

## Taste and Smell Impairment in Institutionalized and Free-Living Italian Elderly People

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### Abstract

A survey was conducted to investigate on the prevalence and distribution of taste and smell (chemosensory) impairments in two samples of Italian elderly people, one of frail institutionalized (n = 76) and the other of healthy free-living (n = 239) individuals. Olfactory and gustatory functions were evaluated by three validated commercial tests (Burghart GmbH Wedel Germany): an odour identification test, a threshold odour test, a taste test. Prevalence of chemosensory impairment in institutionalized subjects is overall much higher (81%) than among the free-living (54%). Specifically, the rate of smell impairment in the two groups is slightly different, while the prevalence of taste impairment is significantly higher among institutionalized. This result is probably due to the medical conditions and high number of medications taken by this sample of frail older persons. Further investigation should be done on larger sample of the Italian population, using standardized methodology in order to obtain more reliable data to be compared with other populations. Moreover, due to the high prevalence rate detected in the present investigation, it is recommended the implementation of information campaigns aimed at increasing awareness and knowledge of these disorders and the associated risks, especially among elderly people living alone.

**Keywords:** *Taste; Smell; Impairment; Elderly people; Prevalence*

### Introduction

The elderly population is rapidly growing worldwide. According to current estimates, the proportion of people over 60 will almost double by 2050 [1]. In Italy the percentage of people over 65 years old is estimated to be 34% in 2050 [2]. Adequate dietary intake has been recognized as one of the key factors in maintaining good health and in increasing the quality of life of the elderly. One of the potential causes of inadequate food intake is considered the age related reduction of taste and smell acuity. Several studies have found a progressive decline in taste and smell functioning, which tends to begin around 65 years of age [3,4]. The causes can be physiological aging as well as certain disease states, pharmacologic and surgical interventions, radiation and environmental exposure [5]. Chemosensory impairments are supposed to affect food perception and liking and consequently to modify food choice, although data in support of this “sequence of assumptions” are currently lacking [6]. Age-related chemosensory impairment has been closely linked to inadequate nutritional intake, reduced social pleasure, aging anorexia, and other related diseases [3]. Moreover in the Italian population there is paucity of studies on taste and smell dysfunction [7,8].

Therefore, on the light of the above considerations, the current investigation was conducted to determine the prevalence of taste and smell impairment in two samples of institutionalized and free-living Italian elderly people.

## Materials and Methods

### Sample

Frail institutionalized elderly people were enrolled at the Clinical Rehabilitation Institute “Villa delle Querce” located in Nemi, Rome. Participants were selected for their physiological and cognitive ability to carry out the evaluation.

Independently living seniors with no severe medical conditions and good cognitive performance were recruited at three local Seniors Recreational Centres located in Rome. The study was approved by local ethic committee and all participants provided their written informed consent.

### Sensory classification

Chemosensory acuity was assessed by means of three validated sensitivity tests produced by Burghart (GmbH Wedel Germany). The original methodology of test administration [9,10] was simplified in order to make it more suitable for elderly people. The methodology of test administration is described elsewhere [6].

Subjects were then classified in three groups on the basis of the performance in the screening test:

- 1) No impairment
- 2) Taste impairment
- 3) Smell impairment

### Data analysis

The distribution of the prevalence of chemosensory impairment by age and gender was tested using Chi-square analysis and Fisher’s exact test. All statistical analyses were performed using XLSTAT v. 2012.1.01 (Addinsoft).

## Results and Discussion

### Sample description

The sample of institutionalized elderly was composed by 76 individuals aged 64-97 (mean age 81 years), and 66% were women. The free-living group included 239 individuals aged 65-101 (mean age 76 years), and 70% were women.

### Taste and smell impairment in institutionalized elderly people

The frequency of smell impairment in this population of frail elderly people was in line with data obtained from other authors on institutionalized subjects [11], while the frequency of taste impairment is higher than expected on the basis of previous investigations [4,12]. This is probably due to the medical conditions and large use of medications, as poly-pharmacy is considered a common cause of impaired taste perception [13]. Moreover taste impairment is significantly higher ( $p = 0.003$ ) in older age group, while no gender difference is observed. In accordance with previous studies [8,14,15], the frequency of smell impairment is significantly higher in the older age group (80-97 years) ( $p < 0.0001$ ) and among men ( $p = 0.018$ ).

	No Impairment (%)	Taste Impairment (%)	Smell impairment (%)
Total sample	19	70	41
Women (n = 53)	23	70	38
Men (n = 23)	9	70	48
Age group 65-79 (n = 31)	23	61	32
Age group 80-97 (n = 45)	16	76	47

**Table 1:** Prevalence of taste and smell impairment in institutionalized subjects. Distribution by gender and age groups.

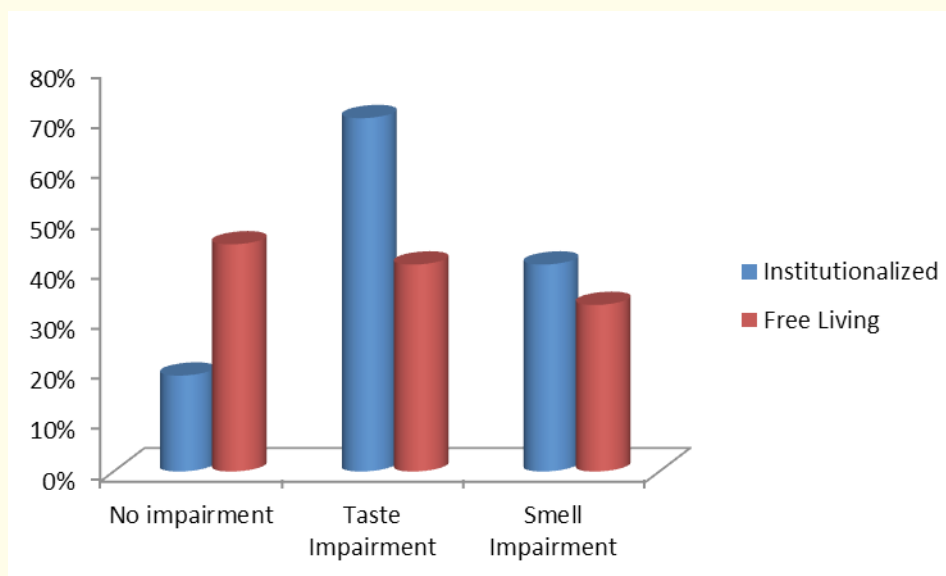
### Taste and smell impairment among free-living elderly people and comparison with Institutionalized subjects

Table 2 shows in detail the prevalence of taste and smell impairment for the whole sample of free-living subjects and subdivided by gender and age groups. Overall the detected prevalence of both taste and smell impairment was significantly higher for men ( $p = 0.007$  for taste and  $p = 0.018$  for smell) and older age group ( $p = 0.003$  for taste and  $p < 0.0001$  for smell), being in line with other studies [12,16].

	No impairment (%)	Taste Impairment (%)	Smell Impairment (%)
Total sample	45	41	33
Women (n = 157)	52	35	28
Men (n = 82)	33	54	44
Age group 60-79 (n = 162)	53	35	25
Age group 80-101 (n = 77)	29	56	52

**Table 2:** Prevalence of taste and smell impairment in free-living subjects. Distribution by gender and age groups.

Figure 1 shows the comparison between prevalence data in the two samples studied. Among the independently living elderly people the rate of subjects with no impairment is significantly ( $p < 0.001$ ) higher. The frequency of smell impairment in both samples is not significantly ( $p = 0.241$ ) different, while the rate of taste impairment among institutionalized subjects is consistently ( $p < 0.0001$ ) higher. The difference in taste perception, as mentioned in the previous section, can be explained by the effect of the high number of medications taken by the institutionalized elderly people considered in this survey.



**Figure 1:** Comparison of prevalence rate between institutionalized and free-living subjects.

## Conclusion

This study shows that the distribution of taste impairment differs consistently between institutionalized and free-living elderly. However, further investigation is needed on a larger sample in order to have reliable prevalence data to compare with other populations. Moreover, due to the high prevalence rate of chemosensory detected in this survey, it is recommended the implementation of information campaigns aimed at increasing awareness and knowledge of these disorders and the associated risks, especially among elderly people living alone.

In particular, dysfunction of taste and olfactory perception, as well as affecting nutrition related quality of life may have other consequences such as the inability to perceive certain smells indicating the presence of smoke, toxins, gas leak and spoiled food products.

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