	Vegetables	P	Meat	P	Cereal	P
Control	2.49 $\pm$ 0.1		1.09 $\pm$ 0.1		3.01 $\pm$ 0.17		5.67 $\pm$ 2.5		5.83 $\pm$ 1.16	
Females with DM 2	2.42 $\pm$ 0.95	N.S	2.71 $\pm$ 1.45	<0.05	2.78 $\pm$ 1.57	N.S	6.3 $\pm$ 1.95	<0.001	5.74 $\pm$ 1.1	N.S
Males with DM 2	2.56 $\pm$ 1.15	N.S	2.33 $\pm$ 1.23	N.S	2.34 $\pm$ 1.24	<0.05	7.2 $\pm$ 2.32	<0.001	6.43 $\pm$ 1.39	N.S

The data are indicated as mean  $\pm$  SD . P values are expressed in comparison with control group. N.S. represents no significant difference. DM2 indicates diabetes mellitus type 2.

### Discussion

The results of current research show that the consumption of vegetable and fruit food groups was lower and the consumption of meat food group was much higher in patients with type 2 diabetes compare with control group. There are many studies which have shown the effects of dietary factors on the development of diabetes or other metabolic disorders.<sup>18, 19, 20, 21</sup> In accordance with this study, some other studies have shown that there is a significant relationship between consumption of too much meat food groups such as hamburger and fried chicken with development of type 2 diabetes.<sup>14, 15</sup> Furthermore some researches indicate that high intake of red meat and full-fat dairy products which contain saturated lipids can lead to inflamma-

tory disease as well as diabetes.<sup>16, 17</sup> Also, in line with our findings, other studies have shown the preventive effects of fiber-rich foods such as vegetable and fruit groups on diabetes and metabolic syndrome.<sup>22, 23, 24, 25</sup> This preventing effect of fiber may arise from the fact that fiber, particularly soluble fiber, can slow the absorption of sugar, which for people with diabetes can help improve blood sugar levels.<sup>22, 24</sup>

### Conclusion

It can be concluded that consumption of too much meat group is a risk factor for development of type 2 diabetes , whereas fruit and vegetable groups which contain dietary fibers can have a protective effects on diabetes. However, a case control study is required to clarify the effects of diet on type 2 diabetes occurrence.

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