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Macronutrient intake pattern among type 2 diabetic adults visiting a tertiary care hospital of rural Vadodara: A cross sectional study

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***Abstract*---**The management of Type 2 Diabetes Mellitus requires a combination of medications and lifestyle changes. The present study was undertaken to correlate the dietary practices, anthropometric and biochemical parameters with the RDA of macronutrients. A cross sectional study consisting diabetic patients (n=50) visiting OPD at a tertiary care hospital were selected. Their anthropometry, food habits and dietary recall were analyzed. Out of 50 subjects, 58% were having normal BMI, 14% were hypertensive. A positive correlation (r=0.23) was observed between Blood pressure and BMI. The mean nutrient intake were Energy 1444 (±470) Kcal, Protein 40.26(±14.15) gm, Fats 28.60(±15.23) gm and Carbohydrate 193.28(±108.9) gm. About half of the subjects were achieving 50% of the calorie requirement, 60% of them were fulfilling 75% RDA for protein. Conclusion: MNT Goals should include maintenance of Ideal body weight along with lifestyle modifications besides maintaining the desired blood sugar levels. This will help in better compliance in management of diabetes.

Keywords---Nutrition, T2DM, Macronutrient, Calorie requirement, Biochemical parameters

Introduction

According to the World Health Organization (WHO), the incidence of Type 2 Diabetes Mellitus (T2DM) is on rise worldwide. It is a chronic disease which requires lifelong medical care and education to prevent acute complications and to reduce the risk of long term complications.[1] The treatment for T2DM requires a multi-prong approach that would include exercise, weight reduction, use of drugs and Medical Nutrition Therapy (MNT), which is the cornerstone of diabetes care and management.[2]

Recommended dietary allowance (RDA) for macronutrients are similar among people with and without diabetes.[3] A balanced diet with proper distribution of calories with adequate quality and quantity of dietary carbohydrate (CHO), protein, fat, and micronutrient intake is advised for the optimum management of blood glucose levels and balancing insulin levels in the body. To the best of our knowledge, no studies indicating macronutrient intake pattern amongst the diabetic people has been reported from Rural Gujarat. Therefore, the study has been undertaken with an aim to identify the macronutrient intake pattern among the rural diabetic patients against the recommended dietary allowances (RDA).

Methodology

A cross- sectional study was conducted in tertiary care hospital of rural Vadodara wherein a total of 50 adult participants with known T2DM were randomly selected for the study upon consent, based on inclusion and exclusion criteria. Data collection was done using pretested questionnaire which included Socio demographic profile, anthropometric data, Medical and family history, addiction pattern and 72 hour dietary recall. Biochemical data included FBS, Post Prandial Blood Sugar, HDL and LDL.

Inclusion Criteria:
- Adult stable type 2 diabetic subjects
- Willingness to participate in the study

Exclusion Criteria:
- History of any chronic illness
- Type -1 DM and Gestational Diabetes Mellitus

All the variables were coded and analyzed in Microsoft excel 2010. Appropriate statistical analyses were performed including Mean SD, Percentage, and Chi Square test. The significance level was preset at 0.05. Correlation was done on data of interest.

Results and Discussion

The results revealed that majority of the participants were within the productive age range of 40-64 years. In terms of socio economic status, the subjects were falling under low income group with occupation under the category of heavy and moderate work. Looking into the anthropometric data, about 80% of the subjects

were having BMI <25 and 20% were falling under the category of overweight and obesity. The mean BMI was more among Females than Males. (Table 1)

The data on family history revealed that 92% of subjects were having family history of diabetes and 8% of the subjects were having family history of hypertension. A total 92% subjects were having raised FBS (>110 mg/dL) and PP2BS values (>140 mg/dL). Also, lipid profile depicted that 96% of the subjects had low HDL (<35(mg/dL) and 88% of the subjects had high LDL values (>100 mg/dL) reflecting high chances of cardiovascular diseases amongst the diabetic subjects.

The data on food intake depicted that majority of the subjects skipped evening snacks, consuming majorly 2 meals a day. The data analysis of 72 hour dietary recall revealed that the mean intake of calories and macronutrients, protein, carbohydrates and visible fat were lower than the recommended RDA given by ICMR, NIN 2017. (Table 2). Around 68% of participants consumed calories less than 50% of the RDA. The per capita calorie intake varied considerably across different expenditure classes with low income households consuming fewer calories than high income group in India.[4] The mean calorie intake has declined from 1743 kcal to 1083 kcal during 1993 to 2012 in rural India. The protein intake was also found to be almost less than half of RDA, i.e. 34.37± 15.25 g for males and 33.34±10.47 g for females. Only 50% of the subjects could meet 100% RDA for proteins (Table 3). The carbohydrate intake was found to be 141.09±45.10g and 145.94±46.87g among male and female diabetic subjects. The statistics showed improper distribution of quantity and calories coming from carbohydrates which tend to influence the glucose response.

Table 1: Distribution of diabetic participants as per Body Mass Index (BMI)

Categories	Cut-offs	Males N=19 (%)	Females N=31(%)	Total N=50	Chi Square
Underweight	(<18.5)	6(31.5)	5(16.1)	11(22)	0.5^{NS}
Normal weight	(18.5-24.9)	10(52.6)	19(61.2)	29(58)	
Overweight	(25-29.9)	2(10.5)	6(19.3)	8(16)	
Obese grade 1	(30-34.9)	1(5.2)	1(3.2)	2(4)	

Table 2: Mean nutrient intake of diabetic subjects showing percent RDA

Sr. no	Nutrient	Male RDA	Male N=19	Female RDA	Female N=31	Total N=50	T value
1	Energy (Kcal)	2730	940.16± 296	1900	936.74±225.3	1444±470	0.95^{NS}
2	Protein (g)	60	34.37± 15.25	55	33.34±10.47	40.26±14.15	0.91^{NS}
3	Visible fat(g)	30	21.15± 15.63	30	20.98±15	28.60±15.23	0.91^{NS}
4	CHO (g)	-	141.09±45.10	-	145.94±46.87	193.28±108.9	0.65^{NS}

Significant at *p<0.05, **p<0.01,***p<0.001,NS-Not significant
Source: ICMR, NIN (2017).

Table 3: Number of diabetic subjects showing percent RDA

Sr. no	Nutrients % RDA	Male N=19	Female N=31	Total N=50
1.	Energy (kcal)			
	<25%	3(15.7)	0	3(1.5)
	26%-50%	15(78.9)	16(51.6)	31(62)
	51%-75%	1(5.2)	15(78.9)	16(32)
	75%-100%	0	0	0
	>100%	0	0	0
2.	Protein (g)			
	<25%	3(15.7)	3(9.6)	6(12)
	26%-50%	3(15.7)	5(16.1)	8(16)
	51%-75%	12(63.1)	18(58.06)	30(60)
	76%-100%	0	4(12.9)	4(8)
	>100%	1(5.2)	1(3.2)	2(2)
3.	Visible Fat (g)			
	<25%	2(10.52)	4(12.9)	6(12)
	26%-50%	7(36.8)	11(35.4)	18(36)
	51%-75%	3(15.7)	1(3.2)	4(8)
	76%-100%	4(21.05)	4(12.9)	8(16)
	>100%	3(15.7)	11(35.4)	14(28)

Note: Figures in parenthesis denotes percentage of the subjects.

Conclusion

Access to balanced diet not only affects person's health but also their ability to manage health conditions especially diabetes mellitus. Rural population is at risk for less diverse, lower quality diet with reduced macro and micro nutrients. Medical Nutrition Therapy should be an indispensable component of T2DM management which is based on the individual's metabolic pathophysiology. This provides adequate calories along with other macro and micro nutrients Designing proper strategies and appropriate nutritional guidance keeping in mind the food diversity and staple foods, while accommodating the individual's culinary practices and eating patterns. Nutrition interventions such as recipe demonstration and Food exhibitions should also be used to educate and motivate the family members to ensure better compliance in their nutritional management of Diabetes Mellitus.

Conflict of interest

The authors declare that they have no conflict of interest.

References

1) Khan MAB, Hashim MJ, King JK, Govender RD, Mustafa H, Al Kaabi J. Epidemiology of Type 2 Diabetes - Global Burden of Disease and Forecasted Trends. J Epidemiol Glob Health. 2020 Mar;10(1):107-111. doi: 10.2991/jegh.k.191028.001. PMID: 32175717; PMCID: PMC7310804.

2) Moy, Foong Ming, and A. R. Suriah. (2002): "Anthropometry and dietary intake of type 2 diabetes patients attending an outpatient clinic." Malaysian journal of nutrition.
3) Gupta L., Lal P, Khandelwal D. (2018): “Optimizing macronutrients in people with diabetes mellitus.”Journal of social health and diabetes.
4) Srivastava, S.K. and Chand, R., (2017), Tracking Transition in Calorie-Intake among Indian, Agricultural Economics Research Review, 30, issue 1.