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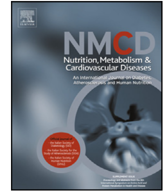

Decline of the Mediterranean diet at a time of economic crisis. Results from the Moli-sani study

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Abstract *Background and aims:* Adherence to Mediterranean diet (MD) is reportedly declining in the last decades. We aimed to investigate the adherence to MD over the period 2005–2010 and exploring the possible role of the global economic crisis in accounting for the changing in the dietary habits in Italy.
Methods and results: Cross-sectional analysis in a population-based cohort study which randomly recruited 21,001 southern Italian citizens enrolled within the Moli-sani study. Food intake was determined by the Italian EPIC food frequency questionnaire. Adherence to MD was appraised by the Italian Mediterranean Index (IMI). A wealth score was derived to evaluate the economic position and used together with other socioeconomic indicators. Highest prevalence of adherence to MD was observed during the years 2005–2006 (31.3%) while the prevalence dramatically fell down in the years 2007–2010 (18.3%; $P < 0.0001$). The decrease was stronger in the elderly, less affluent groups, and among those living in urban areas. Accordingly, we observed that in 2007–2010 socioeconomic indicators were strongly associated with higher adherence to MD, whereas no association was detected in the years before the economic crisis began; both wealth score and education were major determinants of high adherence to MD with 31% (95%CI: 18–46%) higher adherence to this pattern within the wealthier group compared to the less affluent category.
Conclusion: Adherence to MD has considerably decreased over the last few years. In 2007–2010 socioeconomic indicators have become major determinants of adherence to MD, a fact likely linked to the economic downturn.
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Introduction

Cardiovascular disease (CVD), cancer, obesity and type 2 diabetes account for 70% of all deaths in Europe every year [1]. These non-communicable diseases have been shown to be largely preventable by promoting healthy lifestyles, such as healthy diets, physical activity, tobacco cessation and moderate alcohol consumption. Adherence to a Mediterranean dietary pattern has been widely associated with reduced risk for major chronic diseases, including neurodegenerative diseases, and reduced mortality for CVD [2–4].

Studies conducted within Mediterranean populations have shown that adherence to the Mediterranean diet (MD) has gradually declined in the last decades [5–7]. The social and cultural changes occurred during the last years

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and globalization have deeply influenced the lifestyle of people yielding a gradual shifting towards more Western-type ways of living and eating habits and the more affected countries resulted to be the ones in the Mediterranean basin [8,9].

Recent evidence shows that more disadvantaged people are less likely to follow the traditional MD compared to those with higher household income, independently from other socioeconomic indicators [10]. The cost of healthy foods has been suggested to play a role in the dietary choices of people [11] whilst the low cost and high palatability of energy-dense foods is rising concern among the scientific community [12].

The occurrence of the global economic crisis started in 2007 is likely to have worsened the situation mainly for disadvantaged groups. In addition, there is major concern about possible unfavourable outcomes of the global economic crisis on health mainly due to the fiscal austerity adopted by European governments. Recent investigations have highlighted how policies inspired to restriction have deeply affected the health status of people, mainly in the weakest European Community Countries, such as Greece and Italy [13,14].

The aim of this study was to investigate the trend in adherence to MD over the very last years and to explore the role of the global economic crisis and the accounting of socioeconomic indicators for the adherence to the MD before and after the economic downturn.

Methods

Study population

Between March 2005 and April 2010, 24,325 participants (men and women aged ≥35 years) were randomly recruited within a population-based cohort study (Moli-sani), in the Italian region of Molise, an area placed between Central and Southern Italy ([10] and Appendix 2).

After exclusion of subjects reporting personal history of cardiovascular disease (angina, myocardial infarction, heart failure, revascularization procedures and stroke; 5.7%), cancer (3.1%) or of those for whom there were no available information on dietary habits (3.9%), 21,001 subjects were finally included in the analysis.

Dietary information

The validated Italian EPIC food frequency questionnaire was used to evaluate food intake [15,16]. To simplify interpretation of data and to minimize within-person variations in intakes of individual foods, 188 food items were classified into 45 predefined food groups on the basis of similar nutrient characteristics or culinary usage (Appendix 3).

Moderate alcohol intake was defined as regularly drinking less than two or one drinks a day, by men or women, respectively.

We evaluated adherence to Mediterranean diet by using the Italian Mediterranean Index (IMI) a score conceived to better capture healthy eating including foods, such as pasta, more typically consumed in Italy [10,17].

Total food antioxidant content (FAC) score was used to assess the antioxidant content from diet [18].

Socioeconomic indicators

Household income was divided into four categories as low (≤10,000 Euros/year; 0 point), low-medium (>10,000 ≤25,000 Euros/year; 1 point), medium–high (>25,000 ≤40,000 Euros/year; 2 points) and high (>40,000 Euros/year; 3 points). A specific variable for missing values for income (32.2%) was created for not excluding from the analysis such a large representative number of people for whom other socioeconomic information were still available. This category was labelled as “non-respondent”. Housing was considered as rented (0 point), one dwelling ownership (2 points) and more than one dwelling ownership (3 points).

The household wealth score was obtained by the ratio between household income plus housing and then divided by the number of living-in members and ranged between 0 and 6. The score was then categorized as low (<1), medium (≥1 and≤1.25) and high (>1.25) which represent approximate tertiles of the population for whom the score was not missing. Missing values (32.4%) were labelled as “non-respondent”.

Education was divided into three levels: ≤8 (years of studies), 8–13 and >13. Marital status was intended as married/living-in partners, divorced, single or widow. Profession was considered as manual, not manual or other (retired, housewife, etc.). This study also considered the site of residence and it was dichotomized as resident in a city (number of inhabitants >8000) or in smaller villages.

Annual average rate of price change of some foods as measured by the Harmonised Index of Consumer Prices (HICP) was used for a comparison with the trend of adherence to MD in our population.

Statistics

Values for continuous variables are presented as means ± Standard Deviation. Analysis of variance for continuous or categorical variables was applied to test the associations in Tables 1, 2 and 4. High adherence to MD was defined when the Italian Mediterranean Index was ≥5 points.

Multivariable binomial (Poisson) regression with the log link function [19] was used to quantify the associations between high (≥5) vs. low (<5) adherence to the MD with anthropometric or socioeconomic variables. Potential confounders included as covariates in the model were total energy intake, total physical activity, BMI, smoking, hypertension, hypercholesterolaemia and diabetes. An appropriate interaction term between recruitment period (2005–2006 and 2007–2010) and each of the presented variables was introduced to test whether the changes in the adherence to MD in the two enrolment periods were different according to the levels of each variable.

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