



## Research report

# Specific food preferences of older adults with a poor appetite. A forced-choice test conducted in various care settings <sup>☆</sup>



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## ABSTRACT

A poor appetite in older adults is an important determinant of reduced food intake and undernutrition. Food preferences may influence food intake. The aim of this study was to investigate food preferences of older adults with a poor appetite and compare these with preferences of older adults with a good appetite. Older adults ( $n = 349$ , aged 65–101 years) in nursing/residential care homes, hospitals or at home receiving home care participated in a computer-based forced-choice food preference assessment. Self-reported appetite in the past week was classified as ‘good’ or ‘poor’ using a validated instrument. Food preferences were determined by counting the relative frequency of choices for food images according to 11 dichotomous categories: high/low 1) protein; 2) fat; 3) carbohydrates; 4) fiber; 5) variation; and 6) animal/vegetarian proteins; 7) sweet/savory taste; 8) solid/liquid texture; 9) dairy/non-dairy; with/without 10) sauce or 11) color variation. Specific food preferences in participants with a poor appetite were identified by one-sample t-tests comparing frequencies to the expected value of 48. Preference differences between those with a good and a poor appetite were analyzed using GLM adjusting for confounders. The results showed that older adults with a poor appetite ( $n = 113$ ; 32.4%) preferred variation (51.6 vs. 48,  $P < 0.001$ ), color variation (55.9 vs. 48,  $P < 0.01$ ), non-dairy (53.0 vs. 48,  $P < 0.001$ ), high-fiber (51.8 vs. 48,  $P < 0.05$ ), and solid texture (53.5 vs. 48,  $P < 0.05$ ). Participants with a poor appetite had a higher frequency score for variation than participants with a good appetite (51.6 vs. 48.5,  $P < 0.001$ ). In conclusion, older adults with a poor appetite may have specific food preferences. Their preference for variation differs from those with a good appetite. These results may be used to develop meals that are preferred by older adults with poor appetite in order to increase food intake and prevent undernutrition.

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## Introduction

Protein-energy undernutrition is increasingly recognized as a serious health issue affecting a large and growing population of older adults. Undernutrition can be described by “a state of nutrition in which a deficiency or excess (or imbalance) of energy, protein, and other nutrients causes measurable adverse effects on tissue/body form (body shape, size and composition) and function, and clinical outcome” (Stratton, Green, & Elia, 2003). So far, no gold

standard assessment tool to diagnose undernutrition is available. In order to identify undernutrition, various diagnostic criteria and screening instruments have been developed. These instruments usually include one or more characteristics on weight loss, food intake, muscle mass, inflammation and functional status (Kondrup et al., 2003; van Bokhorst-de van der Schueren et al., 2014; White et al., 2012). To date, there is still no consensus on the definition of undernutrition on a national and worldwide level. Studies in older adults all over the world applied various instruments to identify undernutrition and estimate the prevalence of undernutrition in community-dwelling older adults at 2.5–14% (Brazil, China, Scandinavia, UK, US) (Cuervo et al., 2009; Ferreira et al., 2011; Han, Li, & Zheng, 2009; Izawa et al., 2006; Margetts et al., 2003; Schilp et al., 2011), in nursing homes at 12–21% (Italy, US) (Challa et al., 2007; Landi et al., 2013) and in hospitals at 18–55% (Australia, Brazil) (Coelho, Rocha, & Fausto, 2006; Young et al., 2013). Undernutrition is related to bone and muscle weakness, immune deficiencies, prolonged hospitalization, diminished quality of life, an elevated mortality risk, and more health care expenditures (Donini, Savina, &

*Abbreviations:* BMI, body mass index; GLM, general linear model; SNAQ65+, Short Nutritional Assessment Questionnaire 65+.

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Cannella, 2003; Keller, 2004; Liu et al., 2002; Meijers et al., 2012; Sullivan, Bopp, & Roberson, 2002; Vellas et al., 1997). Causes of undernutrition are multifactorial and include a number of biological and psychosocial factors, such as disease, trauma and depression (Schilp et al., 2011; Shahar et al., 2003; Shatenstein, Kergoat, & Nadon, 2001; Sorbye et al., 2008; Van Lancker et al., 2012; Wilson et al., 1998); likely often underpinned by a poor appetite status (Schilp et al., 2011; Shahar et al., 2003).

A poor appetite is experienced by 11–15% of community dwelling older persons (Castel, Shahar, & Harman-Boehm, 2006; Lee et al., 2006; Schilp et al., 2011), 19–52% in hospitals (Kruizenga et al., 2005; Mowe & Bohmer, 2002; Mudge et al., 2011) and 12–66% in nursing homes (Landi et al., 2013; Sullivan et al., 2004) living in Europe, Israel, Australia and the US, and is an important risk factor for the development of undernutrition (Feldblum et al., 2007; Lee et al., 2006; Schilp et al., 2011), evidently because it leads to suboptimal food intake (Shahar et al., 2003, 2009). A poor appetite in older persons can be partly explained by the physiologic processes of decreased physical activity and the altered regulation of food intake leading to a decrease in food intake (the so-called ‘anorexia of aging’) (Morley, 1997). Other individual or environmental factors have been shown to lead to a poor appetite in older adults, such as psychosocial causes (e.g. depression or loneliness), disease-related factors (inflammation, drug use), and oral health (Lee et al., 2006; Morley, 2013; Wade, 1994). A study in a large group of community-dwelling older adults in the US showed that depression, poor self-reported health, current smoking, chewing difficulties, weight loss, vision impairment and log TNF (in inflammatory marker) were independently related to a poor appetite (Lee et al., 2006). Interventions that increase appetite or increase food intake despite a poor appetite, would therefore contribute significantly to the prevention of undernutrition. Up to now, there are only a limited number of interventions available to address this issue. Orexigenic drugs have been found to increase appetite and food intake. However, their use is accompanied by serious unwanted side effects and is therefore only recommended for severe cases of undernutrition (Thomas, 2006). Oral nutritional supplements are used to increase protein-energy intake and short-term studies show a small but significant effect of these supplements on weight gain (Milne et al., 2009). However, long-term compliance rates are generally low (Bonney et al., 2003; Fiatarone Singh et al., 2000) and oral nutritional supplements may reduce the intake of regular meals and snacks, thereby reducing the overall effect (Fiatarone Singh et al., 2000; Gosney, 2003; Milne et al., 2009).

So far, little research has been conducted on the specific food preferences of older adults with a poor appetite. Small studies in older patients suggest that persons with a poor appetite prefer small volumes (Hubbard et al., 2008; Joosten & Vander Elst, 2001) and liquid foods (Stull et al., 2008; Tieken et al., 2007) and dislike meat, stodgy foods and fats (Gustafsson, Ekblad, & Sidenvall, 2005; Ohri-Vachaspati & Sehgal, 1999). In addition, dietary variety is often limited in older persons (Donini et al., 2013), while more dietary variety has been shown to increase food consumption in healthy young adults in the UK (Rolls et al., 1981) and in community-dwelling older adults in Poland (Niedzwiedzka & Wadolowska, 2010) and UK (Hollis & Henry, 2007).

These previous studies suggest that older adults with a poor appetite may have specific food preferences. This knowledge may be useful for the development of new strategies to increase food intake in older adults with a poor appetite, and lower their risk of undernutrition. In the field of psychology research, computer tests using an array of food images presented in a series of pairs and requiring the participant to choose which food he/she would like to eat most (‘forced choice tests’), have been shown to identify stable food preferences and to predict food intake and food choices in actual eating situations (French et al., 2014; Griffioen-Roose et al., 2011). Therefore, the purpose of this study was to examine the specific food

preferences of older adults with a poor appetite by forced choice tests, and to identify potential differences in food preferences between older adults with a good and a poor appetite.

## Subjects and methods

### Study participants and recruitment

Study participants were men and women aged 65 years and older. Recruitment took place in nursing homes, residential care homes, hospitals, and at home through home care organizations, retirement villages and/or meal services. Inclusion criteria were: Dutch language proficiency; able to consume a normal diet consisting of both solid and liquid foods without texture modifications; visual ability sufficient for completing a computer test; able to understand and participate in a task for at least 30 minutes. Exclusion criteria were: Alzheimer’s disease (documented Mini Mental State Exam (MMSE) < 26) (NICE, 2011) or mild to severe cognitive impairment (confirmed by nursing staff using clinical criteria from the National Institute on Aging – Alzheimer’s Association workgroups) (Albert et al., 2011; McKhann et al., 2011), severe chewing and/or swallowing issues, radio- and/or chemotherapy in the previous month; being in a fasting condition for medical examination; or receiving tube feeding or parenteral nutrition. The procedures followed were in accordance with the ethical standards of the responsible institutional committee on human experimentation, in accordance with the Helsinki Declaration of 1975 as revised in 1983. The medical-ethical committee of the VU University Medical Center Amsterdam approved this study and all participants gave oral informed consent. Participants were visited at home or in their institution to perform the test.

### General characteristics

Prior to the forced-choice food preference test, data on sex, age, educational level, type of setting (nursing/residential care home; hospital; at home with home care), smoking status, BMI, diet and nutritional status were obtained during a short interview. The time of testing was recorded and classified into morning or afternoon. BMI was calculated by dividing self-reported body weight (kg) by self-reported height (m) squared. When necessary, body weight or height information was retrieved from staff members or medical records. Nutritional status was assessed by the Short Nutritional Assessment Questionnaire 65+ (SNAQ65+), which is a validated, nutritional screening instrument that can be used to assess undernutrition among older adults and can be easily applied by health care professionals (Wijnhoven et al., 2012).

Appetite was assessed by the following question: “Did you experience a reduced appetite in the previous week? (Yes/No)”. Participants answering “Yes” were defined as having a poor appetite. This question showed to be a strong independent determinant of incidence of undernutrition (Schilp et al., 2011) and mortality risk (Wijnhoven et al., 2012) in community dwelling older adults. At the start of the computer test, current appetite status was assessed using a 9-point Likert scale that varied from “very poor” (1) to “very good” (9). Likert scales have been shown to be valid in assessing the level of appetite in older adults (Kimura et al., 2008) and medical outpatients (Kahn & Wansink, 2004).

### Forced-choice food preference test

Food preferences were assessed using a behavioral ‘forced-choice’ methodology to identify relative food preferences. This method is well suited to situations where overall desire to eat is low (Finlayson, King, & Blundell, 2007). A previously validated computerized procedure, developed by Finlayson and colleagues (Leeds

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