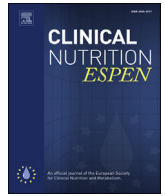




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Original article

Acceptance of texture-modified in-between-meals among old adults with dysphagia

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SUMMARY

Background and aims: Old adults suffering from dysphagia have difficulties swallowing, chewing and/or eating, and are therefore at high risk of undernutrition. In-between-meals that are texture modified are of particular importance for people suffering from dysphagia. To meet their adequate daily amount of food intake they are recommended to eat 3–5 in-between-meals daily. The aim of the current pilot study was to identify the most liked in-between-meals for old adults based on flavour and describe the basic sensory properties of these in-between-meals. Following, the equality between flavour and appearance-based preferences was investigated.

Methods: From three nursing homes 30 old adults aged 70 years or older suffering from dysphagia were recruited. They were assessing 20 texture modified in-between-meals based on their flavour and appearance on a 3 point hedonic scale.

Results: When participants were asked to assign liking based on *flavour*, the most liked in-between-meals were frozen, cold and sweet (vanilla ice cream, strawberry parfait and panna cotta). These meals were among the in-between-meals richest in fat and energy. Liking based on flavour and appearance was equal in 18 out of 20 samples. Furthermore, nutritional and sensory characteristics of the preferred meals were described.

Conclusion: Flavour and sensory-based ranking of in-between-meals opens the possibility to design new in-between-meals to old adults with dysphagia, by choosing the most liked in-between-meals to offer the target group.

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1. Introduction

Dysphagia is defined as a condition related to eating or drinking, impairing a person's ability to swallow or chew [1]. It is estimated that approximately 15% of community dwelling, old adults are affected by dysphagia [2]. Dysphagia is also very common among patients [3] and nursing home residents [4]. The group of people having dysphagia is often cognitively impaired due to dementia and the wide variety of medical conditions causing the dysphagia, including acute or progressive

neurological conditions, trauma, disease, surgery or other additional diagnoses. The simple fact of aging is another reason for dysphagia, because the muscle mass and strength related to swallowing, changes naturally with time [5].

Dysphagia is a significant factor among the causes of undernutrition in old adult individuals [6] and has been associated with increased mortality, partly due to the increased risk of pneumonia [7]. The European society for clinical nutrition and metabolism (ESPEN) has made guidelines on nutrition for people with dementia [8] and elderly in risk of undernutrition (Beck, AM personal communication, October 23, 2017). Both recommend that in-between-meals should be provided to meet an adequate food intake of the individual. In Denmark the Danish Ministry of Food has made this recommendation very clear and states that old

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adults with eating problems (including people with dysphagia), should eat at least three high in protein and energy in-between-meals a day [9]. In order to ensure safety and proper nutrition for people suffering from dysphagia, texture modified food (TMF) with a special consistency has been created. TMF is one among different nutritional interventions to be used for people with dysphagia [10]. In this pilot study the texture types of the in-between-meals were either *minced & moist* or *pureed*. All the included participants were able to eat these texture types. In order to have puree texture the liquids were adjusted with a thickening agent (liquids should be taken with a spoon).

Sensory evaluations of different Texture Modified Foods have been done with meat products, carrot-based foods, soups, pâtés and timbales [11,12]. Despite the fact that *people with dysphagia* is one of the most vulnerable groups in regards to undernutrition [5], none of these studies have evaluated which TMF in-between-meals this group prefer. Therefore, these people were the focus of this study.

The aim of the current pilot study was to identify the most liked in-between-meals for old adults based on flavour and describe the basic sensory properties of these in-between-meals. Following, the equality between flavour and appearance-based preferences was investigated.

2. Materials and methods

2.1. Participants

To be included in the pilot study participants should be:

- (1) older than 70,
- (2) having the symptom *dysphagia*, assessed by an occupational therapist or the nursing staff at the nursing home,
- (3) able to understand Danish,
- (4) able to make assessments of appearance and taste,
- (5) able to eat Texture Modified Foods.

On the other hand participants were excluded from the study if they were:

- (1) in terminal condition,
- (2) having food allergies or intolerances,
- (3) exclusively receiving enteral or parenteral nutrition.

Dementia was not considered an exclusion criterion, since the tests of the pilot study did not require high functions of memory, concentration or language abilities.

2.2. Data collection

The pilot study took place in the spring 2016 at three nursing homes in three different municipality areas in Denmark. A designated contact person in each nursing home identified participants that fulfilled the inclusion criteria for the pilot study. Two research assistants were connected to the pilot project (MS and SLO). These researchers approached the participants in the nursing homes, and introduced them to the pilot study by oral and written information. Informed consent was obtained from all participants. The consent form was signed by next of kin in cases where participants were not able to sign themselves. At the time of inclusion in the pilot study, a contact person of the nursing home collected the following data from the participants' medical record: Age, diagnosis, registration of dementia and mode of feeding and drinking. The procedure was done in collaboration with SLO. Furthermore SLO performed assessments of eating

difficulties and nutritional status together with a research assistant (MS) by observations and interviews of the participants with the use of Minimal Eating Observational Form (MEOFI) [12] and Eating Validation Scheme (EVS) [13].

2.2.1. Minimal Eating Observational Form

The state of eating difficulties was identified through the screening tool Minimal Eating Observational Form (MEOF) II. This is a categorical scale tested for reliability and validity in nursing home residents with dysphagia. Besides problems with *chewing and swallowing* the scale includes difficulties with *ingestion* and *energy* in eating the meal. The scale ranges from 1 to 9, where to a higher number corresponds a worse disability [12].

2.2.2. Eating Validation Scheme

Nutritional assessments were performed using the Eating Validation Scheme (EVS), which in Denmark is recommended for old adults receiving home care and nursing home residents [9]. The EVS assessment involves questions of eating habits, nutritional risk factors and weight loss. The evaluation can result in three different scores: 0 for participants not at risk of being undernourished; 1 means that there is a risk of undernourishment; 2 means that the participant will benefit from a nutritional intervention [13]. Since chewing and swallowing problems are among the included nutritional risk factors dysphagia leads to a risk of undernourishment. A participant suffering from this condition will have an EVS score of at least 1.

2.3. Study design

2.3.1. Selection of in-between-meals

In order to create the in-between-meals to be tested, 20 of the most frequently ordered in-between-meals for old adults with small appetite were chosen from two hospitals and one municipal kitchen menus. A variety of in-between-meals of different flavours, colours and food types were chosen, all with high protein and energy contents, ranging from mousses, porridges and soups. Many of the in-between-meals were traditional, Danish in-between-meals. For example, rye bread soup is a popular breakfast among old, Danish adults.

2.3.2. Texture adaptation

Since the in-between-meals were targeting old adults with dysphagia the consistency chosen was similar to TMF, having *minced & moist* or *puree* texture. Texture descriptors were done according to Danish standardizations [9], very similar to the framework from the International Dysphagia Diet Standardization Initiative (IDDSI) [14].

To meet this requirement, when needed some meals were pureed or blended. Furthermore, the vanilla ice cream and the strawberry parfait used in the pilot study were in a special texture that remained pureed after melting.

2.3.3. Enrichment

Based on the original recipe, some meals were protein enriched with Adosan[®] protein powder (100% protein) from veal or Arla[®] Protino (80% protein) from whey origin. Each in-between-meal contained protein and energy varying between 1.9 and 9.7 g and 165–1409 kJ per portion. The soups and the mashed potato dish were chosen to be a part of the in-between-meal offer, to include a variety of flavours and temperatures in the menu tested. The in-between-meals of liquid consistency and water used for mouth rinse between tasting were adjusted with a thickening agent to have the desired consistency (Ressource, ThickenUp Clear, Nestlé Institute of Health Sciences, Switzerland).

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