

## A Sociological Observational Study on Nutrition in Older Italians: Between Tradition and New Models

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### Abstract

**Purpose of the Study:** Nutrition plays a pivotal role in the health status of elderly people. It is known that advancing age, gender and education (proxy of social status) may affect eating habits. The eating habits of Italian older subjects have not however been extensively investigated. The aims of this study were: 1) to describe and compare the eating habits of Italian older subjects ( $\geq 60$  years old) and those of late adults (aged 50 - 59 years); 2) to explore whether and how their eating habits are affected by age and gender; 3) to identify dietary patterns associated with different food and beverage consumption; 4) to describe and compare the BMI of Italian older subjects and of late adults; 5) to explore whether and how their BMI values are affected by age, gender, and social status.

**Design and Methods:** Retrospective population study with data from the 2010 face-to-face multi-purpose survey by ISTAT (Italian National Statistics Institute). Among 48,336 interviewees of all ages, we focused on 19,789 participants of four age groups: 50 - 59 (late adults;  $n = 6,646$ ), 60 - 69 ( $n = 5,905$ ), 70 - 79 ( $n = 4,544$ ) and  $\geq 80$  ( $n = 2,694$ ). All participants were community-dwelling and were asked about their eating and drinking habits.

**Results:** Eating habits of elderly Italians were similar to those of late adults (50 - 59 years old), without substantial differences according to age group and gender. We were however able to define three distinct dietary patterns, each characterized by specific food items that were prevalently consumed. Drinking habits were more differentiated, also according to age and gender. BMI of the interviewees showed minor differences among late adults and older subjects, even if young elders (60 - 69) and elders (70 - 79) had a greater propensity to be overweight and obese. Overall, education level emerged as a crucial factor in an increased risk of being underweight, overweight and obese.

**Implications:** Although elderly Italians exhibit some distinct dietary patterns, their eating habits are largely shared with their younger counterparts, which may be due to intergenerational relationships. Proper eating behaviors must therefore be promoted and shared at all ages.

**Keywords:** Nutrition and Feeding Issues; Italian Eating Habits; Aging; Gender and Generation

### Introduction and Research Aims

Nutrition is tightly associated with health status in the elderly population. On the one hand, research has shown the harmful effects that a poor diet has on older people's health condition [1]; on the other hand, eating habits of older people are influenced by advancing age, gender and social status. In particular, the older the subjects, the less attention they devote to their nutrition and the following pattern becomes evident: increasing age is indicative of a reduction in both the volume and variety in their diets [2,3].

Although Italy is a country with one of the highest life expectancies, food habits of Italian older people (conventionally those aged  $\geq 65$  years) have not been investigated extensively, and studies focusing on consumption patterns of the whole segment of the elderly population are lacking.

<sup>1</sup>In the paper we distinguish interviewees according to four age group: 50 - 59 as late adults, 60 - 69 as young elders, 70 - 79 as elders, over 80 as old elders. Therefore, the term of elderly refers to all over 60 years old. Senior and older are used as synonyms for elderly.

Concerning young individuals, a study by Casini, *et al.* in 2013 showed that people aged 18 - 29 who formed autonomous family units were greatly responsive to change, and that their food habits have varied between the survey of 2000 and that of 2009. Changes mainly occurred because of homologation trends, in parallel with decreasing food expenditures and the spread of unhealthy food patterns [4]. In this changeful context we hypothesized that eating habits of older Italians ( $\geq 60$  years old) could be different from those of late adults (aged 50 - 59), because the former would be possibly committed to traditional habits while the latter could have varied in line with those of younger generations ( $< 50$  years old).

For this purpose, our aims were to evaluate and describe the dietary patterns of a large sample of Italian subjects aged  $\geq 50$  years old, and to assess the following: 1) to describe and compare the eating habits of Italian seniors (aged  $\geq 60$ ) and those of late adults (aged 50 - 59); 2) to explore whether and how their eating habits are affected by age and gender; 3) to identify dietary patterns associated with different food and beverage consumption; 4) to describe and compare the BMI of Italian seniors and of late adults; 5) to explore whether and how their BMI values are affected by age, gender, and social status.

## Data and Methods

We retrieved data from the 2010 survey conducted by ISTAT (Italian national Statistics Institute, [www.istat.it/en/](http://www.istat.it/en/))<sup>2</sup>. This survey, which had an overall sample of 48,336 citizens of all ages, focused on collecting data about eating habits and nutritional aspects, and was conducted through face-to-face guided interviews with a pre-defined questionnaire (available in Italian at [http://www.unidata.unimib.it/wp-content/pdf/SN100\\_Q\\_ita.pdf](http://www.unidata.unimib.it/wp-content/pdf/SN100_Q_ita.pdf), accessed October 21<sup>st</sup>, 2016). Data are available upon registration at the website UNIDATA - University of Milano-Bicocca (<http://www.unidata.unimib.it/?indagine=multiscopo-istat-aspects-of-daily-life-2010>).

The extent of the sample allows to analyze differentiated sub-samples and to compare different sub-samples. For the purposes of this study, we considered 13,143 participants aged  $\geq 60$  years and 6,646 aged 50 - 59 years, which constituted the group of "late adults". All participants were community-dwelling, and the final sample included 19,789 subjects. The older population ( $\geq 60$  years) was further divided in subgroups according to the age criterion: 5,905 aged 60 - 69, 4,544 aged 70 - 79 and 2,694 over the age of 80.

The administered questionnaire included queries on how often 16 foods and 8 drinks were consumed.

In detail, foods included bread, pasta, rice, meat, fish, eggs, dairy products, cold cuts, savoury snacks, fruits, and vegetables. For foods possible answers were: more than once per day, once per day (daily), a few times per week, once per week, less than once per week, and never. However, in order to simplify data presentation and to obtain a more balanced variable (that represents a dietary intake in which certain foods are systematically present) for subsequent analysis, the first three answers were aggregated in a single item during the analysis. To date, the majority of the answers were "a few times per week".

Beverages considered in the survey included mineral water, carbonated soft drinks (also referred to as "sodas" in the manuscript), non-alcoholic aperitifs, beer, wine, alcoholic aperitifs, digestive spirits and other spirits.

Possible answers for the consumption of water, sodas, beer, and wine were: more than 1 liter per day, between 0.5 and 1 liter per day, 1 - 2 glasses, sporadically, only in certain seasons, and never. Possible answers for the consumption of aperitifs and spirits were: more than 2 shots per day, 1 - 2 shots per day, a few shots per week, rarely, exceptionally, never. For the purpose of this analysis, except for water (because of its large use, mineral water answer is aggregated as daily consumption), for all of the other cases answers were aggregated in order to display any kind of consumption (from daily to occasionally), obtaining the dichotomization "at least occasionally" versus "never".

Although the exact volumes of foods consumed were not recorded, we were nonetheless able to ascertain the dietary patterns of the participants in the sample and most importantly identify situations where certain foods are either never or rarely consumed. In addition to verifying individual consumption, we explored consumption patterns. We preferred to explore emerging models rather than verifying the existence of *ex ante* models such as the Mediterranean Diet.

Furthermore, the collection of height and weight allowed us to calculate the Body Mass Index (BMI = weight [kg]/height<sup>2</sup> [m<sup>2</sup>]), which is a widely adopted and simple proxy of nutritional status.

## Statistical analysis

All of the analyses were performed with the software SPSS 22.0 Version (IBM Corp., Armonk, NY, USA). For the descriptive statistics we reported the percentage of interviewees who answered "at least weekly" for every single food and "at least occasionally" for drink items, divided according to the four age groups: 50 - 59, 60 - 69, 70 - 79 and  $\geq 80$ .

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<sup>2</sup>This survey belongs to the family of Multi-aims survey on the aspects of daily life. It is a set of surveys on behaviors and lifestyles of Italians that Istat has been conducting for 30 years. Some aspects of the survey remain the same every year, while others change.

<sup>3</sup>The sample is statistically representative of the Italian population.

Factor analysis was performed identifying the principal components of the original variables (the missing values are 1,896). These represent the most relevant factors, which we used to define different dietary patterns (eating habits) and drinking patterns (drink consumption). We performed two distinct PCAs for food and beverages because this first one (food) explored an habitual consumption of various foods, while the second one (beverages) explored a not elimination of some beverages (indeed, with the exception of water, the beverages are little-used).

We preferred to explore emerging models (a posteriori method) rather than verifying the existence of ex ante models such as the Mediterranean Diet because the analysis was performed on the Italian population that usually and systematically consumes bread, pasta, legumes, fruit and vegetables. We divided the obtained factors into classes of equal dimension, but there is no statistically significant significance controlling for age and social status. Indeed, the PCA synthesized a little part (36.9%, see table 3) of the overall variance of the original variables.

After, we show descriptive statistics to describe and compare the BMI of Italian seniors and of late adults. Consequently, we performed a multinomial regression model to explore whether and how their BMI values are affected by age, gender, and social status. The multinomial logistic regression model included the variables age, sex and education (which we use as proxy of social status, because for older people the profession is not detected). Education was dichotomized as “lack of middle school license” (less than 8 years of education) versus “at least middle school license” ( $\geq 8$  years of education) . Significance was set for p-values  $< 0.05$ .

## Results

### Eating uniformly, drinking differently

We examined the general tendencies that data reveal concerning the impact of age on eating habits and drink consumption. First of all, the results show (Table 1) that the differences according to age (both between elderly and late adults and among the various age groups of elderly) are minor. Diversity is mostly found in certain food groups of secondary importance (such as savoury snacks, more popular in late adults and young elders) and in some drinks. In particular, those are aperitifs, beer and spirits, but to some degree also wine, which were favoured by late adults and the young elders.

Food items	Age groups			
	50 - 59	60 - 69	70 - 79	80+
<b>Carbohydrates</b>				
Bread, pasta, rice	98.4	98.8	98.7	98.3
Savoury snacks	12.4	7.3	5.0	3.6
Desserts and sweets	44.1	37.1	31.8	31.5
<b>Proteins of animal origin</b>				
Beef	72.2	69.1	67.0	64.0
Pork	48.6	47.1	44.9	38.6
Poultry, white meats	80.5	81.6	81.6	80.4
Fish	63.1	65.2	61.7	56.2
Cold cuts	63.4	58.3	53.6	42.6
Eggs	57.0	58.1	59.1	54.4
Dairy products	83.1	82.7	81.5	79.8
Milk	68.5	69.5	75.3	78.8
<b>Fruits and vegetables</b>				
Leafy vegetables	94.0	94.8	94.1	92.6
Other vegetables	93.4	93.9	93.6	91.1
Potatoes	71.6	73.2	73.7	71.9
Canned legumes	52.3	53.0	50.9	48.5
Fruits	95.9	96.6	97.1	97.1

**Table 1:** Analysis of food consumption in the study population according to age groups. Answers were aggregated and the reported consumption is intended as “at least weekly”. Frequencies are expressed as percentages (%), unless otherwise specified.

<sup>4</sup>65% of the elders (70 - 79) and 80% of the old elders (over 80 years old) have only primary school certificate.

We emphasize that differences in eating habits are basically minute, especially when one takes into account that all the considered food items (in particular proteins of animal origin) are generally associated with good economic status and for older individuals - especially the old elders - a high income is much less prevalent than late adults. This may indicate why, for example, proteins such as beef, pork and fish are consumed less frequently in the over 80 age group (old elders).

Eating habits in Italy in other words, appear to be very similar, both because the underlying cultural model (the Mediterranean Diet) is basically shared by the whole population, and because in the last decades social differences have had very little influence on basic consumption patterns [9], or rather, they had impact on the “quality” rather than the type and quantity of food consumed. Another reason is that most Italian people live in family groups in which eating habits are shared amongst its members, as enlightened by a study from our group (Decataldo, Fiore, Facchini, *et al.*) that is currently under review.

The emerging picture from this analysis is that dietary patterns of the Italian late adult (50-59 age group) and elderly population basically include all of the nutritional key-elements.

The picture illustrating the consumption of beverages is certainly more diversified than the one of food patterns (Table 2). Although mineral water is drunk by about three-quarters of respondents, other beverages surveyed by the questionnaire show wide differences.

Beverages	Age groups, years			
	50 - 59	60 - 69	70 - 79	80+
<b>Non-alcoholic</b>				
Mineral water*	82.6	80.3	77.2	74.7
Carbonated soft drinks	51.4	43.6	33.5	25.6
Non-alcoholic aperitifs	50.0	36.9	24.0	14.2
<b>Alcoholic</b>				
Beer	55.0	42.0	26.7	14.6
Wine	64.9	63.8	61.0	51.0
Alcoholic aperitifs	30.2	20.5	11.2	4.9
Digestive spirits	30.6	23.8	14.1	8.1
Other spirits	27.3	21.4	10.8	5.0

**Table 2:** Analysis of beverages consumption of the study population according to age groups. Answers were aggregated and the reported use is intended as “at least occasional”. Frequencies are expressed as percentages (%), unless otherwise specified.

\*: Because of its large use, mineral water answer is intended as daily consumption.

First of all, the consumption of drinks other than water is less frequent among the elderly. Considering at least an occasional regularity (thus excluding the other answer: “never”), wine consumption ranges from 55 to 65% of the sample; beer and carbonated soft drinks are consumed by 15-55% of the respondents; consumption of aperitifs, digestive spirits, and other spirits ranges from 5% to 30% of the sample (Table 2).

Secondly, the answers provided seem to be mainly related to age and gender differences. All of the beverages are consumed less frequently when one switches from late adults (aged 50 - 59) to young elders (aged 60 - 69) and progresses to more advanced ages. With more detail, drinking mineral water, wine, and soft drinks did not present major differences. Other beverages display a diversity that is much more accentuated, in some cases 1:4 or even 1:5 for the older age groups (elders and old elders) compared to young elders, as it is the case for aperitifs and spirits (Table 2).

Differences were also relevant between men and women, especially for alcoholic beverages. Within the same age group, women that never drink alcohol are generally 20 - 25% more than men who exhibit the same behavior. Moreover, in terms of frequency of alcohol consumption, young-old respondents and males drink more regularly, while the older respondents and females drink them seldomly (data not shown).

While advancing age maintains some explanatory role, we can speculate that certain beverages (such as beer or aperitifs) took root in Italy as a mass consumption phenomenon only in recent decades, involving especially young people. Those subjects are now in the ‘late

adult' or the younger elderly decade (60 - 69). However, the oldest respondents were already adults when this consumption have spread, and were not particularly subjected to the pressure of the new drinking habits. Thus, as older individuals, they are more likely to have kept a reduced interest in regard to these beverages [5].

This also implies that the next older generation will presumably have very different alcohol consumption patterns, more consistent or at least more differentiated than those of the current elderly generation, and perhaps even less gender-differentiated.

We were then interested in verifying whether under the relative homogeneity of food and drink consumption, it was possible to identify dietary patterns associated with different food and beverage consumption. Therefore, we performed a factor analysis, that is two differentiated PCAs for food and beverages (see Data and Methods paragraph).

As regards foods, the analysis confirms the homogeneity of consumption because the three extracted factors are able of explaining/synthesizing only 36.9% of the variance of the original variables (Table 3). However, it is possible to identify three dietary patterns of food consumption: the carnivore, the vegetarian and the quick-lunch consumer.

Furthermore, considering the diet patterns according to gender, our analysis shows that men are more prone to being carnivore (43.8% vs. 39.6% for men and women, respectively), while women tend to prefer vegetarian pattern (34.6% vs. 44.8%). On the other hand, gender differences are very small concerning the other pattern identified by the factor analysis.

In addition to the centrality of mineral water in the framework of beverages of the Italian population, factor analysis demonstrated the presence of a drinking pattern with an association of aperitifs, digestive spirits and other spirits consumption (Table 4).

Beverages	Pattern	
	Drinker pattern	No drinker pattern
Mineral water		.768*
Carbonated soft drinks	.445	.498*
Non-alcoholic aperitifs	.673*	.245
Beer	.678*	
Wine	.546*	-.398
Alcoholic aperitifs	.772*	
Digestive spirits	.750*	
Other spirits	.696*	-.199

**Table 4:** Factor analysis of drinks consumption.

\*: Indicates the most relevant factors (extracted factors: 2; total explained variance: 50, 61%).

Given the substantial uniformity of food habits, differences in drinks consumption are relevant. These disparities seem to lead from both the subjects' identity patterns (gender-related) and from belonging to different generations, as observed in a previous study from Brazil [6].

### Risks of undernutrition and obesity

The descriptive statistics concerning the BMI of the interviewees show minor differences among late adults and elderly, even if young elders (60 - 69) and elders (70 - 79) have a greater propensity to be overweight and obese (Table 5). Despite the substantial similarity in eating patterns, we found differences in BMIs that enlighten two distinct problematic issues. The first concerns underweight women, particularly among the oldest ones, where a portion between 5 and 9% has BMI < 18.5 versus only 1.2 - 2% of underweight men. It is worth noting that anorexia affected less than 0.1% of respondents, almost exclusively women. On the opposite side of the spectrum, the second issue pertains the prevalence of overweight, which affects about 40% - 50% of the population. More importantly, obesity applies to about 10 - 15% of participants according to the BMI criterion, without significant differences according to age groups or gender. In all of the three cases, criticalities mostly emerged in subjects with low education.

In order to understand the role of these factors (i.e. age, education, and gender) in influencing the risk of being underweight and overweight, we performed a multinomial logistic regression analysis. It appears that social status (education) plays a major role where BMI - a known predictor of health status [7] - is concerned. Within the same age group, women are more likely to be underweight, while individuals with low education are more likely to be overweight and obese compared to those who possess at least a middle school diploma (Table 6).

BMI	Age groups, years			
	50 - 59	60 - 69	70 - 79	80+
Underweight	4.4	3.3	3.6	6.6
Normal weight	41.5	36.0	34.6	40.7
Overweight	41.9	45.1	46.6	39.1
Obesity	12.2	15.6	15.1	13.4

**Table 5:** Analysis of BMIs of the study population according to age groups. ". Frequencies are expressed as percentages (%).

Risk factor	Underweight		Overweight		Obesity	
	Exp (B)	p-value	Exp (B)	p-value	Exp (B)	p-value
50 - 59 (ref. Over 80)	.516	.000	1.353	.000	1.237	.004
60 - 69 (ref. Over 80)	.438	.000	1.571	.000	1.406	.000
70 - 79 (ref. Over 80)	.536	.000	1.474	.000	1.202	.009
Woman (ref. Man)	5.106	.000	.469	.000	.852	.000
Lack of middle school license (ref. At least middle school license)	0.584	.000	1.674	.000	1.719	.000

**Table 6:** Multinomial logistic regression of the potential risk factors for underweight, overweight and obesity.

These data confirm previous findings, even though Italy shows an overall better scenario than other Western countries, especially in terms of prevalence of obesity [8].

## Discussion and Conclusion

Contrary to what we hypothesized, our study demonstrates substantially homogeneous food consumption patterns when considering age groups and gender, but this characteristic should not be intended as a "similarity" per se. A first consideration about this kind of survey is represented by an intrinsic criticism, i.e. the lack of information about the preparation/cooking modality of the explored foods. Indeed, it could be hypothesized that the interplay of these factors could have an impact on the respondents' eating patterns. That being said, a deep characterization of volumes and preparations of the explored food items was beyond the scope of the survey, which aimed at illustrating a general overview of food and drinking habits. Overall, the frequency with which the participants consume the main food groups suggests a relatively homogeneous dietary pattern between the late adult population and the elderly, within specific age groups and between men and women.

This dietary pattern probably recognizes multiple common basic elements. First, the wide acknowledgment of the cultural model of the "Mediterranean diet", in which the daily consumption of bread, pasta, milk, olive oil, fruits and vegetables - with the addition of meat, eggs, and dairy products more times per week - is the core of a longstanding tradition, especially embraced by the elderly population. Again, meat seems to be considered a more recent achievement by the older individuals and a proxy of relative wealth [9]. Sharing such a model presumably implies that social differences are mostly affecting the quality of food products rather than their type and quantity, as emerged from the report by the Italian research foundation "CENSIS" - Center for Studies on Social Investments (available at [http://www.censis.it/14?shadow\\_ricerca=107088](http://www.censis.it/14?shadow_ricerca=107088), PDF report available to download after registration). Indeed, income usually affects the overall structure of consumption in other European countries [10], implying that its increase is accompanied by a decrease of the proportion used for food in favor of other less essential goods [11-15]. In Western societies this normally translates in absolute amounts allocated for food consumption that are fairly similar for different social groups.

Finally, the fact that the majority of elderly people live in families - often intergenerational [16,17] - contributes to sharing of eating habits thus attenuating the possible divergence related to age and gender.

A second consideration pertains the risk of undernutrition and obesity. This raises a concern because the prevalence of low BMI values suggests that the aging process is often accompanied by a minor interest in nutrition, up to cases of extremely poor appetite [18]. Moreover, previous research reported an association between low BMI and dementia [19,20].

Overweight and obesity also present worrisome rates, and it is known that obesity generally relates to an overall worse health condition and increased risk of death [21]. Concerning another typical age-related chronic condition, i.e. dementia, the literature reports some results about the association between obesity and the risk of developing cognitive impairment in both animal models and humans [22-24]. It should be noted that the decreased rate of obesity displayed by the older geriatric subjects in our study population compared to late

adults does not necessarily represent a decline of the phenomenon with advancing age. It probably reflects the establishment of unhealthy dietary patterns among the younger generations, which include a growing consumption of high energy-dense food items including high-protein products or even 'junk food', perhaps in line with the modifications reported by Casini, *et al.* among young people (18 - 29 years old) [4]. Indeed, obesity is more prevalent among the respondents who consumed eggs, cold cuts, pork, desserts/sweets, and snacks more frequently than other groups. These food items are considered time-saving and usually related to fast and de-structured meals.

Years ago, during the 50s and 60s, Italy has seen a process of homogenization of dietary patterns that were previously differentiated according to social status; the new model was summarized in the concept of the "Mediterranean diet". As already mentioned, the Mediterranean diet contributed to both the social and generational homogenization. However, in the last two decades, this dietary pattern is progressively giving more and more space to different eating patterns. These include unbalanced diets advertised as "healthy", high-protein diets (mostly of animal origin), and even more recent patterns that encompass the lipid-rich 'junk food' (e.g. fast food).

We should probably expect a return to the marked differences that characterized the Italian population's food consumption up to the beginning of XX century. In contrast with the past, these disparities are likely to be more pronounced and will depend more from the overall cultural models rather than from income per se. Certainly, by no means their social and health impact will be less significant.

A potential limitation of this study is represented by the fact that all study participants were community-dwelling adults. However, because the rate of institutionalization in nursing homes concerns only 2% of the elderly population, we are confident that our sample depicts the Italian scenario quite well and accurately [25]. Therefore, our results can be generalized to the Italian population.

As already mentioned, we lack the exact volume of food consumed, making this work more a qualitative rather than a quantitative analysis. On the other hand, drink consumption was more detailed in terms of volumes.

Despite these potential limitations, the large sample size can be considered as a major strength of our research. In particular, this aspect allowed us to analyze not only age differences, but also the influence of gender on eating habits and dietary patterns.

A second positive aspect is that research was addressed to all age groups, thereby allowing us to compare eating habits between the elderly and the late adult population, and thus catching their consumption trends.

In this complex picture, where eating habits are shared mostly because of the intergenerational relationships between the elderly and their younger relatives, future studies should explore whether - and to what extent - being alone might contribute in affecting the dietary patterns of the older segment of the Italian population (Decataldo, Fiore, Facchini, *et al.* under review).

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## Conflict of Interests

The authors declare that they have no conflict of interests to disclose.

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## Previous Presentations

Preliminary data about this research were presented by CF at the International symposium "Dietary needs of healthy and frail older people", held on August 3rd, 2015, in the context of events of EXPO 2015 Milan, Italy (available with limited access at <http://streaming.unimib.it/tcs/?id=C595565F-C4D9-49A1-B400-EB5DF3944D8B>).

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