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Food Intake of Type II Diabetic Patients from Rohtak District, Haryana

Parminder Kaur
Research Scholar,
Deptt.of Home Science,
Singhania University,
Rajasthan

Shashi Kala Yadav
Assistant Professor,
Deptt.of Home Science,
Govt. College for Women,
Hisar, Haryana

Abstract

Diabetes mellitus or type-2 diabetes, is one of the major non-communicable and fastest growing public health problems in the world, is a condition difficult to treat and expensive to manage. It is a life-long disease, which makes people worry about the quality and longevity of their life after being diagnosed with it. Dietary pattern influences the amount of insulin required to meet blood glucose target goals to maintain optimal blood-glucose levels. The present study was conducted in Rohtak District, Haryana to assess the health status of diabetic male and female patients. A total of 300 Diabetic patients (40-60 Years) were prepared by gathering information from patients coming to various hospitals and also through personal contacts. Majority of patients 85 percent were sedentary workers.76 percent patients were married. Mean daily food intake of all the food groups except pulses & fats was significantly lower than RDI. Mean intake of roots & tubers was significantly higher in males as compared to females. Intake of green leafy vegetables, roots & tubers, other vegetables, fruits and sugar was inadequate i.e. below 50 percent of RDI.

Keywords: Diabetes Mellitus, Socio-Economic, Food Intake, Adequacy.

Introduction

Diabetes mellitus or type-2 diabetes, is one of the major non-communicable and fastest growing public health problems in the world, is a condition difficult to treat and expensive to manage. It has been estimated that the number of diabetes sufferers in the world will double from the current value of about 190 million to 325 million during the next 25 years (Wild et al 2004; Giugliano et al 2008 and Gonzalez et al 2008). Individuals with type-2 diabetes are at a high risk of developing a range of debilitating complications such as cardiovascular disease, peripheral vascular disease, nephropathy, changes to the retina and blindness that can lead to disability and premature death. It also imposes important medical and economic burdens. Genetic susceptibility and environmental influences seem to be the most important factors responsible for the development of this condition. However, a drastic increase of physical inactivity, obesity, and type-2 diabetes has been recently observed. The fact indicates that obesity and physical inactivity may constitute the main reasons for the increasing burden of diabetes in the developed world (Sanchez et al 2008; Panagiotakos et al 2005; Fadupin et al 2001 and Fadupin et al, 2000).

It is felt that lifestyle changes, with diets high in saturated fat and decreased physical activity, together with increased longevity, are the main factors in this explosion of type 2 DM. The problem may be aggravated by intrauterine malnutrition (Hales et al 1992).

Dietary pattern influences the amount of insulin required to meet blood glucose target goals to maintain optimal blood-glucose levels. The dietary pattern, especially carbohydrate intake could contribute to the pathology of diabetes. Dietary carbohydrate influences postprandial blood glucose levels the most and is the major determinant of meal related insulin levels. It has been observed that a ketogenic diet which is low on carbohydrate effectively reduces damaging consequences of diabetes (Khalifa et al, 2011).

Fiber rich diets have been shown unequivocally to be associated with a reduced risk of obesity and diabetes in many observational studies (Mohan and Viswanathan, 2009; Schulze, Matthias 2008 and Hodge and Allison 2004). Wholegrain intake has been consistently associated with a lower risk of diabetes even after adjustment for BMI (Aune and Dagfinn 2013). Conversely, Asian populations, which consume white rice, with little fiber content, as a staple food and a main source of calories, is at increased risk of developing diabetes (Hu and Emily 2012). Routine intake of red meat was also associated with increased risk of diabetes (Pan, An et

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al, 2011). Fruits and vegetables consumption was not found to be associated with risk of diabetes while a higher intake of green leafy vegetables was associated with lower risk (Carter and Patrice 2010 and Cooper and Andrew 2012). Further, consumption of specific whole fruits, such as blueberries, grapes, and apples, was significantly associated with a lower risk of diabetes on the basis of findings from three large prospective cohort studies (Muraki and Isao, 2013). Higher intake of dairy products, especially yoghurt is associated with moderately lower risk of (Tong, 2011). In a meta-analysis higher intake of sugar-sweetened beverages was found to be associated with greater risk of T2DM, while substitution of these beverages with water, coffee, or tea was associated with a lower risk of diabetes (Malik and Vasanti 2010 and Pan, An et al, 2012). Some prospective studies documented that dietary patterns favoring fruits, vegetables, whole grains, legumes and avoiding red meats, refined grains, and sugar-sweetened beverages are beneficial for diabetes prevention (Imamura, Fumiaki et al, 2009 ; Liese , Angela D et al , 2009 and Naughton et al 2008). Consumption of diets high in plant based protein and fat and low in total carbohydrate was associated with lower diabetes risk, conversely a diet low in carbohydrate but high in animal fat and protein was associated with higher risk of diabetes (Halton, Thomas L et al, 2008).

Review of Literature

Kaur & Kalra (2009) studied the life style and nutritional profile of NIDDM patients. A representative group of 60 respondents belonging to different cities of Punjab was selected. Observations showed that the majority of respondents were overweight and over 40 years of age with FBS levels of 200-300 mg/dl at the time of diagnosis. All respondents had general awareness regarding control of diabetes. Majority was consulting doctors, dieticians, was regular in walk and other exercises and was consuming glucose lowering food adjuncts. About 50% maintained fair to good control over diabetes. Data showed a definite decrease in their FBS levels. Mean daily intakes of energy and other essential nutrients except iron were adequate. Findings of study indicate that by modifying diet and life style one can maintain fair control over diabetes.

Patel et al (2012) conducted across-sectional study was made to assessed the current situation of and factors associated with consumption of diabetic diet among 399 type 2 diabetes mellitus (T2DM) subjects from Ahmadabad, Western India. In total, 399 T2DM subjects (65% male, 35% female) with mean age of 53.16}7.95 years were studied. Although 73% of T2DM subjects were consuming diabetic diet, the good glycaemic control (HbA1c level <7%) was achieved only in 35% of the subjects. The majority (75%) of the subjects had a positive family history of diabetes, and 52% were obese. In 77%, the main source of dietary advice was doctor. In 36%, the main methods of cooking were: boiling and roasting. The final multivariate model showed that visit to dietician, level of education, intake of low fat, and family history of diabetes were independent predictors for diabetic

diet consumption among T2DM subjects. However, longitudinal and cohort studies are required to establish the association between consumption of diabetic diet and glycaemic control.

Colles et al (2013) conducted a cross-sectional study of 258 individuals (mean age 55.7 ± 10 years; body mass index 27.1 ± 4.8 kg/m2; diabetes duration 10.1 ± 6.5 years) attending two out-patient clinics in New Delhi, India. Food-related information was collected during a semi structured interview. Clinical, anthropometric, and biochemical data were recorded. Beliefs related to health and diabetes played a role determining food choice and dietary patterns; erroneous views were associated with the poor food choices and greater metabolic perturbations. Average consumption of fruits/vegetables was low. Intakes were positively associated with intentions to manage diabetes; inversely associated with the waist circumference and negatively

Correlated with one's degree of personal responsibility for food choice. Household saturated fat usage was common. High fat intakes were positively associated with the taste preference, ratings of perceived "health-value;" waist circumference, glycosylated hemoglobin percentage (HbA1c%) and lipids.

Shah and Shekhar (2015) concluded a study to reduce the blood sugar level and prevent onset of type 2 diabetes in pre diabetic patients. Pre diabetic patients (N=35) were selected from four municipal dispensaries across Mumbai. The results showed that majority of subjects had reduced blood sugar level and the impact of nutrition education was seen to have a positive result on blood sugar level as it was seen to significantly decrease as the p value of FBS was seen to be 0.007 and that of PLBS was seen to be 0.000 (p<0.05) which was highly significant. The results of physical activity also showed a positive outcome as participants were more involved in physical activity then what was observed previously. The present study would thus like to conclude that the subjects were seen to following a better lifestyle. The subjects were seen to eating healthier, eating homely food, going for more physical activity and thus showed improvement in their anthropometric and biochemical parameters.

Material and Methods

The present study was conducted on Diabetic patients in the age group of 40-60 years. Total 300 patients i.e. 150 Male and 150 Female were selected proportionality for the study from patients coming to various hospitals like Civil Hospital, P.G.I and Private Nursing Homes at O.P.D time of Rohtak District ,Haryana and also through personal contacts. Health status of diabetic patients assessed by a well structured interview schedule was prepared in accordance with the methodological procedure keeping in view the objectives of the investigation. The interview schedule was pretested initially, based on the responses obtained and difficulties realized, suitable amendments will be made to make it more functional.

Result and Discussion

The information regarding Age, Sex, Education qualification, Marital Status, Occupation, Income and Activity presented in Table 1. 46 percent of the patients were in the age group of 40-50 years, followed by 53 percent in 51-60 years of age. 50 percent patients were male and 50 percent were female.

Table 1: Socio- Economic profile of Diabetic Patients (n=300)

Characteristics	Frequency	Percentage
Age		
40-50 years	139	46.33
51-60 years	161	53.66
Sex		
Male	150	50.00
Female	150	50.00
Education Qualification		
Uneducated	37	12.33
Primary	42	14.00
Middle	36	12.00
Metric	69	23.00
Sr. Secondary	34	11.33
Graduate	56	18.66
Post Graduate	26	8.66
Marital Status		
Single	11	3.66
Married	228	76.00
Widow	39	13.00
Divorced	18	6.00
Separated	4	1.33
Occupation		
Private Service	68	22.66
Govt. Service	62	20.66
Business	55	18.33
Agriculture	11	3.66
House Wife	84	28.00
Retire	20	6.66
Income		
Up to 50,000	114	38.00
50,000 to 1 lac	126	42.00
1 lac to 1.5 lac	37	12.33
1.5 lac to 2 lac	17	5.67
2 lac to 2.5 lac	6	2.00
Activity		
Sedentary	225	85.00
Moderate	38	12.66
Heavy	7	2.33

Maximum patients (23%) were having Metric education followed by Graduate (18%) and 14 per cent up to Primary, while 12 per cent with middle and almost similar percentage (12%) were illiterate and 11 per cent were educated up to Sr. Secondary and eight per cent of patients were Post Graduate. Majority of patients (76%) were married followed by 13 per cent Widow while six per cent were Divorcee and other three per cent were Single and remaining 1 per cent was separated. Majority of patients (28%) were House wife followed by 22 per cent were Private Service while 20 per cent Govt. Service and other 18 per cent were in Business and other 6 per cent are retired and remaining three per cent were in Agriculture. Majority of subjects (42%) had monthly income 50,000 to 1 Lac followed by 38 per cent with up to 50,000 while 12 per cent with monthly income 1 Lac to 1.5 Lac and other 5 per cent with monthly income 1.5 Lac to 2 Lac and only two per cent was between 2 Lac to 2.5 Lac. Majority of patients (85%) were sedentary workers followed by 12 per cent were moderate workers while remaining two per cent were heavy activity workers (Table 1).

Table2. Food consumption pattern of Diabetic patients (n=300)

Data regarding mean daily food intake of Diabetic patients have been presented in Table 2.

Cereals

Table 2 highlight the results related to mean daily cereal intake of the Diabetic patients both (male and female) were 208.91 which was 81.92 per cent of RDI and significant lower than RDI (Table 2). The daily mean scores comparison indicated that cereals intake of male and female was 208.30 g and 209.52 g, respectively (Table 3) It was found that the intake of cereals by male and female diabetic patient did not differ significantly.

Pulses

The data presented in Table 2 indicated that daily mean intake of pulses among diabetic patients 70.67 g which was only 117.78 percent of RDI and significantly higher than RDI. Comparative mean scores showed that the mean daily pulses intakes of male and female were 70.16 g and 71.17 g, respectively (Table 3) however, the differences were non-significant.

Table -2   Mean daily food intake of diabetic patient   (n=300)

Food Stuff	RDI	Mean daily nutrient intake	Z value	Overall intake (% of RDA)
Cereals	255	208.91±38.27	-20.85**	81.92
Pulses	60	70.67±14.80	12.55**	117.78
Milk and Milk products	250	321.99±58.98	21.17**	128.79
Roots and Tubers	200	61.92±23.52	-101.52**	30.96
Green Leafy Vegetables	100	25.99±11.58	-110.46**	25.99
Other Vegetables	200	52.66±19.43	-131.55**	26.33
Fruits	300	143.65±32.38	-83.60**	47.88
Sugar & Jaggery	20	6.40±2.07	-113.33**	32
Fats & Oils	20	23.24±3.21	17.05**	116.2
Meat & Poultry	200	25.61±7.86	-215.29**	12.80

Values are mean ± SD

** Significant at 1% level

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RDI-Recommended Dietary Intake

Z-value shows comparison of nutrients intake with RDA

Milk and Milk Products

Turning towards the mean daily intake of milk and milk products of diabetic patients was 321.99g which was significantly higher and 128.79 percent of the RDI (Table 2). Further, results revealed that consumption of milk and milk products was slightly higher in male (323.12 g) as compared to female (320.85g) .However; the differences were non-significant (Table 3).

Roots and Tubers

The perusal of (Table 2) displays the comparison of daily mean intake of roots and tubers were significantly lower in females (53.60g) than in males (65.22 g) the mean daily intake of roots and tubers by diabetic patients was 61.92 g/day which was 30.96 percent of the RDI and significantly lower than RDI (Table 3)

Table -3 Comparison between mean daily food intake of diabetic patient (n=300)

Foodstuffs	Recommended Dietary Intake (RDI)	Mean daily food intake				
		Male (n=150)	Z Value	Female (n=150)	Z Value	Male vs. Female Z value
Cereals	255	208.30±39.07 (81.68)	-14.63**	209.52±37.56 (82.16)	-14.81**	-0.27 NS
Pulses	60	70.16±14.77 (116.93)	8.40**	71.17±14.84 (118.61)	9.23**	-0.58 NS
Milk and Milk products	250	323.12±59.28 (129.24)	15.10**	320.85±58.84 (128.34)	14.76**	0.33 NS
Roots and Tubers	200	65.22±22.54 (32.61)	-73.24**	53.60±24.06 (26.8)	-71.77**	2.45**
Green Leafy Vegetables	100	25.86±11.09 (25.86)	-81.47**	26.12±12.07 (26.12)	-74.61**	-0.19 NS
Other Vegetables	200	52.52±18.09 (26.26)	-99.64**	52.78±20.73 (26.39)	-87.11**	-0.11 NS
Fruits	300	144.54±32.77 (48.18)	-58.00**	142.75±32.07 (47.58)	-60.01**	0.48 NS
Sugar & Jaggery	20	6.51±2.03 (32.55)	-79.35**	6.29±2.10 (31.45)	-80.64**	0.90 NS
Fats & Oils	20	22.98±3.13 (114.9)	11.46**	23.50±3.26 (117.5)	13.00**	-1.41 NS
Meat & Poultry	200	25.89±7.88 (12.94)	-159.73**	25.26±7.90 (12.63)	-144.4**	0.38 NS

Values are mean ± SD

**Significant at 1% level

NS-Non significant

Z value shows comparison of nutrients intake with RDI

Green Leafy Vegetables

Results in Table 2 revealed that mean daily intake of green leafy vegetables of diabetic patients was 25.99 g (25.99% of RDI) and significantly lower than RDI. The consumption of green leafy vegetables was slightly lower in male (25.86) as compared to female (26.12) however, the differences were non-significant (Table 3).

Other Vegetables

Moving towards the daily mean intake of other vegetables of diabetic patients was 52.66 g (26.33% of RDI) (Table 2). The intake of other vegetables was significantly (P≤0.01) lower than RDI. Table also pointed out that daily mean intake of other vegetables by female was almost similar to male and the differences were non-significant (Table 3).

Fruits

Data in Table 2 revealed that the mean daily intake of fruits of diabetic patients were 143.65 g (47.88% of RDI) .The fruits intake was significantly lower than RDI. The mean intake of fruits was found to be slightly higher in male (144.54 g) than the

female (142.74 g) however, the differences were non-significant (Table 3).

Sugar and Jaggery

Data with regard in Table 2 stated that the daily mean intake of sugar and jaggery of diabetes patients was 6.40 g which was 32 percent of the RDI and significantly lower than RDI. The results highlighted slightly higher consumption of sugar and jaggery among male (32.55% of RDI) than female (31.45% RDI) (Table 3). These difference were non significant.

Fats and Oils

Table 2 indicated that daily mean intake of fats and oils of the diabetic patients were 23.24 g which was 116.2 per cent of RDI and significantly higher than RDI. Further table displays statistically significant result i.e., lower than RDI. Mean scores reflected that the consumption of fats and oils was slightly lower in male (114.9%) than female diabetic patient (117.5%), however, the differences were non-significant (Table 3).

Meat & Poultry

The data presented in Table 2 indicated that daily mean intake of meat & poultry among diabetic patients 25.61 g which was only 12.80 percent of RDI and significantly lower than RDI. Comparative mean scores showed that the mean daily meat & poultry intakes of male and female were 25.89 g and 25.26 g, respectively; however, the differences were non-significant (Table 3).

Table 4. Adequacy of food intake by diabetic patient (n=300)

The results regarding adequacy of food intake have been shown in Tables 4. It was observed that majority of the diabetic patient (46%) consumed marginally adequate amount of cereals. The remaining 37 and 17 per cent of them took marginally inadequate and adequate amount of cereals, respectively. Data related to adequacy of pulses determined that majority of diabetic patient (69%) consumed adequate amount of pulses. Thirty percent of diabetic patient consumed marginally adequate and few patient consumed marginally inadequate amount of pulses. (Table 4)

Table - 4 Adequacy of food intake by diabetic patients (n=300)

Category of adequacy	Cereals	Pulses	Milk & milk products	Roots & tubers	Green leafy veg.	Other veg.	Fruits	Sugar and jiggery	Fats and oils	Meat And Poultry
I	17	69.3	92.7	-	-	-	-	-	86	-
II	46	30.3	7.3	-	0.3	-	-	-	14	-
III	37	0.3	-	2	3	1	40	-	-	-
IV	-	-	-	98	96.3	99	60	100	-	100

1. 100 per cent and above (Adequate)
2. 75 to 99.9 per cent of RDI (Marginally adequate)
3. 50 to 74.9 per cent of RDI (Marginally inadequate)
4. Below 50 per cent of RDI (Inadequate)

The intake of milk and milk products was adequate among 92 percent of the respondents. Seven percent of the respondents consumed marginally adequate amount of milk and milk products. As far as intake of roots and tubers was concerned, majority of the respondents (98%) had inadequate amount daily and only two percent of the patients had marginally inadequate amount of roots and tubers in their daily diet (Table 4).

Majority of the patient (96%) consumed inadequate and three percent consumed marginally inadequate amount of green leafy vegetables in daily diet. Majority of the patients (99%) consumed inadequate amount of other vegetables and only one percent patient took marginally inadequate amount of other vegetables.

Maximum patients (60 %) consumed inadequate amount of fruits in their diets and remaining 40 percent patient consumed marginally inadequate amount of fruits. All of the patient (100%) consumed inadequate amount of sugar and jaggery Most of the respondents i.e. 86 percent consumed adequate and remaining 14 percent consumed marginally adequate amount of fats and oils. All of the patient (100%) consumed inadequate amount of meat and poultry in their diet (Table 4).

Conclusion

The present study was conducted to determine the Health status of Diabetic Patients. (40-60 Years). For this study, a total of Three hundred Diabetic patients in the age group of 40-60 Years i.e. 150 male and 150 female were drawn proportionately from the randomly selected Hospitals of District Rohtak. The study indicated that mean daily intake of most of the food stuffs was less than RDI. Inadequate intake of green leafy vegetables, other vegetables and fruits was also observed .Therefore patients need to be educated to consume more fruits & vegetables and avoid sugar and fats & oils for improving their health condition.

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