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# Eating habits and lifestyles: a multivariate analysis of the data from an Italian population-based survey

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## Abstract

The aim of the study was to describe dietary habits and lifestyles in relation to the self-perceived health of the Italian population. The data derived from the Multi-purpose Family Survey, “Aspects of Daily Life” (MFS), a yearly population-based survey conducted by the Italian National Census Bureau (ISTAT). Our study analyzed the 1997 and 1998 MFSs data, a national representative sample of 115,419 individuals  $\geq 14$  years of age. The multiple correspondences analysis and the cluster analysis were used for the study. Five clusters were identified, clearly distinguished with regard to dietary habits and lifestyle, which are associated with socioeconomic conditions, age, gender, as well as self-perceived health conditions. Although the information gathered do not allow us to assert any causal relationship between diet and health, they allow to identify behavioral patterns (eating habits and lifestyles) representative of the Italian population, which may result in useful contributions for planning nutrition policies. © 2004 Elsevier Inc. All rights reserved.

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## 1. Introduction

Within the framework of public health strategies, attention is generally focused on the existing relationship among dietary habits, lifestyles, and health conditions, and search for proof that dietary habits in a population can be important risk or preventive factors related

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to specific disease [1–3]. Several studies confirm a relationship among the socioeconomic and demographic conditions of individuals, their lifestyles, and eating habits. Features such as gender, age, socioeconomic status (in terms of occupational levels or type of work), as well as education level, physical activity, and smoking seem to contribute to determining eating habits. Women, together with wealthy and/or highly educated individuals, seem to have adopted a healthier diet [4–10] than others. Moreover, those who embrace healthier behaviors, a less sedentary lifestyle, and who do not smoke seem to have a more balanced diet too [11–13]. Many studies have confirmed that specific dietary habits—which might result in a lack or an excess of nutrients—along with conditions such as overweight/obesity, are related to serious chronic pathologic conditions such as diabetes [14], cardiovascular diseases [15–17], and cancer [18,19].

In particular, a relationship has been shown between consumption of fats, especially saturated fats, and blood cholesterol level, that is an ascertained cardiovascular risk factor [20–22]. On the other hand, it is well known that the intake of fiber, fruits, and vegetables constitutes a protective factor against the onset of certain types of cancer [23, 24].

The aim of this study was to determine the main behavioral patterns, in terms of diet and lifestyle, among the Italian population, and to describe the socioeconomic and demographic features of the individuals who adopt them, to verify the existence of any possible relationship among eating habits, lifestyle, and health conditions.

## 2. Methods and materials

The data come from the Multi-purpose Family Survey, “Aspects of Daily Life” (MFS) [25,26], a yearly cross-sectional survey conducted by the Italian National Census Bureau (ISTAT). The only population-based information on eating habits, lifestyles, and self-perceived health conditions available in Italy come from the MFS. This Survey provides a national representative estimate of the socioeconomic and demographic features of the Italians, of their eating habits and lifestyles (smoking habits, alcohol use, physical activity), as well as of their self-perceived health conditions.

Our study analyzed the 1997 and 1998 MFSs data. It concerns a national representative sample of 115,419 individuals  $\geq 14$  years old. This age interval was chosen because defined questions (on consumption of food, drinks and smoking) in the MFS self-administrated questionnaire referred only to individuals  $\geq 14$  years of age. The categorical variables of interest, selected from the survey, were classified into four large groups: demographic and socio-economic characteristics; dietary habits; lifestyle; and self-perceived health status and diseases. Considering the multidimensional phenomenon, first we used the multiple correspondences analysis (MCA) [27,28], and after this a cluster analysis (CA) [29,30] was run. Lifestyle<sup>1</sup> and dietary habits<sup>2</sup> were considered the “active variables,” whereas demographic

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1 Physical exercise during leisure time, physical activity at work, housework activity, smoking habits, number of cigarettes, means of transport.

2 Main meal, breakfast, usual place for lunch, frequency of consumption of bread, pasta or rice, frequency of

and socioeconomic characteristics<sup>3</sup> together with the subjective perception of the health status<sup>4</sup> were the “illustrative variables.” In addition, gender and age, selected from the survey as well, were also included as active components of the analysis. The age was subdivided into five classes: youths (14–24 years), young adults (25–34 years), adults (35–64 years), older persons (65–74 years), very old persons ( $\geq 75$  years). Categorical variables presenting missing values were treated by the SPAD [31] procedure “analysis of incomplete variables.”

Secondly, a CA was run, using as “classificatory variables” those axes resulting from the MCA. The CA allowed the grouping of the interviewed individuals into specific clusters that were homogeneous inside themselves for concerning the active variables, although they were quite different from each other. The “dynamic clouds” method (nonhierarchical method) and the “Ward’s method” (hierarchical method) [29, 30] were combined for the CA to be performed. Prevalence ratios (PR) and relative levels of significance were calculated for any possible values that the variables may assume in each cluster according to the choice of the interviewed individuals. PRs were calculated as the ratios between the frequency of a specific variable value in the cluster and the frequency of the same value in the remaining sample. Only statistically significant PRs are presented ( $P \leq 0.05$ ) in the tables.

### 3. Results

The MCA for the original data allowed to detect four axes that explained 35% of the total variance (using the Benzecri formula the total variance increased up to 75%). These axes, calculated as a linear combination of the original variables, summarize all of these variables in respect to the dietary patterns of the sample, providing that the lack of information that may derive from this combination is at the lowest level. The first axis sets lifestyles and dietary habits of the nonworking individuals (mostly homemakers and retired persons) against those of the working individuals (mostly youths and young adult males). The second axis is characterized by opposing “healthy” lifestyle and habits to the unhealthy ones. The third axis shows two different dietary patterns contrast concerning the amount of food eaten: on one side a diet poor in proteins and moderate in quantity, and on the other side an excessive diet rich in fat and proteins. The fourth axis concerns those individuals who usually eat at work and shows the contrast between individuals who have a healthy diet and those who do not. A CA was performed starting from these four axes, a good partition of the whole

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consumption of processed pork, frequency of consumption of meats, frequency of consumption of milk, frequency of consumption of cheese, frequency consumption of eggs, frequency of consumption of vegetables, frequency of consumption of fruit, frequency of consumption of fish, frequency of consumption of fat, frequency of consumption of wine, frequency of consumption of mineral water, frequency of consumption of fizzy beverages, frequency of consumption of beer.

<sup>3</sup> Age, gender, residence, marital status, family type, education level, income source, occupation.

<sup>4</sup> Declared pathologies: arthrosis, hypertension, osteoporosis, chronic bronchitis and other respiratory diseases, nervous disorder, diabetes, angina pectoris, ulcer, asthma, calculus of the liver, myocardial infarction, calculus of the kidney, cancer, cirrhosis, allergies; self-perceived health status.

sample into five clusters was obtained. The intracluster variance was equal to 50% of the total variance. The features of each of the five clusters described below.

### 3.1. First cluster

Individuals who follow a “moderate and poor in protein” diet are prevalent in this cluster. Of the Italian people, 26.4% are represented in this group. They are the eldest proportion of the nonactive population: old and very old persons (PR = 2.61), widows/widowers (PR = 3.20). Their income comes from retirement pensions or social security allowances (PR = 2.09), and the women are numerous (PR = 1.62). The low education level of the group is apparent; 13% of the individuals have never attended school (PR = 3.24).

Most of the individuals usually have lunch (the main meal) at home but do not have a complete breakfast (they have only something to drink, PR = 1.14). Their diet is poor and, above all, protein intake is low. They reported eating meat, cheese, processed pork, and eggs, and drink milk “less than once per week” (PR = 3.33; PR = 3.16; PR = 2.91, PR = 1.92; PR = 1.24, respectively). Their intake of carbohydrates seems also limited: they report eating bread, pasta, and rice no more than once or twice per week (“less than once per week” PR = 2.57; “once or twice per week” PR = 1.55); On the contrary, they eat fruit and vegetables once or twice daily (PR = 1.12 for both). They do not drink wine (PR = 2.08), beer (PR = 1.64), fizzy drinks (PR = 1.76), or mineral water (PR = 1.87). They do not smoke (PR = 1.47), and although they do not explicitly have any physical training (either at work or during their leisure time, as expected), they do housework, at times heavy (PR = 1.25), being mostly women, housewives, or retired persons.

They report frequent pathologic conditions of the elderly: arthrosis (PR = 1.94), hypertension (PR = 2.24), osteoporosis (PR = 3.21), as well as chronic bronchitis and respiratory diseases (PR = 2.05). On the other hand, fewer persons in this cluster are affected by nervous disorders, diabetes, heart disease, and many other pathologies; however, compared to the other clusters these diseases strongly characterize the group (Table 1).

### 3.2. Second cluster

Persons who “eat high protein meals at home” characterize the second cluster. It represents 10.9% of the national population, mostly resident in Northwestern Italy (PR = 1.36); prevalent are young persons who are still students (PR = 1.22; PR = 1.19) and retired older persons (PR = 1.20; PR = 1.30 respectively). Most of them are men (PR = 1.08) and their education level is prevalently low (PR = 1.17). This group well represents the male proportion of the nonactive population: mostly boys who live with their families, and retired men who live with their wives but not any longer with children. They all have the same eating habits: they usually have their meals at home (PR = 1.12), and lunch and breakfast are their main meals (PR = 1.07; PR = 2.58, respectively).

A high content of protein characterizes their diet. They say that they eat proteins of various origin “once or twice per day”: eggs (PR = 64.75), fish (PR = 19.18), meat (PR = 6.56), processed pork (PR = 5.95), cheese (PR = 2.99), and milk (PR = 1.24); butter is the most used fat (PR = 2.96). They also eat vegetables, fruit, and carbohydrates derived from bread,

Table 1

First cluster: percentage frequencies of variables values within the cluster and corresponding percentage frequencies within the remaining population sample; Prevalence Ratios (PR)

	Frequency within the cluster (a)	Frequency within the remaining sample (b)	PR (c=a/b)
<b>Active Variables</b>			
Usual lunch: at home	95.2	76.6	1.24
Main meal: lunch	84.7	68.7	1.23
Sleeps after meals: often	68.6	57.4	1.20
Breakfast: only beverages	32.6	28.7	1.14
Meat: less than once per week	18.0	5.4	3.33
Cheese: less than once per week	28.4	9.0	3.16
Processed pork meats: less than once per week	71.7	24.6	2.91
Bread, pasta or rice: less than once per week	1.8	0.7	2.57
Bread, pasta or rice: 1-2 times per week	11.0	7.1	1.55
Eggs: less than once per week	67.7	35.2	1.92
Fish: less than once per week	60.5	39.8	1.52
Milk: less than once per week	29.6	23.8	1.24
Vegetables: 1-2 times per day	63.4	56.4	1.12
Fruit: 1-2 times per day	87.0	78.0	1.12
Physical exercise during leisure time: none	53.3	29.3	1.82
Physical activity at work: none	74.8	44.3	1.69
Housework activity: moderate or heavy	64.6	51.8	1.25
Smoking habit: non-smokers	68.2	46.4	1.47
Wine at meals: never	67.9	32.6	2.08
Mineral water: never	24.5	13.1	1.87
Fizzy beverages: never	83.1	47.3	1.76
Beer: never	94.9	57.9	1.64
<b>Illustrative Variables</b>			
Marital Status: widow/widower	17.9	5.6	3.20
Education: none	13.6	4.2	3.24
Age group: olds and very olds	37.1	14.2	2.61
Income source: retirement pension and social security allowances	41.7	20.0	2.09
Gender: woman	72.3	44.5	1.62
<b>Declared pathologies:</b>			
Arthrosis	33.9	17.5	1.94
Hypertension	20.4	9.1	2.24
Osteoporosis	12.2	3.8	3.21
Chronic bronchitis and other respiratory diseases	8.4	4.1	2.05
Nervous disorders	7.9	3.7	2.14
Diabetes	7.4	2.9	2.55
Angina pectoris	6.3	2.2	2.86
Ulcer	5.4	3.3	1.64
Asthma	5.0	2.8	1.79
Calculosis of the liver	4.2	1.7	2.47
Myocardial infarction	3.0	1.2	2.50
Calculosis of the kidney	2.9	1.7	1.71
Cancer	1.9	0.9	2.11
Cirrhosis	0.6	0.2	3.00

pasta or rice, once or twice per day (PR = 1.59, PR = 1.12; PR = 1.06)). In other words, they do eat every kind of food presumably in large quantities; their daily meals include bread, pasta, or rice, proteins, fruit, and vegetables. They drink a considerable amount of wine and beer: from 0.5 to 1 L of wine or beer per meal (PR = 2.23; PR = 3.11), once or twice a week they also drink wine between meals (PR = 1.79). They do not engage in any physical exercise at work or at home, although they have physical training during their spare time once or twice a week. Most of them are former smokers (PR = 1.17).

Among the pathologic conditions they are affected by, the only significant ones are cancer (PR = 1.27) and myocardial infarction (PR = 1.13); although these conditions affect very few individuals (Table 2).

### 3.3. Third cluster

The third cluster includes persons who “eat at home and adopt a healthy diet and lifestyle”. This group represents 31.4% of the Italian population; most of them live in the South. The pattern of this cluster is made of the female proportion of the nonworking population. There are women (PR = 1.17), housewives, and students (PR = 1.52; PR = 1.35), women looking for a job (PR = 1.43), and retired women (PR = 1.24); the ages are quite well distributed, there are young, adult, and older persons with the exception of young adults and very old adults. They are prevalently women and daughters still living in the family. The most frequent family pattern is “wife and children” (PR = 1.49).

They usually eat at home (PR 1.23) and lunch is their main meal. They adopt a fairly balanced diet and eat proteins of various origins, once or twice per week: eggs (PR = 1.90), fish (PR = 1.70), processed pork (PR = 1.69), cheese (PR 1.47), milk (PR = 1.39), and meat (PR = 1.27). They report eating fruit once or twice a day (PR = 1.10) but vegetables only once or twice a week (PR = 1.31). They have a good breakfast (“they eat and drink something” at least, PR = 1.15). They report regularly having one or two drinks of wine per day at meals (PR = 1.23) and never or seldom between meals (PR = 1.10) (note: one drink is approximately one medium glass). They do physical exercises once or more per week (PR = 1.46) and do not smoke (PR = 1.15). The majority engage in moderate or heavy physical activity during housework (PR = 1.21), being mostly women in charge of all the housework.

This is the only group in which the very low frequency of declared pathologic conditions is statically significant when compared to the frequencies in the other groups. (Table 3).

### 3.4. Fourth cluster

The fourth cluster includes mostly individuals who “eat out and are sedentary.” The group represents 17.7% of the Italian people. They are mainly young adults (PR = 2.01) and men (PR = 1.41) and are professionally qualified, being mostly managers and businessmen (PR = 3.57), employees (PR = 3.42), but also self-employed workers and labor cooperative members (PR = 1.94), their level of education is high (PR = 2.53) and most of them live in the northwest and northeast of Italy (PR = 1.52; PR = 1.34, respectively) followed by central Italy (PR = 1.19). They usually have lunch in restaurants, cafeterias and company canteens (PR = 9.94). Dinner is considered the main meal for the majority of the individuals

Table 2

Second cluster: percentage frequencies of variables within the cluster and corresponding percentage frequencies within the remaining population sample; Prevalence Ratios (PR)

	Frequency within the cluster (a)	Frequency within the remaining sample (b)	PR (c=a/b)
<b>Active Variables</b>			
Main meal: breakfast	8.5	3.3	2.58
Main meal: lunch	77.4	72.4	1.07
Usual lunch: at home	90.0	80.5	1.12
Sleeps after meals: often	67.3	59.5	1.13
Eggs: 1-2 times per day	25.9	0.4	64.75
Fish: 1-2 times per day	21.1	1.1	19.18
Meat: 1-2 times per day	59.0	9.0	6.56
Processed pork meats: 1-2 times per day	37.5	6.3	5.95
Cheese: 1-2 times per day	75.9	25.4	2.99
Fat: butter	6.8	2.3	2.96
Milk: 1-2 times per day	72.8	58.7	1.24
Vegetables: 1-2 times per day	87.1	54.7	1.59
Fruit: 1-2 times per day	88.7	79.3	1.12
Bread, pasta or rice: 1-2 times per day	94.2	88.6	1.06
Fizzy beverages: 2-4 drinks per day	13.0	2.1	6.19
Beer: 2-4 drinks per day	2.8	0.9	3.11
Wine at meals: 2-4 drinks per day	11.6	5.2	2.23
Wine between meals: 2-4 drinks per week	8.4	4.7	1.79
Physical exercise during leisure time: 1-2 times per week	23.1	16.7	1.38
Housework activity: none	24.6	20.7	1.19
Physical activity at work: none	58.5	51.6	1.13
Smoking habit: former smokers	24.2	20.7	1.17
<b>Illustrative Variables</b>			
Residence: Northwest	34.9	25.7	1.36
Occupation: retired	28.1	21.6	1.30
Occupation: student	10.8	9.0	1.20
Age group: youngs	17.6	14.4	1.22
Age group: elderly	14.7	12.2	1.20
Education level: low	63.8	54.5	1.17
Gender: men	51.4	47.7	1.08
<b>Declared Pathologies:</b>			
Cancer	1.4	1.1	1.27
Myocardial infarction	1.8	1.6	1.13

in this cluster (PR = 5.36), although for a lower number (PR = 1.39) breakfast is the main meal. They report eating vegetables and drinking milk once or twice per day (PR = 1.13 and PR = 1.15, respectively). They eat bread, pasta, or rice once or twice per week (PR = 1.53) and also processed pork (PR = 1.15); less than once a week they consume eggs, meat, and fish (PR = 1.27; PR = 1.26; PR = 1.15, respectively). They seem to drink a fair amount wine and beer: 1 or 2 drinks of beer or wine during meals (PR = 2.32; PR = 1.48) as well as 1 or 2 drinks of wine between meals per day (PR = 2.64). They drink also plenty of water (PR = 1.26).

This group is prevalently made up of smokers (PR = 1.57) and former smokers (PR =

Table 3

Third cluster: percentage frequencies of variables values within the cluster and corresponding percentage frequencies within the remaining population sample; Prevalence Ratios (PR)

	Frequency within the cluster (a)	Frequency within the remaining sample (b)	PR (c=a/b)
<b>Active Variables</b>			
Main meal: lunch	85.5	67.1	1.27
Usual lunch: at home	93.5	76.0	1.23
Breakfast: something to eat and to drink	66.2	57.6	1.15
Sleeps after meals: sometimes	31.6	23.1	1.37
Eggs: 1-2 times per week	75.6	39.8	1.90
Fish: 1-2 times per week	68.9	40.5	1.70
Processed pork meats: 1-2 times per week	70.7	41.8	1.69
Cheese: 1-2 times per week	67.8	46.1	1.47
Milk: 1-2 times per week	15.0	10.8	1.39
Meat: 1-2 times per week	88.0	69.3	1.27
Vegetables: 1-2 times per week	43.2	33.0	1.31
Fruit: 1-2 times per day	85.5	78.0	1.10
Wine at meals: 1-2 drinks per day	56.8	46.3	1.23
Fizzy beverages: 1-2 drinks per day	40.4	34.0	1.19
Wine between meals: never or seldom	77.5	70.6	1.10
Physical exercise during leisure time: 1-2 times per week	22.2	15.2	1.46
Physical activity at work: none	64.2	46.9	1.37
Housework activity: moderate or heavy	62.8	51.7	1.21
Smoking habit: non-smokers	57.7	49.6	1.16
<b>Illustrative Variables</b>			
Occupation: housewife	21.8	14.3	1.52
Occupation: looking for a job	7.7	5.4	1.43
Occupation: student	11.2	8.3	1.35
Occupation: retired	25.7	20.8	1.24
Marital status: wife with children	26.7	17.9	1.49
Residence: South and Islands	43.6	31.1	1.40
Age group: youngs, adults, and elderly	60.9	54.4	1.12
Gender: women	57.7	49.2	1.17

1.11), who occasionally engage in physical exercise during their leisure time (“once or twice per month” PR = 1.84). Allergies are the only pathologic conditions that are declared more frequently than others (PR = 1.24) (Table 4).

### 3.5. Fifth cluster

The fifth cluster includes persons who “eat out, have an unbalanced diet, and drink heavily.” It represents 13.6% of the Italian population. They are workers in small and medium-sized companies in the north east of the country: mostly men (about 80% of the group, PR = 1.82), who live in northeastern Italy (PR = 1.14). They are youths or young adults (PR = 1.36; PR = 1.22) and are prevalently self-employees or labor cooperative members, as well as workmen (PR = 2.21; PR = 1.50), although there are also a few



Table 4

Fourth cluster: percentage frequencies of variables values within the cluster and corresponding percentage frequencies within the remaining population sample; Prevalence Ratios (PR)

	Frequency within the cluster (a)	Frequency within the remaining sample (b)	PR (c=a/b)
<b>Active Variables</b>			
Usual lunch: out (restaurant, cafeteria, canteen)	63.6	6.4	9.94
Main meal: dinner	64.9	12.1	5.36
Main meal: breakfast	5.0	3.6	1.39
Breakfast: something to eat and to drink	72.0	57.8	1.25
Bread, pasta or rice: 1-2 times per week	11.3	7.4	1.53
Eggs: less than once per week	53.0	41.7	1.27
Meat: less than once per week	10.6	8.4	1.26
Milk: 1-2 times per day	67.5	58.7	1.15
Processed pork meats: 1-2 times per week	56.9	49.6	1.15
Fish: less than once per week	50.5	44.1	1.15
Vegetables: 1-2 times per day	64.2	56.9	1.13
Wine between meals: 1-2 drinks per day	38.5	14.6	2.64
Beer at meals: 1-2 drinks per day	52.0	22.4	2.32
Fizzy beverages: 1-2 drinks per day	54.2	32.0	1.69
Wine at meals: 1-2 drinks per day	67.7	45.7	1.48
Water: plenty of	79.9	63.6	1.26
Physical exercise during leisure time: 1-2 times per month	16.2	8.8	1.84
Smoking habit: smoker	35.6	22.7	1.57
Smoking habit: former smoker	22.9	20.7	1.11
<b>Illustrative Variables</b>			
Occupation: manager/businessman	15.7	4.4	3.57
Occupation: employee	34.9	10.2	3.42
Occupation: self-employed workers/labour cooperative members	51.5	26.6	1.94
Education level: high	14.4	5.7	2.53
Age group: young-adults	61.0	30.4	2.01
Gender: men	63.3	44.9	1.41
Residence: Northwest	37.2	24.5	1.52
Residence: Northeast	23.7	17.7	1.34
Residence: Central regions	22.5	18.9	1.19
<b>Declared pathologies:</b>			
Allergies	8.4	6.8	1.24

unemployed individuals (PR = 1.43). Not surprisingly, they perform moderate, sometimes heavy, physical activity at work (PR = 2.55), although no physical activity is performed at home (PR = 1.97). The group's education level is generally low (PR = 1.11). They usually eat out too, but not in restaurants or cafeterias. They eat in company canteens or in "other places" (PR = 1.24); this probably means that they have a sandwich or a quick meal at work. They eat few fruits and vegetables ("less than once per week" PR = 9.17; PR = 6.73), few eggs, little fish and cheese ("less than once per week" PR = 1.22; PR = 1.38; PR = 2.21, respectively). They eat, above all, processed pork ("1 or 2 times per day" PR = 2.10) and

use butter (PR = 2.35). They do not have breakfast (PR = 5.25) and seldom drink milk (PR = 2.87). They are smokers (PR = 2.71), but most of all they are heavy drinkers of wine and beer. They report drinking >1 L of wine and beer per day at meals (PR = 5.91; PR = 4.71), and many of them state they drink wine between meals too, up to 1 L per day (PR = 7.21) and sometimes more (PR = 3.88).

According to them, their health conditions are very poor: they say that they feel ill or very ill (PR = 1.11), and there is a significant proportion with ulcer (PR = 1.08) (Table 5).

#### 4. Discussion

The results of this study are consistent with those from other studies. Eating habits are strongly linked to socioeconomic conditions, to age and gender, and to lifestyle in general: persons who adopt a highly unbalanced diet are also generally less careful with other health-related aspects of his/her life. Heavy smokers and drinkers are likely to be men more than women, who have manual rather than intellectual jobs [1–10]. Moreover, our study showed that the most important factor in determining the adoption of a particular diet seems to be the professional status of the individual. Performing a job determines whether the main meal is eaten at home or not; the first three clusters are in fact essentially made up of retired persons, housewives, or students who can have lunch (still the main meal for the Italian population) at home; unlike workers who have to eat at work, in cafeterias and company canteens, or have a very light meal such as a sandwich, as do those in the fourth and fifth clusters, respectively.

Two large groups resulted from our analysis: one encompassing the first three clusters of nonactive individuals, different from each other concerning age and gender more than any other features. In the nonactive population, we distinguished the elderly belonging to the first cluster, men mostly included in the second, cluster, and women in the third cluster. The second large group included the individuals of the two remaining clusters: the active population, made up of workers whose professional status likely contributed in determining their eating habits.

Even if the links among dietary habits and lifestyle, age, and gender are to a certain extent clear, on the other hand, caution is necessary in interpreting the relation between eating habits and health conditions. This could be due to several reasons.

First of all, data on health conditions referred to self-perceived and declared health. Although self-perception contributes in determining the need for medical care and health services, it must be considered only a proxy of actual health as objectively evaluated.

Moreover, data coming from this survey concerned the consumption of foods in term of frequency, not in terms of quantities; moreover, the data referred to the habits of the Italian population observed at a certain time point. Any connection, and therefore any etiological hypothesis involving eating habits, cannot be investigated through a cross-sectional approach. For assessment of health conditions over time, a longitudinal study is needed, with objective measurements of physical parameters and also a rigorous measuring system for the nutrients intake. Furthermore, even if eating habits observed at a certain time-point often reflect a cultural development of past habits, sometimes they may also be driven by recent

Table 5

Fifth cluster: percentage frequencies of variables values within the cluster and corresponding percentage frequencies within the remaining population sample; Prevalence Ratios (PR)

	Frequency within the cluster (a)	Frequency within the remaining sample (b)	PR (c=a/b)
<b>Active Variables</b>			
Breakfast: never	27.3	5.2	5.25
Usual lunch: out (companies canteen or other)	14.1	11.4	1.24
Fruit: less than once per week	22.0	2.4	9.17
Fruit: 1-2 times per week	30.4	9.7	3.13
Vegetables: less than once per week	14.8	2.2	6.73
Vegetables: 1-2 times per week	54.1	33.4	1.62
Milk: less than once per week	58.0	20.2	2.87
Fat: butter	5.4	2.3	2.35
Fat: other	18.6	14.6	1.27
Cheese: less than once per week	26.8	12.1	2.21
Processed pork meats: 1-2 times per day	17.6	8.4	2.10
Fish: less than once per week	59.4	43.0	1.38
Eggs: less than once per week	52.0	42.5	1.22
Wine with meal: more than 4 drinks per day	20.7	3.5	5.91
Wine away from meal: 2-4 drinks per day	20.2	2.8	7.21
Wine away from meal: more than 4 drinks per day	3.1	0.8	3.88
Wine away from meal: 1-2 drinks per day	34.5	16.4	2.10
Beer: more than 4 drinks per day	3.3	0.7	4.71
Beer: 1-2 drinks per day	49.4	24.3	2.03
Smoking habit: smoker	55.0	20.3	2.71
Physical activity on the job: moderate or heavy	58.1	33.4	1.74
Housework activity: seldom or never	68.2	41.2	1.66
<b>Illustrative Variables</b>			
Gender: male	78.8	43.3	1.82
Occupation: self-employed workers/labour cooperative members	38.3	17.3	2.21
Occupation: workman	2.1	1.4	1.50
Occupation: looking for a job	8.3	5.8	1.43
Age group: young	19.2	14.1	1.36
Age group: young-adult	42.4	34.8	1.22
Residence: Northeast	20.9	18.4	1.14
Education level: low	60.6	54.7	1.11
<b>Health conditions and declared pathologies:</b>			
Perceived health status: bad and very bad	7.2	6.5	1.11
Ulcer	4.1	3.8	1.08

diagnoses of specific pathologic conditions that need restricted diets. For all of these reasons, we could not interpret the association between perceived health and diet as a causal relationship, but only as a simple one between the two.

Following these considerations, it is clear that the association between diet and health emerging from the first cluster is not significant. First of all, the health conditions of old and very old persons are often related to the ageing process, also moreover, we know very little about the previous eating habits, which may, to a certain extent, have determined their present health status. It is also likely that their current dietary patterns are influenced by the senile disorders that they have to cope with and not vice versa.

Moreover, the second cluster showed a high prevalence of individuals affected by myocardial infarction. Here too, however, the proportion of retired persons and former smokers was prevalent, and the observed association between an excessive protein diet and infarction might be confounded by the well known “smoke/age/infarction” association.

The relationship between balanced diet and good perceived health, which resulted in the analysis of the third cluster, might be a causal relationship. In fact, this cluster was characterized by housewives and female students with similar habits and lifestyles for years.

For the fifth cluster, the unbalanced “diet/ulcer” relationship and, above all, the “alcohol abuse/ulcer” one seemed to suggest a causal relationship as well.

In conclusion, although the information gathered do not allow us to assert any causal relationship between diet and health, they do allow us to identify behavioral patterns, in terms of eating habits and lifestyles, representative of the Italian population. These may result in useful contributions for planning nutrition policies.

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