

Food habits in a southern Italian town (Nicotera) in 1960 and 1996: Still a reference Italian Mediterranean diet?

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ABSTRACT. *Background:* A follow-up analysis of cohorts surveyed in the "Seven Countries Study" has provided increasing evidence of an association between diet and morbidity or mortality from coronary heart disease (CHD) and cancer. The effects of the "Mediterranean diet" on mortality is still evident in Italy, where food patterns differ significantly in different geographical areas. *Objective:* To examine differences in food habits in Nicotera, one of the Italian rural areas of the Seven Countries Study, between 1960 and 1996. *Methods:* In 1996, 80 subjects, 37 females and 43 males, aged 40-59 years, were examined in Nicotera assessing food intake by means of a semiquantitative questionnaire of food frequency, validated for the Italian population. In 1960, food intake of a sample of Nicotera subjects was assessed by weighed record method for three seasons. *Results:* Food choices differed markedly between 1960 and 1996. Consumption of animal foods increased, as did that of cakes, pies and cookies and sweet beverages in both male and female groups; an increase of alcoholic beverages was observed only in females. *Conclusions:* In 1960, Nicotera inhabitants were following a diet defined as a "reference Italian Mediterranean diet", but by 1996 the Nicotera diet approached that of an average Italian diet, whose characteristics fall short of a true Mediterranean diet. This change in dietary habits may be responsible for an increased risk of CHD and cancer in the general population in the absence of other factors.

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INTRODUCTION

The reference Mediterranean diet, typical of people living beside the Mediterranean sea, is a moderate diet based on virgin olive oil, fruit, vegetables, fish, legumes, cereals and wine (usually drunk in moderation with meals) (1).

The so-called Mediterranean eating pattern may help prevent coronary heart disease (CHD) as well as reduce the risk for some cancers. In fact, an increased overall mortality and CHD and stroke mortality have been associated with the progressive abandoning of the Mediterranean diet (2). On the contrary, increased fruit consumption and decreased wine consumption are associated with decreased mortality from cerebrovascular disease (3). Furthermore, a relationship between modified food consumption patterns and mortality for cancer at different sites is known (4). In 1960, in the context of the Seven Countries Study, one of us (A.A.) examined the diet of males aged 40-59 years from three rural areas of Italy: Creval-

core (northern Italy), Montegiorgio (central Italy) and Nicotera (southern Italy) (5).

Since the Mediterranean diet had been abandoned by males in two of the longitudinal areas surveyed (2), we deemed it of interest to also check the dietary habits of subjects from Nicotera, considered the area where a "reference Italian Mediterranean diet" was consumed (6).

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SUBJECTS AND METHODS

Subjects

Eighty adult inhabitants of Nicotera (43 males, 37 females, aged 40-59 years), selected at random, were examined in 1996. All participants gave their informed consent. Subjects affected by chronic disease, taking regular medications (including oral contraceptives in females) or on a restricted or special diet were excluded. Details on the subjects examined in 1960 are reported in previous papers (5, 7).

Anthropometric measurements

Trained operators performed anthropometric measurements according to international methodology (8). Body height and weight were recorded by a stadiometer and beam scale stadiometer (Invernizzi, Milano, Italy). Body mass index (BMI, kg/m²) was calculated from the above values.

Food intake recording

In 1996 food intake was assessed by a semiquantitative food questionnaire proposed and validated for the Italian population (9). The questionnaire con-

Table 1 - Daily intake food groups (g) of subjects from Nicotera in 1996 (mean±SD).

Food group	Males (n=43)	Females (n=37)
Milk	120.2±138.4	130.8±150.3
Cheese	41.5±22.9	50.8±38.9
Meat	84.9±42.6	91.1±41.5
Eggs	9.7±7.6	14.9±33.1
Fish	53.7±34.7	61.6±33.1
Fats and oils	34.6±49.4	42.9±57.2
Cereals	255.3±122.4	278.4±95.8
Legumes	29.5±21.5	24.3±10.9
Vegetables	333.3±282.5	265.8±111.7
Fruit	173.6±170.3	298.4±253.0
Sweet beverages	151.0±201.3	91.1±152.1
Alcoholic beverages	196.2±210.0	202.7±193.2
Sugar	10.9±9.0	14.4±15.0
Cakes/pies/cookies	33.4±50.1	47.6±100.6

Table 2 - Daily intake of energy nutrients of subjects from Nicotera in 1996 (mean±SD).

	Males (n=43)	Females (n=37)
Protein (g)	67.4±25.2	73.5±24.1
Fat (g)	117.2±46.6	119.1±36.2
Carbohydrate (g)	269.4±130.2	304.8±103.8
Alcohol (g)	40.0±13.0	42.0±13.0
Energy (kcal)	2400±926.0	2585.5±733.1
Energy (kJ)	10.0±3.9	10.8±3.1

sists of 16 printed forms and 16 pages with coloured photos of the most common Italian foods and courses. The printed forms list 93 food items; food frequency is coded in 3 categories: daily, weekly, monthly, with 1 to 6 number of times each. Three

Table 3 - Daily intake food groups (g) of subjects from Nicotera in 1960 (mean±SD of three seasons).

Food group	Males (n=64)	Females (n=63)
Milk	37.8±96.3	35.0±67.0
Cheese	16.91±16.8	9.0±12.6
Meat	49.7±46.6	24.0±25.2
Eggs	21.6±23.0	9.5±16.3
Fish	43.9±31.9	22.1±19.2
Oils	40.2±14.7	31.8±13.3
Fats	2.9±5.6	3.2±9.1
Cereals	455.4±134.8	346.0±107.1
Legumes, raw/fresh	13.6±33.8	16.0±34.8
Legumes, raw/dry	29.0±33.9	22.8±28.0
Vegetables	303.9±147.2	267.8±141.4
Fruit	104.3±109.7	60.1±53.0
Sweet beverages	0	0
Alcoholic beverages	287.9±246.3	59.2±87.5
Sugar	25.2±21.7	18.7±13.6
Cakes/pies/cookies	1.1±4.0	0.8±4.6

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Changes in food habits in Nicotera

Table 4 - Daily intake of energy nutrients of subjects from Nicotera in 1960 (mean±SD).

	Males (n=64)	Females (n=63)
Protein (g)	78.6±14.1	54.8±15.8
Fat (g)	67.4±14.7	51.0±18.9
Carbohydrate (g)	366.6±92.1	277.8±74.1
Alcohol (g)	25.6±21.9	5.3±7.8
Energy (kcal)	2485±536	1775±457
Energy (kJ)	10.4±2.2	7.4±1.9

portions (A, B, C) of 61 foods or courses are illustrated in the form with coloured photos. Instructions and other questions are included. The filled-out forms are scanned into a computer, where customised software calculates the daily food and course consumption. The questionnaire requires about 15 minutes to complete and process for each subject. The weighed record method, which was used in the 1960s, is fully described in previous papers (5, 7).

Statistics

Statistical analysis was performed using the SPSS software package, version 6.0 (SPSS, 1988). Analysis of variance was used to test for differences of the variables between males and females in 1960 and 1996. Values are presented as mean and standard deviation (SD), unless stated otherwise.

RESULTS

Tables 1 and 2 show the mean daily intake of food groups and nutrients of subjects from Nicotera examined in 1996. Females present higher values than males for most food groups and nutrients.

Tables 3 and 4 show the mean of three seasons of daily intake of food groups and nutrients of subjects from Nicotera examined in 1960 (4). Males always have higher intakes than females.

The distribution of food groups, expressed as g/100 kcal or g/418 kJ for males in Nicotera examined in 1960 and 1996 is shown in Figure 1. In 1996, males show higher values for milk, cheese, meat, fruits, cakes, pies and cookies and lower values for eggs, cereals, sugar and alcoholic beverages.

The distribution of food, reported as g/100 kcal or g/418 kJ for females in Nicotera examined in

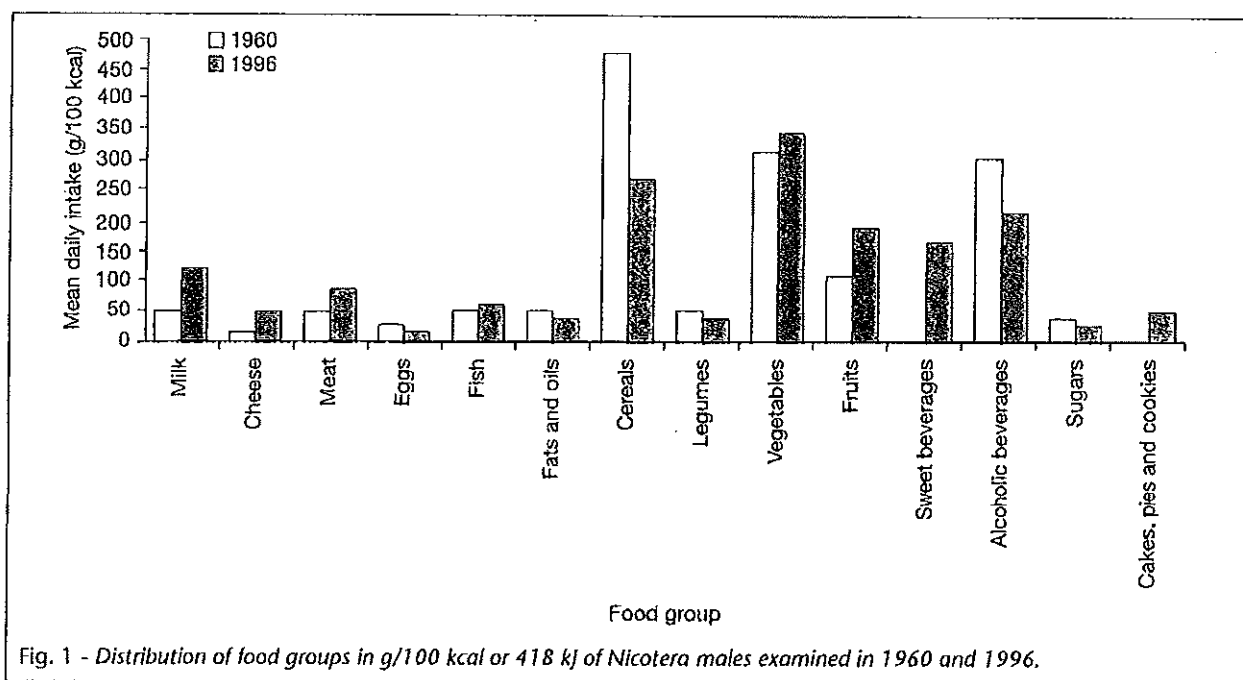
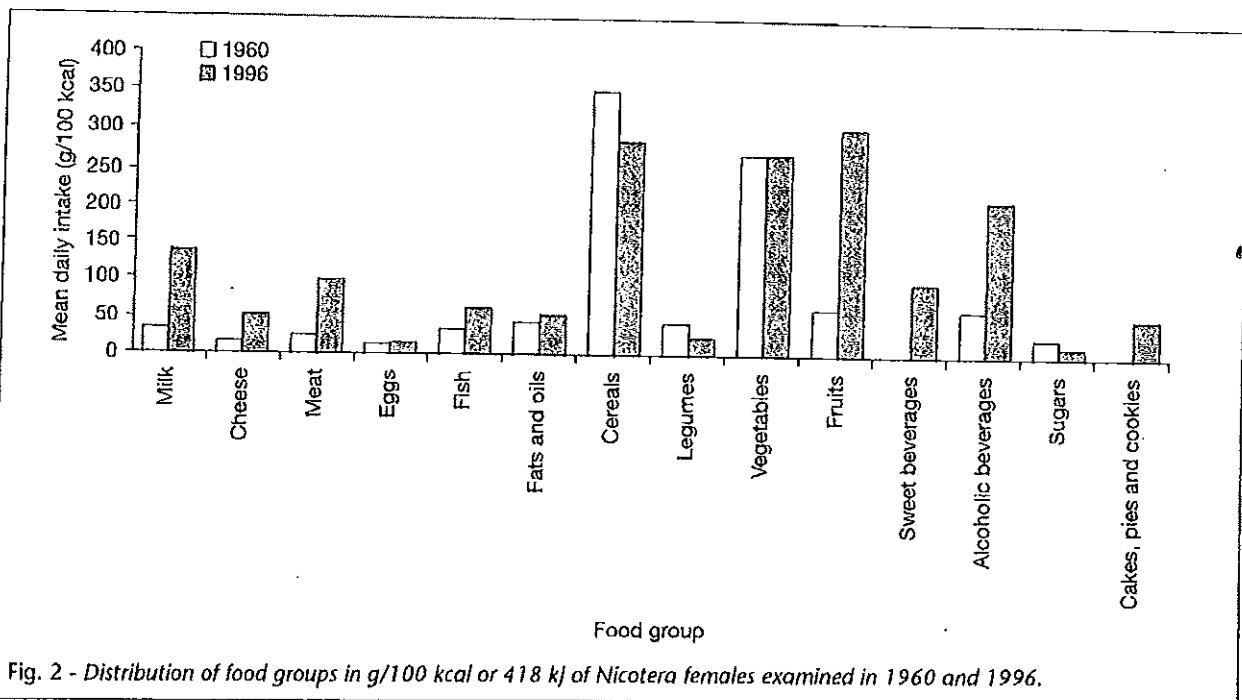
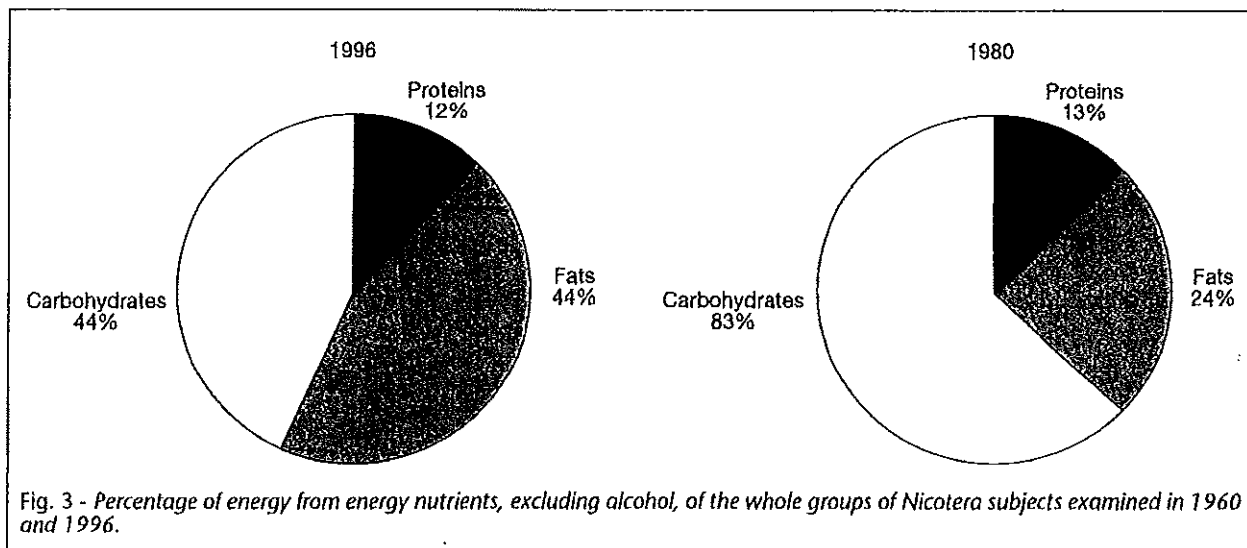


Fig. 1 - Distribution of food groups in g/100 kcal or 418 kJ of Nicotera males examined in 1960 and 1996.



1960 and 1996, is shown in Figure 2. In 1996, females present higher intakes of milk, cheese, meat, fish, fruit, cakes, pies and cookies, alcoholic beverages and sweet beverages and lower intake of legumes. The percentage of energy from energy nutrients in

the pooled Nicotera subjects examined in 1960 and 1996 is reported in Figure 3. In 1960, 63% of energy was provided from carbohydrate, 13% from proteins and 24% from fat. In 1996, energy from carbohydrates decreased to 44%, whereas that from fat almost doubled. Sex differences were negligible.



DISCUSSION

The present study demonstrates that intake of meat and dairy products, as well as cakes, pies, cookies and sweet beverages increased in 1996 compared to 1960. Accordingly, the mean of the MAI (2) decreased from 9.4 for males and 11.4 for females in 1960 to 2.8 and 2.5, respectively, in 1996. Similar results were obtained in Crevalcore and Montegiorgio, the two rural Italian cohorts followed longitudinally for 31 years.

The present study is cross-sectional, the dietary survey techniques were different and no other relevant variables were collected. Nevertheless, the present data point out that the traditional food choices of Mediterranean population are changing. Indeed, the diet of Nicotera subjects examined in 1996 differs markedly from the original Mediterranean type. Improved socio-economic status and wider food availability may be the major determinants of this change.

To reverse this trend, one approach is to raise the awareness of children to the benefits of healthy dietary habits. To improve public health, we can target interventions to medical professionals and school educators. Adequate nutritional intervention programmes are needed to counteract deteriorating eating habits.

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