



The third Italian National Food Consumption Survey, INRAN-SCAI 2005–06 – Part 1: Nutrient intakes in Italy

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Abstract *Background and aims:* Italian National Food Consumption Survey, INRAN-SCAI 2005–06, is the third national food consumption survey performed in Italy. This study describes energy and nutrient intakes in Italy.

Methods and results: A national cross-sectional food consumption survey was conducted using consecutive 3-day food records between October 2005 and December 2006. A sample of 3323 males and females aged 0.1–97.7 years living in private households was investigated. Individual food records were converted into energy and nutrient intakes with the use of recently updated national food composition databases. For each subject, intakes of energy and of 27 nutrients were calculated, including six minerals (i.e., iron, calcium, phosphorus, magnesium, potassium and zinc) and 10 vitamins (i.e., thiamine, riboflavin, vitamin C, vitamin B₆, retinol, β -carotene, vitamin A as retinol equivalents (REs), vitamin E, vitamin D and vitamin B₁₂). On average, 36% of calories appeared to derive from fat (11% from saturated fatty acids) and 45% from available carbohydrates (15% from soluble carbohydrates).

Conclusions: The results of the INRAN-SCAI 2005–06 survey in terms of nutrient intakes provide an important piece of information for nutrition surveillance of the population and may also be used to identify priorities for further research.

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Introduction

An imbalanced intake of nutrients is associated with increased morbidity and mortality from diseases, including cardiovascular diseases, cancer, diabetes, osteoporosis, etc. [1] There is an international consensus that healthy food choices and adequate physical activity level may improve health conditions and prevent chronic diseases [2,3].

Estimating nutrient intake is an important part of activities aimed at monitoring nutritional status. It allows the identification of groups nutritionally at risk due to insufficient or excessive intake of specific nutrients; to target, plan and evaluate nutrition intervention programmes; and to establish dietary recommendations, food regulations and nutrition policies [4].

In Italy, the last national food consumption survey had been carried out in 1994–96: the INN-CA Study [5]. This food consumption database had allowed to estimate nutrient intake [6–8] and total diet studies were implemented [9–14].

The results of some more recent Italian studies, assessing nutrient intake in sub-groups of the population, are also available in the literature [15–22].

After about a decade, the third national food consumption survey (INRAN-SCAI 2005–06) was carried out and the results have been published in terms of food consumption [23].

This article is aimed at presenting descriptive statistics of energy, macro- and micro-nutrients intakes in Italy.

Methods

A detailed description of the study design, participation rate and survey protocol is reported elsewhere [23]. The main features are summarised here.

Study population

The INRAN-SCAI 2005–06 survey was conducted on 1300 households stratified into the four main geographical areas of Italy (north-west, north-east, centre, south and islands) between October 2005 and December 2006. In total, 1329 households participated in the food survey corresponding to 3323 individuals (1501 males and 1822 females).

Food survey

Food consumption data were collected at individual level for 3 consecutive days using the estimated food record method with a semi-structured diary.

All foods and drinks consumed (including tap and bottled water), both at and outside home, were recorded by each participant using household measures and estimating portion sizes according to detailed guidance notes (with instructions to quantify the portions used by children) and photographs atlas developed on the basis of EPIC-SOFT picture book [24]. For children below 8 years of age, the diaries were filled in by the person who took care of him/her.

The use of vitamin and/or mineral preparations and of a range of medicines and products containing nutrients

(cod liver oil-based preparations, herbal, botanical and homeopathic preparations, etc) were also registered in the diaries. Any of these products is hereafter called 'supplement'.

Data entry, food and nutrient databases and statistical analysis

Individual intakes of foods and nutrients were calculated with the use of the in-house software INRAN-DIARIO version 3.1, developed by INRAN [23]. This software includes several checkpoints to ensure the accuracy and completeness of the data recorded and allows each interviewer to create new temporary food codes for all the food items and recipes that are not present in the databanks.

Any missing food – consumed during the survey – was added to the food composition database. At the end of the INRAN-SCAI 2005–2006 survey, it included 1244 food items and 118 supplements. Missing nutrient values were estimated on the basis of nutrient levels in similar foods or of manufacturer's data (e.g., food labels), in particular, for fortified foods. Recipe calculations were undertaken without any adjustment for nutrient losses during cooking. Four databases were used to transform the recorded data into weights of single food items and into amounts of energy and nutrients (see [online annex](#) for databases description: Scheme 1).

The present article reports energy and nutrient intakes (mean of the 3 days for each subject) as mean, median and percentiles of distribution of intakes by sex and age. Age categories were infants (0–2.9 years), children (3–9.9 years), teenagers (10–17.9 years), adults (18–64.9 years) and the elderly (65 years and above), with males and females grouped in the case of infants and children. Nutrient density expressed as amount of dietary fibre, cholesterol, vitamins and minerals per unit of energy was also calculated.

The definition of nutrients was that adopted in the Italian National Food Composition Tables [25]. Food energy was expressed as kilocalories (kcal) and megajoules (MJ); vitamin A was expressed in retinol equivalents (REs). Available carbohydrates were expressed as mono-saccharides equivalent, that is, the sum of free sugars and complex carbohydrates. Dietary fibre was intended as the sum of hemicelluloses, celluloses, lignin, pectins, gums, waxes and resistant starch.

The significance of differences between age and sex classes was assessed with a non-parametric test (Kruskal–Wallis) only among teenagers, adults and the elderly. Statistical analyses were performed with SAS package version 8.01 (SAS Institute Inc., Cary, NC, USA).

Ethical issues

The survey was exclusively observational and non-invasive, ethical aspects were related only to the collection of information on food habits that may be related to health and thus might be sensitive. INRAN is part of the National Statistical System (SISTAN) and guarantees individual data protection. An additional ethical committee review of the study protocol was considered unnecessary.

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