



Chemosensory impairment does not diminish eating pleasure and appetite in independently living older adults



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ABSTRACT

Objective: This study aims to evaluate the impact of chemosensory impairment on diminished eating pleasure and appetite in independently living Italian older adults.

Study design: 239 individuals (65 to 101 years old, 157 women), with no severe medical conditions and good cognitive performance were recruited. Olfactory and gustatory functions were measured using a short version of Sniffin' Sticks and Taste Strips tests (Burghart). Information about socio-demographic characteristics, health, perceived smell and taste impairment, diminished eating pleasure and appetite were obtained with a specially designed questionnaire.

Results: Prevalence of chemosensory impairment detected in this sample is high, being 41% for taste and 33% for olfaction. However, the frequency of self-reported impairment is consistently lower than the measured one, especially in men and in older subjects.

Measured chemosensory impairment is not significantly related with eating pleasure and appetite. On the other hand, factors significantly influencing decline of eating pleasure are: living alone, dietary restriction and perceived taste impairment. Meanwhile, a significant influence of dietary restriction, dentures and subjective health status on appetite decline is observed.

Conclusions: The results of this study show that chemosensory impairment may not be related with diminished eating pleasure and appetite, while other non-physiological factors such as loneliness, dietary restrictions and subjective health should be taken more into account in order to develop effective strategies to counteract malnutrition in the elderly. In addition, low awareness of chemosensory impairment among this sample highlights the importance of measuring sensory acuity rather than asking by questionnaire or interview, in order to obtain reliable data.

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Nothing would be more tiresome than eating and drinking if God had not made them a pleasure as well as a necessity. Voltaire

1. Introduction

Decrease in gustatory and olfactory function with increasing age has been extensively reported [1–3].

Chemosensory impairment can have a significant impact on quality of life [4], is associated with functional disabilities and reduced independence [3] and seems to influence food choice and eating behavior [5]. Actually, it is commonly believed that age-related deficits in taste and smell are directly responsible for nutritional problems in old age. However, there is no scientific demonstration that chemosensory impairment plays a crucial role

in the etiology of malnutrition and there is little evidence to link smell and taste dysfunction with lower food intake.

Some authors pointed out that impaired chemosensory perception in older people may be accompanied by diminished appetite [6,7] and alteration in dietary behavior [5,8]. Merkonidis et al. [4] stated that patients reporting chemosensory dysfunction often complained of diminished pleasure from eating. On the other hand, in recent studies where olfactory and/or gustatory function were actually measured, no direct correlation between sensory impairment and hedonic response nor food intake was observed [9–11].

Despite an improved understanding of the consequences of impaired chemosensory function, the picture of how age-related sensory decline impacts eating behavior is still incomplete.

Moreover, previous research has typically assessed chemosensory impairment using tests that are not optimized for an aging population. Most of these experiments have also tended to focus on only a single dimension (e.g. appetite or eating pleasure). In order to shed more light on the influence of chemosensory disorder on the etiology of malnutrition in the elderly population, the

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goal of this study was to explore the influence of measured and self-reported chemosensory impairment on both diminished appetite and eating pleasure in relation with other non-physiological factors (i.e. socio-demographic characteristics and health) among Italian independently living seniors.

The chemosensory acuity of a sample of considerable size ($n = 239$) of subjects aged 65 or older, were evaluated using both olfactory and gustatory tests optimized for elderly people. A questionnaire was developed to gather information about socio-demographic characteristics, health, perceived smell and taste impairment, diminished eating pleasure and appetite. People who presented cognitive impairment were not included in the experiment, as both the chemosensory tests and the questionnaire required verbal answer.

2. Methods

2.1. Participants

Two hundred thirty-three elderly people, aged ≥ 65 years, independently living with no severe medical conditions and good cognitive performance, were recruited from three Senior Recreation Centers located in Rome.

Participants were selected on the basis of their cognitive status, on their interest to collaborate to the research and to be informed about their taste and smell functioning. Subjects were included if they had a Short Portable Mental Status Questionnaire (SPMSQ) score of more than 7 [12]. Enrolled subjects were rewarded with a gift. The local ethic committee approved the study, and written informed consent was obtained from all participants.

2.2. Measure of chemosensory acuity

Olfactory acuity was assessed by means of Sniffin' Sticks [13], while taste acuity by Taste Strips [14]. Those commercial tests are validated and produced by Burghart (Wedel, Germany).

A short version of odor identification, odor threshold and gustatory tests were used in order to make the procedure more suitable for elderly people as they tend to easily become fatigued. Odor test was based on the identification of nine common odorants and on the detection threshold for phenyl ethanol (a compound with a rose-like odor), while gustatory test was based on twelve strips with three different concentration of taste solutions (sweet, sour, salty, bitter). The detailed procedure was optimized in a previous experiment we conducted with institutionalized elderly people and is published elsewhere [9].

2.3. Questionnaire

A specially designed questionnaire was administered in face-to-face interviews. The questionnaire (reported in detail in Fig. 1) was subdivided in five domains:

- Socio-demographic characteristics: age, gender, marital status, education, living alone.
- Health: self-rated health, medical condition, medications, dietary restrictions for health reasons, dentures and smoking.
- Perceived taste impairment.
- Perceived smell impairment.
- Perceived eating pleasure and appetite decline.

2.4. Data analysis

All statistical analyses were performed using XLSTAT software v. 2012.1.01 (Addinsoft) at a significant level ($p < 0.05$).

Socio-Demographic

Age

Gender

Marital Status

Education

Do you live alone? Yes/No

Do you eat alone? Yes/No

Health

In general would you say that your health is:

0 (very poor)- 5 (excellent)

Medical condition and medication taken

Do you follow any special diet for health reasons? Yes/No

Do you wear dentures? Yes/No

Do you smoke? No/Yes/Ex Smoker

Taste impairment

0 (no)- 1 (yes, little)- 2 (yes, some)-3 (yes, a lot)

With respect to the past:

Have you noticed any problem with your sense of taste?

Have you noticed a decline in your sense of taste?

Have you noticed any alteration in your sense of taste?

Smell impairment

0 (no)- 1 (yes, little)- 2 (yes, some)-3 (yes, a lot)

With respect to the past:

Have you noticed any problem with your sense of smell?

Have you noticed a decline in your sense of smell?

Have you noticed any alteration in your sense of smell?

Eating Pleasure and Appetite Decline

0 (no)- 1 (yes, little)- 2 (yes, some)-3 (yes, a lot)

With respect to the past:

Have you noticed a decrease in your pleasure of eating?

Have you noticed a decrease in your appetite?

Fig. 1. Questionnaire.

The differences between measured and self-reported taste and smell impairments were tested using Chi-square analysis.

Correlations among the questionnaire variables and prevalence data were measured using Spearman's correlation coefficients. Cronbach's alpha (α) coefficients were computed to measure internal consistency of the scales used to measure perceived taste and smell impairment.

The influence of measured and perceived chemosensory impairment, socio-demographic factors and health related factors on eating pleasure and appetite reduction were detected by means of regression analysis and ANOVA.

3. Results

3.1. Participant characteristics

239 subjects, 157 women and 82 men, from 65 to 101 years old (mean age 76.1 years, SD 6.7) participated in this study. Information regarding sociodemographic and health related factors, collected

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