Assessment of Relationship between Dietary Intake and Demographic Status among Type 2 Diabetes Mellitus Patients

Pritisha Ghosh[1], Sulagna Ray[2]

PhD Scholar, Department of Food and Nutrition, Seacom Skill University, Kendradangal, Shantiniketan, Birbhum – 731236, West Bengal, India
Corresponding Author Email: *pritishaghosh001[at]gmail.com*
Phone: +91 - 9007599372

Department of Food and Nutrition, Seacom Skill University, Kendradangal, Shantiniketan, Birbhum – 731236, West Bengal, India

Abstract: *It was attempted to determine the association between dietary pattern especially nutrient intake and demographic status among type 2 diabetes mellitus (T2DM) patients of eastern India. A total of 201T2DM patients were randomly selected, who visited the clinics from Kolkata and Sonarpur area. All the data were gathered through questionnaire survey to know dietary patterns viz. protein, carbohydrate, calorie, and fat intake as well as demographic status of the T2DM patients. Among nutrients, the protein intake was observed statistically significant (P=0.024, P=0.017 and P=0.025) association with age group, gender, and locality. But did not show significant association with religion, marital status, education, and family type. This study is concluded that demographic factors viz. age group, gender, and locality were influenced by nutrients intake especially protein among T2DM patients of eastern India. The present findings in its first time in which the association of demographic parameters were found to be important criteria regarding the association with dietary pattern.*

Keywords: Type 2Diabetes mellitus, Demographic status, Dietary pattern, Nutrient intake, Diet knowledge and practice

1. Introduction

Type 2 Diabetes mellitus (T2DM) is a multi - metabolic disorder characterized by hyperglycaemia, due to relative or absolute deficiency of insulin affecting carbohydrate protein, fat, vitamin, minerals, water, and electrolyte metabolism leading to micro and macro vascular complications. [1]

Dietary practice indicates to know preferences in food consumption among patients', which is based on diabetes nutrition education, highlighting to take foods with lesser fat, higher fiber, and lower sodium. [2] It is recommended that carbohydrate, protein, and fiber should be taken on a daily basis with proportion of 45 - 50%, 10 - 20%, and 12% of energy, respectively, for fat minimum 0.5 g per meal. [3] Generally, nutrition plays a vital role to control or prevent DM. [4] The risk of T2DM is closely related to both under and over nutrition. [5] It is well fact that the balanced food intake with endogenous and/or exogenous insulin levels is preventing DM in improving glycemic control. [6] Major international studies have been found related to the association between dietary pattern and demographic status, lifestyle features of T2DM patients. [7 - 10] Furthermore, inadequate health information system and absence of data regarding dietary pattern of DM patients as per demographic status in eastern India is lacking.

The present study attempted to evaluate the association between dietary pattern and demographic status of type 2 diabetes mellitus (T2DM) patients of eastern India.

2. Materials and Methods

Study design:
The study was based on a total number of 201T2DM patients, who visited our clinics, Kolkata, eastern part of India. All the data were collected through questionnaire survey to know dietary patterns viz. protein, carbohydrate, calorie, and fat intake as well as demographic status of the T2DM patients.

Study variables
The data on demographic status viz. age, gender, religion, marital status, locality, education, and type of family were collected. The dietary patterns viz. protein, carbohydrate, and fat intake data were gathered.

Statistical analysis
The statical analysis was performed by using SPSS tool (version 16). Categorical variables were analysed by frequency and percentage (%). Chi square test was performed between demographic status and dietary patterns among T2DM patients. In statistical analysis, P<0.05 was considered statistically significant.

3. Results

In our study (Table 1), maximum frequency of 29.0% of 51 - 60 years of age group followed by 41 - 50 years (23.4%) and 61 - 70 years (20.9%). Majority of cases were males (54.2%) and minimum females (45.8%). The frequencies of the mixed population of religion were obtained 85.1% Hindu and 12.9% Muslim for DM prevalence. Majority of cases were married (86.1%). Majority of patients from urban area (69.2%) and minimum from rural area (30.8%). The

frequencies of education level were obtained groups for college (35.8%) followed by Madhymik (28.9%). Majority of cases were found nuclear (65.7%) followed by joint family (21.9%).

Table 1: Frequency distribution of demographic status of T2DM patients

Demographic variables	N	%
Age group (Years)		
20 - 30	12	6.0
31 - 40	25	12.4
41 - 50	47	23.4
51 - 60	59	29.4
61 - 70	42	20.9
71 - 80	16	8.0
Total	201	100.0
Gender		
Male	109	54.2
Female	92	45.8
Total	201	100.0
Religion		
Hindu	171	85.1
Muslim	26	12.9
Others	4	2.0
Total	201	100.0
Marital status		
Married	173	86.1
Unmarried	18	9.0
Widow	10	5.0
Total	201	100.0
Locality		
Urban	139	69.2
Rural	62	30.8
Total	201	100.0
Education		
Primary	23	11.4
Madhyamik	58	28.9
Higher Secondary	27	13.4
College	72	35.8
University	15	7.5
Illiterate	6	3.0
Total	201	100.0
Type of family		
Nuclear	132	65.7
Joint	44	21.9
Extended Nuclear	25	12.4
Total	201	100.0

Table 2 describes frequency distribution of type of diet in which higher frequency of non - veg diet (93.0%).

Table 2: Frequency distribution of type of diet among T2DM patients

Type of diet	N	%
Veg	9	4.5
Non Veg	187	93.0
Ovoveg	5	2.5
Total	201	100.0

Table 3 evaluates the association between age groups and nutrient intake among T2DM patients. The protein intake was observed statistically significant (P=0.024) association with age group.

Table 4 evaluates the association between gender and nutrient intake among T2DM patients. The protein intake was observed statistically significant (P=0.017) association with gender.

Table 5 evaluates the association between religion and nutrient intake among T2DM patients. The nutrient intake did not observe statistically significant association with religion.

Table 6 evaluates the association between marital status and nutrient intake among T2DM patients. The nutrient intake did not observe statistically significant association with marital status.

Table 7 evaluates the association between locality and nutrient intake among T2DM patients. The protein intake was observed statistically significant (P=0.025) association with locality.

Table 8 evaluates the association between education and nutrient intake among T2DM patients. The protein intake did not observe statistically significant association with education.

Table 9 evaluates the association between family type and nutrient intake among T2DM patients. The protein intake did not observe statistically significant association with family type.

Table 3: Chi square test between age and nutrient intake among T2DM patients

		Protein			Total	Chi square value	P value
		<55	55 - 65	>65			
Age (Years)	20 - 30	2	2	8	12	20.28	0.027
	31 - 40	5	8	12	25		
	41 - 50	8	17	22	47		
	51 - 60	26	16	17	59		
	61 - 70	16	8	18	42		
	70 - 80	4	8	4	16		
Total		61	59	81	201		
		Carbohydrate			Total	Chi square value	P value
		<240	240 - 251	>251			
Age (Years)	20 - 30	5	0	7	12	4.91	0.897
	31 - 40	12	2	11	25		
	41 - 50	23	5	19	47		
	51 - 60	33	4	22	59		
	61 - 70	20	4	18	42		
	70 - 80	9	0	7	16		

		102	15	84	201		
Total							
		Fat			Total	Chi square value	P value
		<40	40 - 50	>50			
Age (Years)	20 - 30	3	4	5	12	6.03	0.813
	31 - 40	6	14	5	25		
	41 - 50	6	28	13	47		
	51 - 60	11	32	16	59		
	61 - 70	7	24	11	42		
	70 - 80	1	11	4	16		
Total		34	113	54	201		

Table 4: Chi square test between gender and nutrient intake among T2DM patients

		Protein			Total	Chi square value	P value
		<55	55 - 65	>65			
Gender	Males	32	24	53	109	8.538	0.014
	Females	29	35	28	92		
Total		61	59	81	201		
		Carbohydrate			Total	Chi square value	P value
		<240	240 - 251	>251			
Gender	Males	58	7	44	109	1.506	0.471
	Females	44	8	40	92		
Total		102	15	84	201		
		Fat			Total	Chi square value	P value
		<40	40 - 50	>50			
Gender	Males	18	60	31	109	0.301	0.86
	Females	16	53	23	92		
Total		34	113	54	201		

Table 5: Chi square test between religion and nutrient intake among T2DM patients

		Protein			Total	Chi square value	P value
		<55	55 - 65	>65			
Religion	Hindu	50	54	67	171	5.826	0.213
	Muslim	11	4	11	26		
	Others	0	1	3	4		
Total		61	59	81	201		
		Carbohydrate			Total	Chi square value	P value
		<240	240 - 251	>251			
Religion	Hindu	88	15	68	171	3.894	0.421
	Muslim	12	0	14	26		
	Others	2	0	2	4		
Total		102	15	84	201		
		Fat			Total	Chi square value	P value
		<40	40 - 50	>50			
Religion	Hindu	26	98	47	171	2.401	0.662
	Muslim	7	13	6	26		
	Others	1	2	1	4		
Total		34	113	54	201		

Table 6: Chi square test between marital status and nutrient intake among T2DM patients

		Protein			Total	Chi square value	P value
		<55	55 - 65	>65			
Marital status	Married	55	53	65	173	8.888	0.064
	Unmarried	3	2	13	18		
	Widow	3	4	3	10		
Total		61	59	81	201		
		Carbohydrate			Total	Chi square value	P value
		<240	240 - 251	>251			
Marital status	Married	87	13	73	173	2.486	0.647
	Unmarried	8	1	9	18		
	Widow	7	1	2	10		
Total		102	15	84	201		
		Fat			Total	Chi square value	P value
		<40	40 - 50	>50			
Marital status	Married	27	101	45	173	6.509	0.164
	Unmarried	4	6	8	18		
	Widow	3	6	1	10		
Total		34	113	54	201		

Table 7: Chi square test between locality and nutrient intake among T2DM patients

		Protein			Total	Chi square value	P value
		<55	55 - 65	>65			
Locality	Urban	49	42	48	139	7.402	0.025
	Rural	12	17	33	62		
Total		61	59	81	201		
		Carbohydrate			Total	Chi square value	P value
		<240	240 - 251	>251			
Locality	Urban	74	9	56	139	1.384	0.501
	Rural	28	6	28	62		
Total		102	15	84	201		
		Fat			Total	Chi square value	P value
		<40	40 - 50	>50			
Locality	Urban	27	74	38	139	0.301	0.86
	Rural	7	39	16	62		
Total		34	113	54	201		

Table 8: Chi square test between education and nutrient intake among T2DM patients

		Protein			Total	Chi square value	P value
		<55	55 - 65	>65			
Education	Primary	7	7	9	23	17.03	0.074
	Madhyamik	19	24	15	58		
	Higher Secondary	7	6	14	27		
	College	18	17	37	72		
	University	8	2	5	15		
	Illiterate	2	3	1	6		
Total		61	59	81	201		
		Carbohydrate			Total	Chi square value	P value
		<240	240 - 251	>251			
Education	Primary	10	2	11	23	9.949	0.445
	Madhyamik	34	3	21	58		
	Higher Secondary	11	5	11	27		
	College	37	5	30	72		
	University	8	0	7	15		
	Illiterate	2	0	4	6		
Total		102	15	84	201		
		Fat			Total	Chi square value	P value
		<40	40 - 50	>50			
Education	Primary	7	11	5	23	14.405	0.155
	Madhyamik	7	37	14	58		
	Higher Secondary	2	15	10	27		
	College	12	41	19	72		
	University	6	5	4	15		
	Illiterate	0	4	2	6		
Total		34	113	54	201		

Table 9: Chi square test between family type and nutrient intake among T2DM patients

		Protein			Total	Chi square value	P value
		<55	55 - 65	>65			
Family type	Nuclear	37	43	52	132	2.187	0.701
	Joint	15	10	19	44		
	Extended Nuclear	9	6	10	25		
Total		61	59	81	201		
		Carbohydrate			Total	Chi square value	P value
		<240	240 - 251	>251			
Family type	Nuclear	66	13	53	132	4.818	0.307
	Joint	23	0	21	44		
	Extended Nuclear	13	2	10	25		
Total		102	15	84	201		
		Fat			Total	Chi square value	P value
		<40	40 - 50	>50			
Family type	Nuclear	23	75	34	132	0.791	0.94
	Joint	7	23	14	44		
	Extended Nuclear	4	15	6	25		
Total		34	113	54	201		

4. Discussion

In the present study, we attempted to evaluate the association between dietary pattern especially protein, carbohydrate, calorie, and fat intake and demographic status of T2DM patients inhabiting eastern part of India.

Dietary pattern indicates to know preferences in food consumption among patients', which is based on diabetes nutrition education, highlighting to take foods with lesser fat, higher fiber, and lower sodium. [2] Generally, nutrition plays an important role to prevent T2DM. [4] Both malnutrition and over nutrition poses the risk of progression of T2DM. [5]

In our study, the protein intake was observed statistically significant (P=0.024, P=0.017 and P=0.025) association with age group, gender, and locality while protein, carbohydrate, and fat intake did not observe significant association with religion, marital status, education, and family type.

The majority of international studies have been found related to the association between dietary pattern and demographic status, lifestyle features of T2DM patients. [7 - 10] Bawazeer et al. [9] stated that the dietary patterns were affected by demographic features (age, gender, marital status, and education), which is supported the present study.

Furthermore, inadequate health information system and absence of data regarding dietary pattern of T2DM patients as per demographic status in eastern India is lacking.

5. Conclusion

The present study is concluded that demographic factors viz. age group, gender, and locality were influenced nutrients intake especially protein among T2DM patients of eastern India. The present findings observed the significant association of few demographic parameters for high protein intake as an alteration of dietary pattern. This group is further investigating to know the diet alteration and disease progression.

References

[1] Frier BM. Hypoglycaemia in diabetes mellitus: epidemiology and clinical implications. Nat Rev Endocrinol.2014; 10 (12): 711 - 22.

[2] Worku A, Mekonnen Abebe S, Wassie MM. Dietary practice and associated factors among type 2 diabetic patients: a cross sectional hospital based study, Addis Ababa, Ethiopia. Springerplus.2015; 4: 15.

[3] Gray A, Threlkeld RJ. Nutritional recommendations for individuals with diabetes. In: Feingold KR, Anawalt B, Boyce A, et al. (eds) Endotext. South Dartmouth, MA: MDText. com, Inc., 2000.

[4] Gebeyehu AF, Berhane F, Yimer RM. Dietary knowledge and practice and its associated factors among type 2 diabetes patients on follow - up at public hospitals of Dire Dawa, Eastern Ethiopia. SAGE Open Med.2022; 10: 20503121221107478.

[5] Bekele BB. The prevalence of macro and microvascular complications of DM among patients in Ethiopia 1990 - 2017: Systematic review. Diabetes Metab Syndr.2019; 13 (1): 672 - 7.

[6] Abejew AA, Belay AZ, Kerie MW. Diabetic complications among adult diabetic patients of a tertiary hospital in northeast Ethiopia. Adv Public Health.2015; 2015: 290920.

[7] Chan R, Chan D, Woo J. Associations between dietary patterns and demographics, lifestyle, anthropometry and blood pressure in Chinese community - dwelling older men and women. J Nutr Sci.2012; 1: e20.

[8] Teixeira JA, Castro TG, Grant CC, Wall CR, Castro ALDS, Francisco RPV, et al. Dietary patterns are influenced by socio - demographic conditions of women in childbearing age: a cohort study of pregnant women. BMC Public Health.2018; 18 (1).

[9] Bawazeer NM, Al - Qahtani SJ, Alzaben AS. The association between dietary patterns and socio - demographic and lifestyle characteristics: A sample of Saudi Arabia. Curr Res Nutr Food Sci.2021; 9 (3).

[10] Ruggieri S, Drago G, Panunzi S, Rizzo G, Tavormina EE, Maltese S, Cibella F. The influence of sociodemographic factors, lifestyle, and risk perception on dietary patterns in pregnant women living in highly contaminated areas: Data from the NEHO Birth Cohort. Nutrients.2022; 14 (17): 3489.