Intake of iron in a northern Italy population

Marcella Malavolti[1], Carlotta Malagoli[1], Sabina Sieri[2], Vittorio Krogh[2], Marco Vinceti[1]

[1]Environmental, Genetic and Nutritional Epidemiology Research Center, Department of Biomedical, Metabolic and Neural Sciences, University of Modena and Reggio Emilia, Modena, Italy; [2]Epidemiology and Prevention Unit, Fondazione IRCCS Istituto Nazionale dei Tumori, Milan, Italy

Background

Globally an estimated two billion people suffer from a chronic deficiency of micronutrients. When total body iron concentration falls blow a certain threshold erythripoiesis is impared leading to iron deficiency anaemia. Iron deficiency and related anaemia is a significant public health problem in several countries, and it becomes a very serious condition in poor resources countries. Iron is not only a functional component of hemoglobin, but it is also necessary to ensure the correct functioning of many of the most important metabolic pathways. For this reason, iron deficiency and anemia are severe comorbidity, expected to occur in different clinical situations.
Iron deficiency anemia is responsible for approximately 50% of all cases.
In the WHO European Region the prevalence in the latter population group ranges is from 19,8% to 33 and caused 68,36 million years lived with disability.

Methods

We investigated dietary iron intake of 719 residents of five provinces of the Emilia Romagna region in northern Italy (Bologna, Ferrara, Modena, Parma and Reggio Emilia), using a validated semi-quantitative food frequency questionnaire specifically developed as a part of the European Prospective Investigation into Cancer and Nutrition (EPIC) study specific for the Northern Italy population. The EPIC questionnaire was designed to capture habitual diet/eating behaviors during the past 12 months. Participants were asked to respond to 248 questions about 188 different food items, including seasonal foodstuffs, and to indicate the number of times a given item was consumed (per day, week, month, or year), from which the absolute frequency of consumption of each item was calculated. The food items were then linked to the Italian Food Tables to obtain estimates of Iron dietary intake. We focused our attention especially in non-menopausal women (considered as aged <50), a population at high risk for anemia, to assess if their iron intake is adequate taking into account the population reference intake (PRI) recently established by the European Food Safety Authority (EFSA).

Results

Average iron intake was 12,71 (±4,35) mg/day. We found an average iron intake higher in males 13.68 (±4.43) mg/day than in females 11.93 (±4.12) mg/day, without any differences of iron intake between younger (age<50) 11,91 (±3,40) mg/day and older women (age≥50) 11,94 (±4,72) mg/day. These intakes were appropriate than those recommended by EFSA for older women (11 mg/day) but not for pre-menopausal women (16 mg/day). The main food group contributing to iron intake was wheat and grain products representing more than 20 % and up to 49 % of the iron intake in all population groups except infants. Other main contributing food groups were meat and meat products, vegetable and vegetable products, dark chocolate, legumes, eggs, fish and dried fruits.

Table 1. Average Iron dietary intake (mg/day)

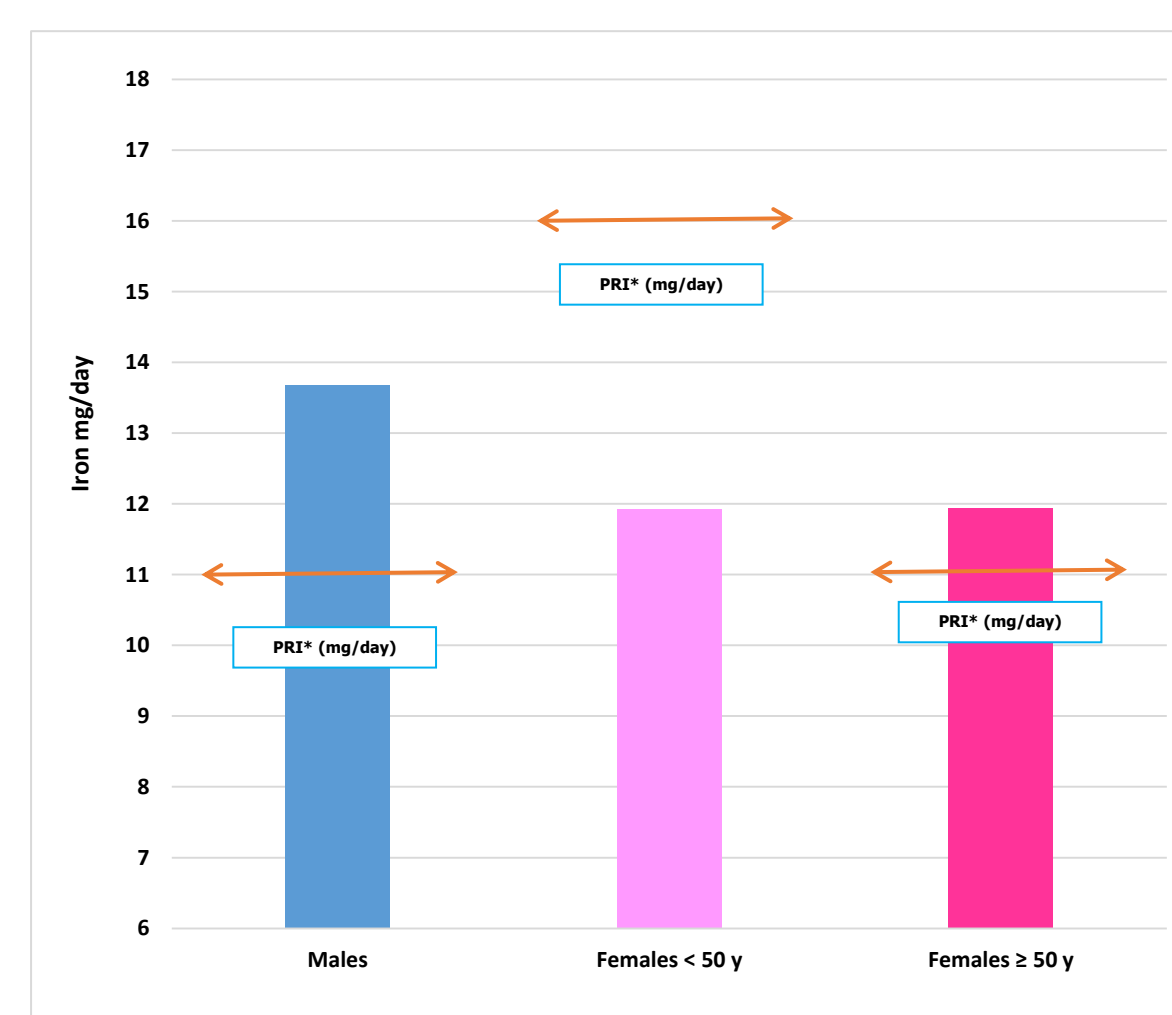|	n	(%)	Mean±SD	(min-max)
All subjects	719	(100.0)	12.7±4.35	(2.96-30.91)
Gender				
Men	319	(44.4)	13.7±4.43	(4.21-30.91)
Women	400	(55.6)	11.9±4.12	(2.95-30.62)
Female Age (years)				
<50	195	(48.8)	11.9±3.4	(5.46-23.28)
≥50	205	(51.2)	11.9±4.7	(2.95-30.62)
Female Province				
Bologna	99	(24.8)	12.11±4.53	(4.29-30.62)
Ferrara	63	(15.8)	11.89±3.81	(3.19-22.38)
Modena	120	(30)	11.37±3.79	(2.95-25.36)
Parma	39	(9.7)	11.99±4.05	(6.02-23.28)
Reggio E.	79	(19.7)	12.55±4.34	(3.52-28.03)

Figure1. * Population Reference Intake of Iron (mg/day)
(a): The PRI covers the requirement of approximately 95% of premenopausal women

Figure 2. Epic Food Frequency Questionnaire for the assessment of Iron intake
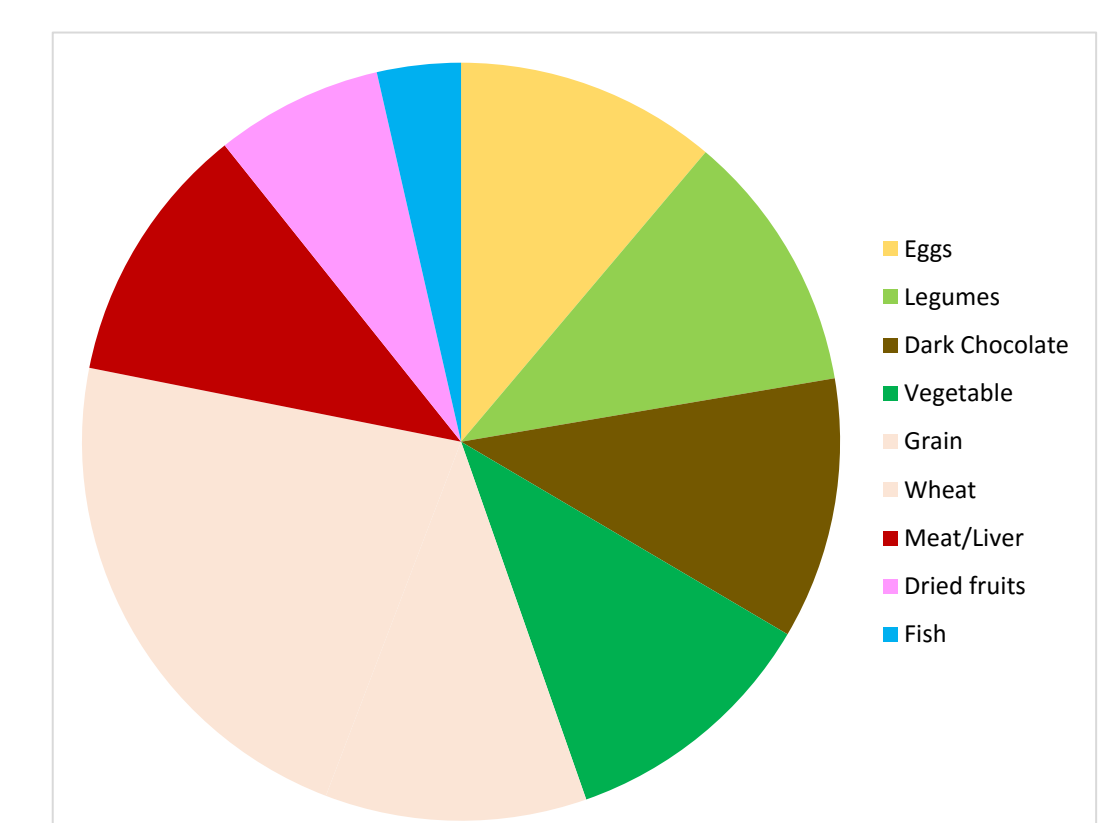
Figure 3. Food categories which gave the major contribution to Iron dietary intake (INRAN)

Eggs
Legumes
Dark Chocolate
Vegetable
Grain
Wheat
Meat/Liver
Dried fruits
Fish

Conclusions

Our analysis suggested that pre-menopausal women iron intake in this northern Italy population is much lower than the recommended levels. This investigation may contribute to increase the awareness of the epidemiological burden of this illness, and the importance of screening at-risk patients. Public health interventions should be considered to increase Iron intake in population and counteract the risk of iron deficiency anemia.

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✉: marco.vinceti@unimore.it

CREAGEN- Environmental, Genetic, and Nutritional Epidemiology Research Center, Modena and Reggio Emilia University