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Presentation

Dietary pattern analysis: a comparison between matched celiac and non-celiac subjects

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A gluten free (GF) diet: is it nutritionally correct?

- All the processed and natural foods containing gluten are excluded from the celiac diet.
- Because derivates of gluten-rich grains are important sources of nutrients in the general diet, their exclusion from the diet of celiac patients could potentially have major effects on their nutritional status.
- However, to date, it is still difficult to draw a conclusion on the nutritional adequacy of a GF diet because studies conducted in different countries regarding macro- and micro-nutrient intake have reported conflicting results.

A gluten free (GF) diet: is it nutritionally correct?

- Similar intakes of energy[1-4], fat [1], proteins, carbohydrates[1,4], including starch and sugars, fiber and cholesterol have been reported in celiac patients and in control subjects;
- Lower caloric[3,5] and fibre intake[1-2], but a higher intake of total and saturated fat[3-4] were observed in the diet of celiac patients compared to healthy control subjects;
- Lower levels of folate, niacin, vitamin B12, vitamin E, vitamin A, phosphorus, calcium, zinc and selenium were described in celiac individuals than in control subjects [1-3, 6-8].

1Grehn et al., 2001;2Wild et al., 2010; 3Kinsey et al., 2008; 4Dall'Asta et al., 2012; 5Bardella et al., 2000; 6Thompson et al., 2005; 7Stepherd and Gibson, 2012; 8Hallert et al, 2002.

A gluten free (GF) diet: is it nutritionally correct?

This discrepancy among the studies could be partly linked to:

- the limited nutritional data of GF foods in the food databases;
- the different tools for recording the dietary habits;
- the different approach in conducting the study (e.g., the comparison with a matched control group or a reference population in the national survey);
- the small sample enrolled.

An ongoing study

- 150 celiac patients from the Lombardy region (Northern Italy);
- 150 healthy non-CD control subjects;
- dietary habits recorded by means of a food frequency questionnaire and a 7-day weighed food record.

We now have the results of the 7-day weighed food records for 50 celiac patients and 50 control subjects.

Characteristics of celiac and control subjects

The celiac patients are recruited at the **Center for Prevention and Diagnosis of Celiac Disease** at the University of Milan (Italy).

Exclusion criteria:

1) diagnosis of celiac disease of less than 2 years,
2) age under 18 or over 70,
3) metabolic or chronic diseases (diabetes mellitus, etc.),
4) pregnancy or lactation,
5) to be vegetarian or vegan.

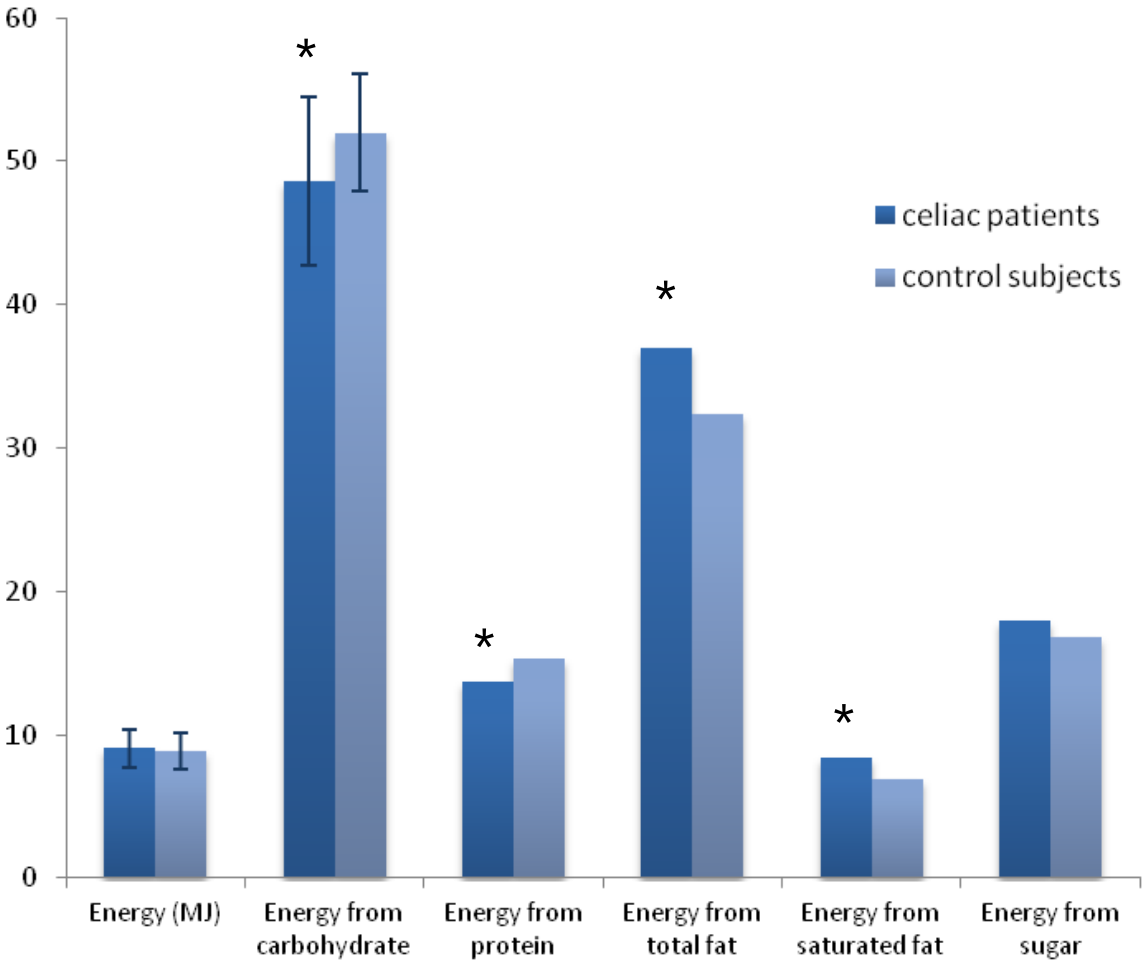
	Celiac patients n=50	Control subjects n=50
Female, n (%)	72	76
Age, y	43.2 ± 2.0	38.8 ± 2.0
Height , cm	1.66 ± 0.01	1.67 ± 0.01
Weight, kg	61.4 ± 1.4	61.9 ± 1.3
BMI, kg/m^2	22.2 ± 0.4	22.1 ± 0.4

Values are mean ± standard error of the mean (SE)

First step: the development of a composition database of gluten free products

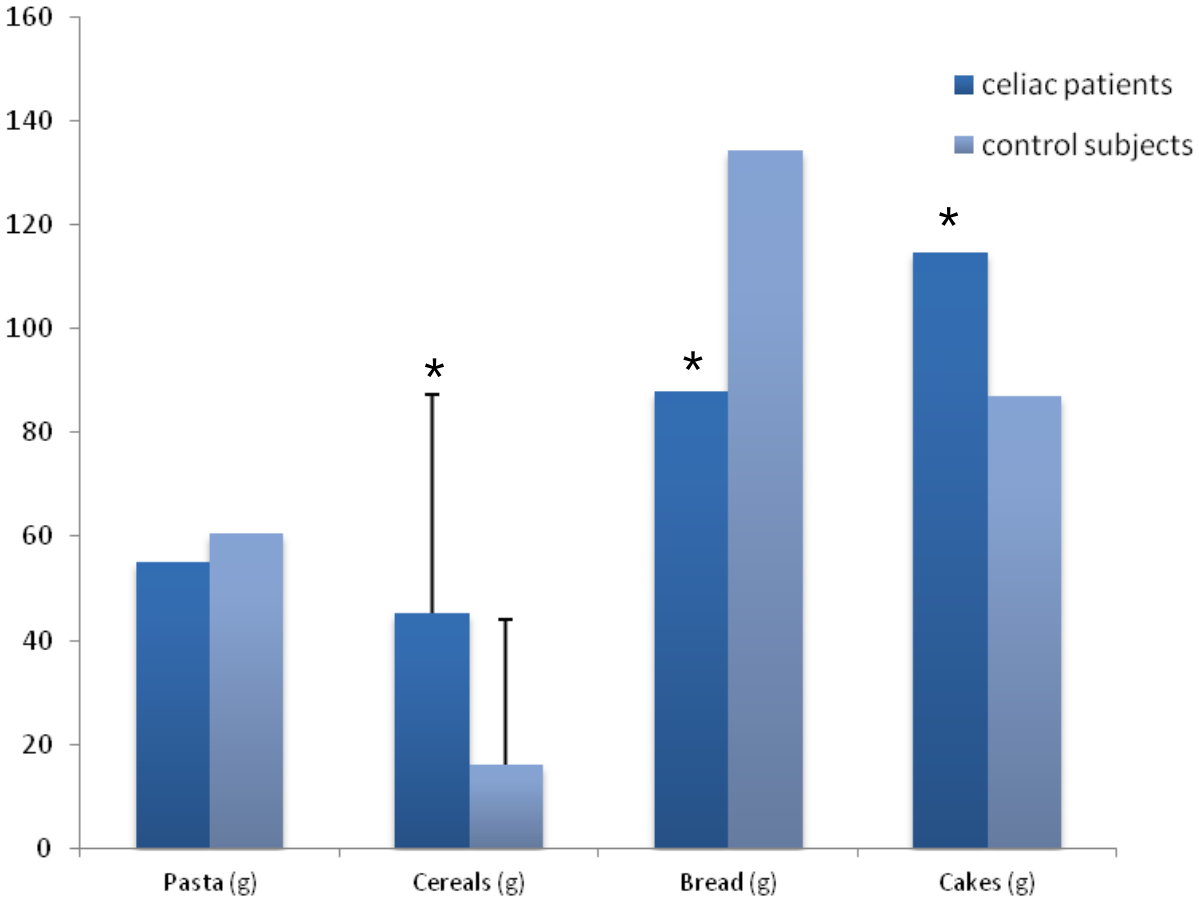
- The GF foods were selected from the 5 most popular commercial brands in Italy;
- The calculated nutritional data was performed on the ingredients reported on the label and on the nutrition information of each product;
- The nutritional values of each food were calculated as the average of the nutritional values for all the single similar foods from each brand;
- The nutritional composition was determined for 60 products included in these categories - breads and pizzas, pasta dishes, cookies, breakfast products, sweet products, savory snack and flours.

Dietary intake of celiac patients and control subjects



- Significantly different ($p < 0.05$) from control subjects.
- Mean ± SD or median

Daily intake of carbohydrate-rich foods in celiac patients and control subjects

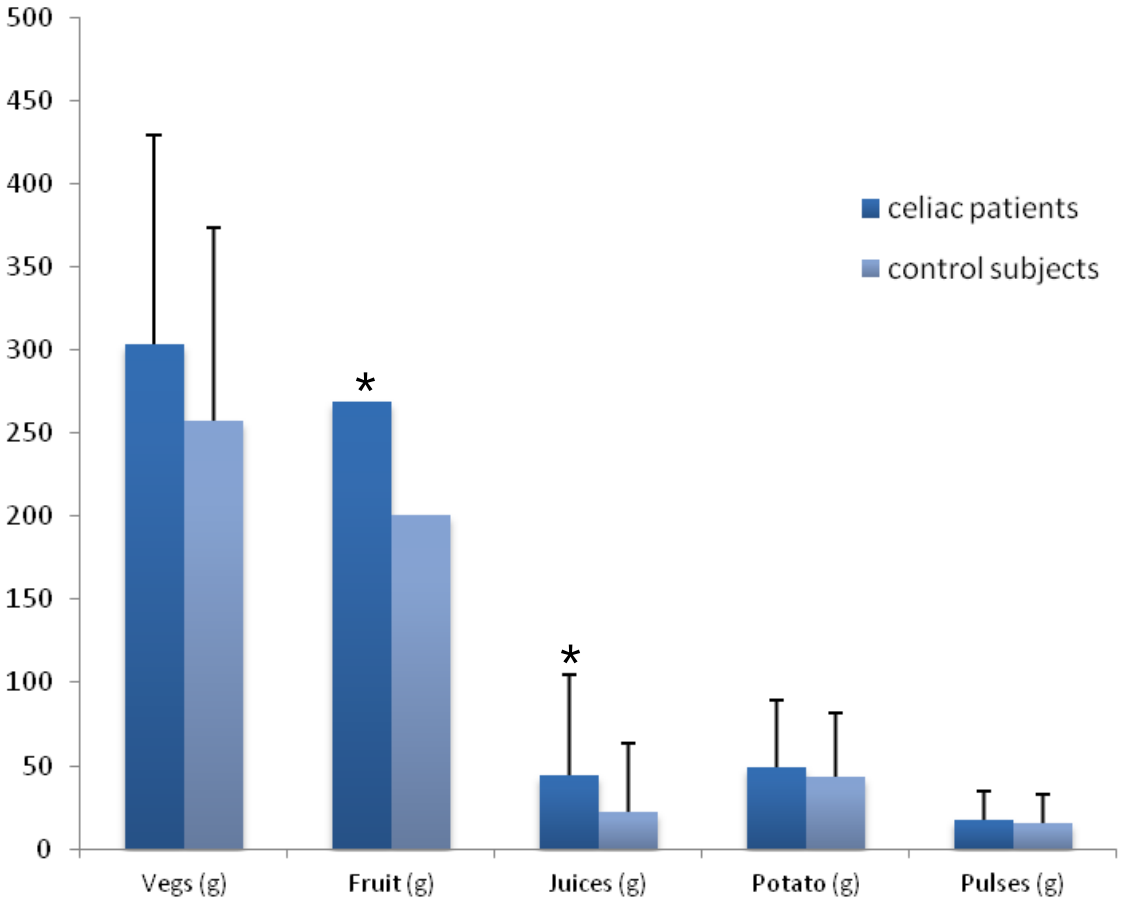


- Similar intake of meat, fish, eggs, milk and cheese;
- Similar intake of **calcium sodium** and **iron**.

•Significantly different ($p < 0.05$) from control subjects.

•Mean ± SD or median

Daily intake of plant foods in celiac patients and control subjects



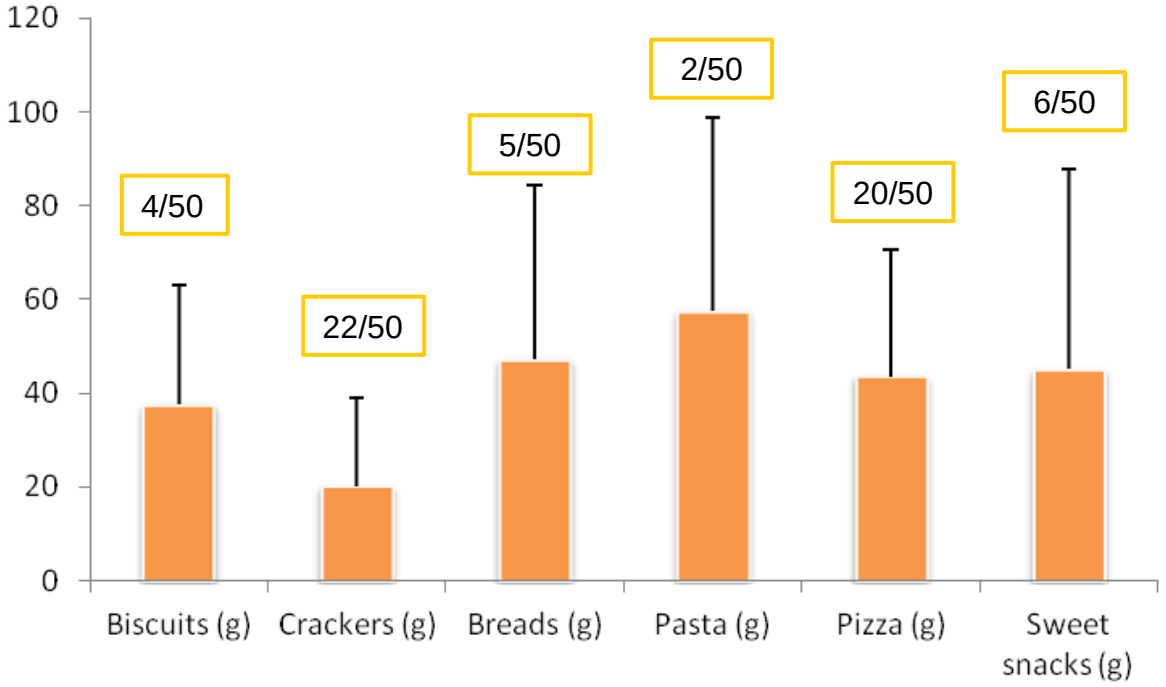
- Higher intake of **vitamin C** and **E** and **potassium** in celiac patients;
- Similar intake of folate and β–carotene.

•Significantly different ($p < 0.05$) from control subjects.

•Mean ± SD or median

Daily intake of commercial GF foods and pseudo-cereals in celiac patients

- Celiac patients have averagely consumed 209 g/day of commercial GF products (82-406 g/day);
- Two of them included a portion of buckwheat and one consumed it in flour form mixed with other flour;
- A volunteer consumed two portions of quinoa.



Mean ± SD

In conclusions

- As a general remark, the diet of our celiac patients is not worse than that of the matched control group, except for the high intake of fat;
- Our preliminary results confirm a higher intake of total and saturated fat in celiac patients than in control subjects partially due to the higher content of fat in GF products with respect to the conventional products;
- Comparing the dietary habits of the entire group with the nutritional recommendations, both groups introduce less calcium, iron, folate and potassium, but too much sodium, and a low amount of fruit and vegetables;
- These data need to be confirmed by an evaluation of the other subjects enrolled and by the food frequency questionnaire that describes a habitual diet consumed in the previous year.

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Thank you for your attention

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