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Self-reported adherence to diet and preferences towards type of meal plan in patient with type 2 diabetes mellitus. A cross-sectional study

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Abstract *Background and aims:* Few studies have evaluated the attitudes of patients with type 2 diabetes mellitus (T2DM) towards the given dietary plans. In this study, we aimed to evaluate: i) the self-reported adherence of T2DM patients to the prescribed diets; ii) the use of other types of diet schemes; iii) the patients' preferences towards the type of meal plans.
Methods and results: A 16 multiple-choice items questionnaire was administered to 500 T2DM patients; 71.2% (356/500) of them had the perception of having received a dietary plan; only 163/356 declared to be fully adherent. The latter had lower BMI (25.8 ± 4.5 *vs* 29.1 ± 4.5 kg/m^2, $p < 0.001$) than patients who were partly adherent. Among patients not following the given diet, 61.8% was eating in accordance to a self-made diet and 20.9% did not follow any diet. Only a few patients (2.4%) had tried a popular diet/commercial program. Most patients preferred either a "sufficiently free" (201/500) or a "free" (218/500) scheme. The use of supplements attracted younger, obese individuals, with higher education, and most managers. In a multinomial regression model, age and diabetes duration were inversely associated with the choice of a "rigid" scheme, diabetes duration and glycated hemoglobin levels were inversely correlated with a "free" diet choice, obesity was associated with a "strategic" scheme choice, while lower education (inversely) and obesity (directly) correlated with the preference for "supplement use".
Conclusions: Socio-cultural/individual factors could affect attitudes and preferences of T2DM patients towards diet. These factors should be considered in order to draw an individually tailored dietary plan.

Introduction

Diet is the cornerstone of type 2 diabetes mellitus (T2DM) therapy [1,2]. Despite the widely proven benefits of a correct diet, a low adherence to dietary recommendations in T2DM patients is very commonly experienced in clinical practice, as also reported in literature [3–7]. Many studies tried to identify the best diet for T2DM and most guidelines suggest to adopt individual dietary strategies to improve patients' compliance [8]. However, an incredibly

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small number of studies evaluated the patients' attitude towards diet. Perceptions of healthy food and appropriateness of portions are highly variable and often skewed, leading patients to choose foods with poor nutritional quality [9,10]. The views of educators and T2DM patients about barriers to diet are unexpectedly quite different [11]. Most patients are disappointed about dietary advices and report such recommendations to be far from their real life and/or irrelevant for an everyday use [12]. Furthermore, attitudes, needs, wishes, and lifestyle habits are so different among individuals to make the purpose of a fruitful single dietetic approach for all patients unrealistic; indeed, the term "tailored" is always cited in guidelines to describe the need of a personalized diet for each patient [1,2]. Moreover, different "trendy" diets are often followed by many people because of their popularity, even if their safety and nutritional profile are currently uncertain [13].

The objective of the present study was to evaluate the attitudes of T2DM patients towards the provided dietary plan in order to find new strategies to improve the patients' compliance to the nutritional recommendations. In particular, the specific aims were to evaluate: i) the adherence of patients to the prescribed diet; ii) the use of other dietary therapies (such as popular diets, commercial programs), and iii) the patients' preferences in relation to the type of diet.

Methods

Study population

The study population was recruited from the Diabetes Clinic of the "Città della Salute e della Scienza" Hospital of Turin (North-Western Italy). T2DM patients referring to our Clinic are representative of Italian outpatients, characterized by longstanding diabetes, a high prevalence of chronic complications and insulin treatment [14].

The first 500 T2DM patients consecutively admitted from November 2015 to the Diabetes Clinic were enrolled, according to the following criteria:

- Inclusion criteria: T2DM patients able to understand the questions contained in the questionnaire and to provide informed consent to participate to the study; having been a patient of the Diabetes Clinic for at least one year;
- Exclusion criteria: T2DM patients unable to provide informed consent to participate to the study and to understand the content of the questionnaire and/or to fill it.

During their first visit, all the patients received a personalized written dietary plan, in accordance with guidelines, provided by one of the two dieticians expert in diabetes nutrition therapy [15]. Both dieticians followed the same counseling style. In particular, the nutritional composition was carbohydrates 45–60% total kcal, simple sugars <10% total kcal, fiber 20 g/1000 kcal, fats <35% total kcal, saturated fats <10% total kcal; monounsaturated fats 10–20% total kcal, polyunsaturated fats 5–10% total kcal, cholesterol <300 mg/day, proteins 10–20% total kcal, salt <6 g/day, alcohol ≤20 g/day (males), ≤10 g/day (females). The total energy requirements were calculated in line with the Italian Guidelines [16], and the foods suggested were in accordance with the Mediterranean pyramid [17]. All the patients received an individualized 60-min session of food education by a trained dietician covering the following topics: quantity and quality of food carbohydrates, healthy cooking, reducing salt and fat intakes, options when dining out, how to read nutritional labels and healthful food shopping. Each patient received a written plan with details of daily and weekly frequencies and portion sizes, and a list of food alternatives. This dietary plan could be considered "sufficiently free", as it allowed the patients to choose which foods to eat daily by means of a list of allowed alternatives with the corresponding recommended portions. The food list was compiled based on patient preferences, traditions, religion and economic affordability. Individualized modifications of the food plans in terms of nutrient composition and caloric content were further performed to improve post-prandial glucose control, to prevent hypoglycemia, to achieve weight, lipid, and blood pressure goals, to manage chronic complications or comorbidities and specific individual needs (e.g. eating away from home). The nutritional recommendations were checked and reinforced by the diabetologists during each visit, occurring every 4–6 months. When considered necessary, a follow-up support by the dietician was offered to patients.

During each visit, all the patients were weighed, their BMI was calculated and glycated hemoglobin (HbA1c) was determined, and data relative to the incidence of any new medical conditions, changes in drug therapy or supplement use were up-dated by the diabetologists. The anthropometric, laboratory and clinical data were written on a report given to each patient to be shown to his/her general practitioner.

Study design

Observational explorative study conducted on 500 T2DM patients.

Ethical aspects

Each patient gave his/her written informed consent to participate to the study. The study protocol was approved by the Ethics Committee of the "Città della Salute e della Scienza" Hospital of Turin.

End points

The primary endpoint was to assess the percentage of patients who claimed to follow the diet prescribed by the Diabetes Clinic.

Secondary endpoints were:

- collecting data on patients' orientation towards the dietary recommendations proposed by the Diabetes

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