Dietary habits in Parkinson's disease: Adherence to Mediterranean diet

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ABSTRACT

Introduction: Our objective is to describe the dietary habits, food preferences and adherence to Mediterranean diet (MeDi) of a large sample of Italian Parkinson's Disease (PD) patients compared to a group of controls.
Methods: Dietary habits of 600 PD patients from throughout Italy and 600 controls matched by gender, age, education, physical activity level and geographical residence, were collected using the ON-GP Food Frequency Questionnaire. Then, we compared patients by disease duration and the presence of swallowing disturbances.
Results: Overall, adherence of PD patients (males, 53.8%; mean disease duration, 9.2 ± 7.0 years) to MeDi was similar to controls (score, 4.8 ± 1.7 vs. 4.9 ± 1.6; P = 0.294). Patients consumed less alcohol and fish and drank significantly less water, coffee, and milk which resulted also in lower total fluids intake. On the contrary, they ate more fruit, cooked vegetables, cereals and baked items, more dressings and more sweets in general. Disease duration was associated with increased intake of several food groups but it was not associated with changes in MeDi score (P = 0.721). Patients with swallowing disturbances (n = 72) preferred softer and more viscous food but preferences did not result in differences in dietary pattern. However, patients with dysphagia drank less fluids (P = 0.043).
Discussion: PD patients presented different dietary habits and food preferences compared to the general population and adherence to MeDi was not associated with disease duration. Self-reported dysphagia was associated with reduced intake of fluids. These aspects may be amenable to change in order to improve the management of nutritional issues in this patient population.

1. Introduction

Besides having a potential role in the etiopathogenesis of the disease [1,2], nutrition has an important role to play in the integrated management of Parkinson's disease (PD) [3]. Body weight can variably modify during the course of the disease. Weight loss may characterize the pre-clinical stage of the disease, while weight gain in the first years of the disease may reflect benefits deriving from positive response to pharmacological treatments. Disease progression is associated with body weight reduction despite compensatory food intake, even in presence of increasing food intake, whilst neurosurgical procedures usually result in important weight gain and related metabolic complications [3,4]. Dietary amino acids (especially neutral amino acids) compete with levodopa for absorption from the gut and through the blood-brain barrier, reducing the efficacy of the drug [5]. To optimize the

effects of levodopa, PD patients should follow a protein redistribution diet, with a low-protein lunch and protein intake in the evening. Some patients may require cereal devoid of protein for lunch [6]. Dysautonomic manifestations could get significant benefit from dietary management [3,7]. Approximately, 60% of patients suffer from constipation. This makes a fiber-rich diet together with correct hydration essential [8]. Besides, probiotics and prebiotics may be a useful adjuvant therapy [9]. Dysphagia for solid food or liquids or both occurs in the advanced stages and is associated with the risk of complications, which may even be serious, such as malnutrition or ab ingestis pneumonia [10]. A semisolid diet and the use of thickeners are required to treat dysphagia, while in some cases enteral nutrition is required.

These considerations show how important nutrition is in PD and how investigations on dietary habits of PD patients can provide findings of considerable interest. To date, few investigations have been performed in PD patients and their sample size was small [11—14]. In a recent article [4] we described micronutrients and macronutrients intake in a large group of PD patients and focused on energy balance, protein redistribution, the influence of protein intake on levodopa therapy, and constipation. However, in the last two decades, there has been also growing interest in the possible implications of dietary pattern, particularly the Mediterranean diet (MeDi). A prospective study has shown an inverse association between adherence to MeDi and risk of PD [2]. A recent case-control study conducted in the US has found that PD patients adhere less than controls to a Mediterranean-type diet and their behavior was associated with age at onset [11].

To expand the knowledge in this area, the objective of this study was to assess dietary habits, food preferences and adherence to MeDi in Italian PD patients compared to controls and in-between patients with and without self-perceived swallowing difficulties.

2. Methods

2.1. Study population

We conducted a large case-control observational study [4]. Dietary habits and lifestyle of patients suffering from idiopathic Parkinson's disease (PD) with normal cognitive functions (MMSE >24 points), from all Regions of Italy and recruited consecutively among the PD patients attending the outpatient neurology clinic of the Parkinson Institute (ASST G. Pini-CTO, ex ICP, Milan, Italy) were the subject of this study. The Parkinson Institute is located in Lombardy, the most populated Region of Italy (total inhabitants: 10.003.419 — www.demo.istat.it [accessed 18th January 2016]). The dietary habits of the patients were then compared with those of a control group matched [1:1] by gender, age [±1 year], education, physical activity level and geographical area. Controls were selected among all the patients in the database of the "ON-GP" software freeware online, developed by the Grana Padano Observatory (OGP) [15,16]. Some of the controls were the spouses of the patients included or people accompanying them or other patients attending the hospital for other minor health reasons (minor neurologic, orthopedic, dermatologic [not allergic] or ophthalmologic disorders). Subjects and patients reporting the use of any type of dietary supplement and/or receiving artificial nutritional support were excluded. All the subjects recruited provided their informed consent to the study. The study was approved by the local Ethics Committee.

2.2. Assessments

The online "ON-GP" Software freeware was used [15,16]. This software is able to collect the following information: gender; age; geographical area (residence); education; type of occupation; anthropometric data (body weight, height, body mass index [BMI]); time dedicated to household chores, free time dedicated to sedentary hobbies and physical activity. Based on this information, the software then provides an estimate of resting energy expenditure (REE) according to the Harris-Benedict equations [17] and physical activity level (PAL) according to Italian guidelines (LARN) [18].

Trained dieticians (not blinded to diagnosis) completed the questionnaire by interviewing patients directly (with the aid of caregivers whenever necessary to avoid missing items). 24-hour dietary recall associated with the use of a food atlas was also considered for consistency of portion size. Dietary habits were investigated with a semi-quantitative 66-item Food Frequency Questionnaire (FFQ) included in the "ON-GP" Software [15,16], with the objective of assessing the frequency of consumption of the main food groups and drinks over the last 12 months. Moreover, the software provided the calculation of daily calorie, macronutrient, micronutrient and fluid intakes according to the Italian Food Composition Tables [19]. In this way any excesses and/or deficiencies were highlighted. Based on the data processed, the software enabled us to print a report containing personalized advice to give the patient.

All the histories were then saved and collected in a password-protected, web-based database, which can be extracted in Excel format and used for statistical analyses. Then, for each participant we calculate the MeDi score (range: 0 to 9 points; higher score indicated greater adherence to the MeDi) according to the well-established method recently used also by Alcalay et al. [11,20] for conducting a similar analysis in PD patients. First, we regressed caloric intake (measured in kilocalories) and calculated the derived residuals of daily gram intake for each of the following 7 food categories: dairy, meat, fruits, vegetables, legumes, cereals, and fish. Therefore, 1 point was assigned for each beneficial component (fruits, vegetables, legumes, cereals, and fish) whose caloric-adjusted intake was equal or above the sex-specific median. Then, detrimental components (meat and dairy products) whose caloric-adjusted intake equal or below the median were scored similarly. Intake ratio of monounsaturated fats to saturated fats above the sex-specific median and mild to moderate alcohol consumption (>0 to <30 g/day) were also given 1 point each. Participants were given a zero for each of the categories if the caloric-adjusted consumption was outside the range described above.

Furthermore, on the same day and in collaboration with the neurologist, the following clinical information was collected for all PD patients by interviewing: duration of disease, Unified Parkinson Disease Rating Scale (UPDRS) from part I to part IV [21], and disease severity (Hoehn and Yahr [HY] staging system) [22]. The presence of swallowing disturbances was assessed using the specific item of UPDRS part II which is consistent with the screening question included in the "Non Motor Symptom Questionnaire" ("Have you experienced any difficulty in swallowing food or drink or problem with choking?") recommended by the task force of the Movement Disorders Society [23,24].

2.3. Statistical analysis

All analyses were performed using the SPSS 23.0 for Windows (SPSS Inc., Chicago, Illinois). All statistical tests were two-tailed, and a p-value <0.05 was assumed to be statistically significant. Descriptive statistics of categorical variables were presented as counts and percentages, while continuous variables were reported as mean and standard deviation. Particularly, data on foods consumption were presented as crude values (unadjusted for energy intake) as they were not collected to address the pathophysiologic role of diet in PD.