



## Brief report

## Nutritional status and dietary habits in Parkinson's disease patients in Ghana

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## ABSTRACT

**Objective:** Dietary treatment is important for the management of Parkinson's disease (PD). Our objective was to describe the dietary habits and assess the nutritional status of Ghanaian patients with PD. This study is part of a larger project, for which Ghana has been selected as a pilot country. **Methods:** Fifty-five Ghanaian patients with PD and 12 healthy Ghanaian controls were recruited. We assessed nutritional status, investigated dietary habits, and assessed the prevalence of the nutritional complications of PD (e.g., constipation and dysphagia).

**Results:** The mean daily caloric intake was about 1200 kcal/d in patients with PD and in controls. The typical diet was based on semisolid foods, usually vegetable soups accompanied by cereal flour or root starch or sometimes chicken or fish. The intake of milk and its derivatives was low. The prevalences of constipation and dysphagia in patients with PD were 49% and 21%, respectively.

**Conclusion:** This study has yielded information that could be useful for the study of the management of PD and for the assessment of response to therapy.

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## Introduction

Dietary factors should be taken into consideration for the management of Parkinson's disease (PD). First of all, diet may influence the response of patients with PD to treatment: large quantities of proteins, especially animal proteins, compete with levodopa for absorption from the gut and therefore may decrease the absorption of levodopa and, hence, its efficacy [1]. Second, an appropriate diet prevents malnutrition in terms of deficiency, which occurs mainly in the advanced stages of PD [2]. Third, the diet has a role in the treatment and prevention of non-motor complications of PD, such as constipation [3] and dysphagia [4].

Recently, several nutrients and foods, such as milk [5] and vitamin D [6], have been suggested to be included among the environmental risk factors for PD, although with inconsistent results. A recent article by Smith [7], showing how a high-protein

diet promotes atherogenesis in rats, supports the hypothesis that the diet can promote the onset of neurodegenerative diseases.

Furthermore, epidemiologic studies investigating the epidemiology of PD in sub-Saharan countries have suggested a lower prevalence than in developed countries [8–10]. The finding of a five-fold higher prevalence of PD in African-American than in Western African populations [11] has suggested that environmental factors might be responsible for this difference [8].

In developing countries, the local diet is different from the Mediterranean diet. This environmental factor may be important in the understanding and management of PD motor and non-motor symptoms.

Considering all these preliminary remarks, we decided to assess the nutritional status and dietary habits of Ghanaian patients with PD. Ghana was identified as a suitable country for the performance of a pilot study.

## Materials and methods

At the Parkinson Institute, Istituti Clinici di Perfezionamento (Milan, Italy), we have set up a research project on PD in developing countries. The project started in Ghana and will be extended to others countries in Africa. A multidisciplinary team, including two neurologists, one nurse, and one nutritionist, went

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**Table 1**  
Food-frequency questionnaire

1. How many times a day do you eat?
  - a 1
  - b 2
  - c 3
  - d When I have time and food is available
  - e I don't know
2. How many times a week do you eat *fufu*?
  - a >5
  - b 2 or 3
  - c 1
  - d 0
  - e I don't know
3. How many times a week do you eat *bankù*?
  - a >5
  - b 2 or 3
  - c 1
  - d 0
  - e I don't know
4. How many times a week do you eat *omo tuo* or *kelewele*?
  - a >5
  - b 2 or 3
  - c 1
  - d 0
  - e I don't know
5. How many times a week do you eat *red red*?
  - a >5
  - b 2 or 3
  - c 1
  - d 0
  - e I don't know
6. How many times a week do you eat vegetables (onions, tomatoes, *okro*, or eggplant)?
  - a >5
  - b 2 or 3
  - c 1
  - d 0
  - e I don't know
7. How many times a week do you eat fruit?
  - a >5
  - b 2 or 3
  - c 1
  - d 0
  - e I don't know
8. How many times a week do you drink milk?
  - a >5
  - b 2 or 3
  - c 1
  - d 0
  - e I don't know
9. How many bowls of water do you drink a day?
  - a 1
  - b 3
  - c 5
  - d >8
  - e I don't know
10. How many times a week do you drink beer?
  - a >5
  - b 2 or 3
  - c 1
  - d 0
  - e I don't know
11. How many times a week do you drink palm wine?
  - a >5
  - b 2 or 3
  - c 1
  - d 0
  - e I don't know

(continued)

**Table 1** (continued)

12. How many times a week do you drink *apa teshi* or *bumkutuku*?
  - a >5
  - b 2 or 3
  - c 1
  - d 0
  - e I don't know
13. Do you favor food with spices (cumin, cinnamon, chili pepper, ginger)?
  - a Yes
  - b No
  - c I don't know

according to UK Brain Bank criteria [12]. The duration of disease was  $6.3 \pm 4.7$  y (mean  $\pm$  standard deviation). These patients were given levodopa and underwent an in-depth assessment of nutritional status. A control group of 12 African patients, matched by age and sex, was also identified.

Patients with PD and the controls were assessed by the nutritionist. Anthropometric data (body weight in kilograms, height in meters, and body mass index as the ratio of body weight to height squared) were collected.

A food-frequency questionnaire (Table 1) was administered to assess the qualitative intake of nutrients and the quantitative intake of food expressed in kilocalories. The questionnaire was drafted by the nutritionist, after having established the composition of the main typical dishes by consulting the Wikipedia Web site [13] and collecting information from the local population.

A food history was also collected by 2–4 h recall. The 2–4h recall is designed to assess the quantitative intake of nutrients and kilocalories. It has been used by other investigators in nutritional studies performed in Ghana [14].

The Swallowing Disturbance Questionnaire [15], validated for PD, was used to assess the presence of dysphagia. The scale has 14 items, each with a score ranging from 0 to 3, except one question with a score ranging from 0.5 to 2.5. The total score ranges from 0.5 to 44.5. The scientific evidence has suggested it can be used for the diagnosis of dysphagia needing treatment (cutoff score  $\geq 11$ ).

The Rome III criteria (Constipation module) were used to assess the presence of chronic constipation, and these criteria have been used in PD [3]. According to these criteria, patients are considered to have functional constipation if they score at least 2 points on the questionnaire.

The daily energy expenditure was measured in six subjects using an armband [16], which monitored energy expenditure during usual daily activities for 24 h. Patients were asked to pursue their usual daily activities while they wore the armband for 24 h. A food history was also collected by 24-h recall.

All questionnaires were administered in English with the collaboration of an interpreter.

Informed consent was obtained from all the patients. The ethics committee approved this study.

The data were collected anonymously and entered into a database protected by a password. The statistical analysis of data was carried out using JMP 3.2.6 (SAS Institute, Cary, NC, USA).  $P < 0.05$  was the limit for statistical significance. Means were compared using the Mann–Whitney test for non-parametric data.

## Results

We examined a group of 55 patients (37 men and 18 women) with PD living in Accra (greater Accra region) or Sogakofe (Volta region). We compared the group of patients with PD with a group of 12 healthy volunteers (six men and six women); all subjects lived in Accra. The anthropometric and nutritional characteristics of the two groups are presented in Table 2.

The search on local dietary habits disclosed that the typical diet of Ghanaians is based on one-dish meals, usually vegetable soups accompanied by dumplings containing a large proportion of cereal flour (rice, maize, millet) or root starch (cassava, cocoyam, yam) or sometimes also fried, grilled, or stewed chicken or fish. Large amounts of spices and palm oil are added. Also, bananas and plantains are common ingredients.

The most popular local dishes are *fufu* (pounded cassava, rice, plantain, or cocoyam), *bankù* (pounded maize or rice with bananas, served with stewed meat or fish soup), *omo tuo* (rice balls with a spicy sauce), *red red* (bean soup with plantain puree), and *kelewele* (dessert made of fried plantains flavored with ginger).

there several times in 2011 (four visits, each lasting about 1 wk). During the stay in Ghana, at Accra and Sogakofe, the team examined many patients referred by local physicians because of suspected PD. All the subjects underwent a complete neurologic examination and the diagnosis of PD was confirmed in 55 patients

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