



Feature Article

Increasing food intake in nursing home residents: Efficacy of the Sorbet Increases Salivation intervention

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ARTICLE INFO

Article history:

Received 6 January 2014

Received in revised form

27 March 2014

Accepted 31 March 2014

Available online 01 May 2014

Keywords:

Nursing home

Elder

Salivation

Food intake

Xerostomia

ABSTRACT

The purpose of this study was to test the effect of the Sorbet Increases Salivation (SIS) intervention on resident food intake and body weight. Using a pre- post design, thirty-nine nursing home residents received 2 ounces of lemon-lime sorbet prior to lunch and dinner meals for 6 weeks. As a comparison and prior to the intervention, participants were offered 2 ounces of a non-citrus drink for 6 weeks prior to the lunch and dinner meals. Twenty-two residents completed both the comparison and intervention periods. Of those, 8 gained weight, 10 maintained and 4 lost weight. The amounts of food ingested during dinner increased significantly ($p = 0.001$) from the comparison period to the intervention period (208–253 g). For liquids, the amounts ingested during dinner decreased significantly ($p = 0.002$) from the comparison period to the intervention period (from 356 ml to 310 ml). Further study is needed to test the efficacy of the intervention with a larger sample of residents from multiple nursing homes.

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Introduction

Up to 85% of elders living in nursing homes suffer from inadequate food intake,¹ which can lead to weight loss and malnutrition. The Centers for Medicare & Medicaid Services² defines significant weight loss as “a weight loss of 5% or more in the last month or 10% or more in the last two quarters” for those not on a provider-prescribed weight-loss regimen. Malnutrition compromises quality of life and can lead to chronic disability, functional decline, increased health care utilization and health care costs, and even death.³

A multifaceted problem, weight loss can be caused by poor appetite, chronic disease, sensory loss, poor oral/dental health, polypharmacy, depression, chronic inflammation, catabolism due to severe illness, and environmental factors.⁴ For the average nursing home resident, weight loss may ultimately be due to inadequate food intake.⁵

Many of the medications taken by older adults have anticholinergic or sympathomimetic actions, causing xerostomia or dry mouth.⁶ The average nursing home resident uses 7–8 different medications each month, while approximately one third of resident's use 9 or more.⁷

Persons with xerostomia have difficulty in chewing, forming a food bolus and swallowing. They also can experience a decreased ability to taste food. Dependent upon the medication, symptoms of xerostomia can be temporary secondary to short-term antihistamine use, viral infections, dehydration, and/or anxiety, or long-standing secondary to iatrogenic causes from drugs, local radiation, or chemotherapy.^{8–10} In the older adult population, xerostomia is most likely drug-induced and the risk increases with greater numbers of drugs taken.¹⁰

Xerostomia can lead to poor food intake in older adults.¹¹ In an extensive review of the literature, there was some preliminary evidence that offering sorbet prior to meals can stimulate salivation and help alleviate the effects of drug-induced xerostomia in older adults. In this 2011 pilot study,¹² 8 of 10 nursing home residents ate more food after consuming 2 ounces of sorbet when compared to non-sorbet meals. However, the study was underpowered and thus, not generalizable.

The purpose of this study was to continue to pilot test the use of the Sorbet Increases Salivation (SIS) intervention with a larger sample of nursing home residents within two nursing homes. The aim of this pilot study was to test the effect of the intervention on resident food intake and body weight when compared to a competing treatment of 2 ounces of a non-citrus drink before meals. We hypothesized that participating residents would consume significantly more food over the treatment period in

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contrast to a comparison period leading to increased body weight post intervention.

Methods

Study design and intervention

Using a pre- post design, thirty-nine nursing home residents ($n = 20$ from Nursing Home A, $n = 19$ from Nursing Home B) received 2 ounces of lime sorbet prior to lunch and dinner meals for 6 weeks. As a comparison and prior to the intervention, participants were offered 2 ounces of a non-citrus drink for 6 weeks prior to the lunch and dinner meals. The breakfast meal was not a part of the intervention because older adults typically eat the most food at breakfast.

Setting

Two nursing homes (110 & 160 beds) located in Spokane, Washington agreed to participate in the study. Both facilities are for profit and offer subacute, skilled, custodial and dementia care.

Sample recruitment

Facility nursing staff identified all residents who met inclusion/exclusion criteria. Inclusion criteria included residents age 65 years or older, a Mini Mental State Examination (MMSE) score of 12–30 indicating moderate/mild or normal cognition, residents that consume meals in the main dining room, residents who screened positive for drug-induced xerostomia (dry mouth), and residents who can feed themselves unassisted in ~1 h or less. Residents excluded were those that were actively dying – receiving palliative or hospice care, those that had a history of head/neck radiation, salivary gland surgery, or Sjogrens disease, residents with a diagnosis of dysphagia or major depression, and those receiving a pureed diet.

A nurse known to the resident introduced the Principal Investigator (PI) or Research Associate (RA) to each qualified resident. The PI or RA explained the study, invited participation, and if agreeable, obtained written informed consent, administered the Mini Mental State Examination (MMSE), and screened for xerostomia. If the resident had a guardian and met study criteria, facility staff contacted the guardian. After the guardian verbally agreed, the PI or RA made contact to obtain written consent. In this case, assent was obtained from the resident. Residents that did not score 12–30 on the MMSE, or did not screen positive for xerostomia were not included in the study. After informed consent was obtained, the RA obtained demographic data (age, gender, diagnoses) and diet information (type of diet, consistency) from the subject's medical record. If a resident (or their guardian) refused to participate, did not score 12–30 on the MMSE, or did not screen positive for xerostomia, another resident was invited to participate until an N of 20 was obtained at each nursing home. Human subjects (IRB) approval was obtained through Gonzaga University's Human Subjects Protection Program prior to initiation of the study.

Measures

Pre-study screening

The Mini Mental State Examination (MMSE) is a valid and reliable 11-item tool for measuring 5 areas of cognitive function in diverse populations.¹³ Scores of 12–23 indicate mild-moderate impairment; 24–30 indicates normal cognition.¹⁴ Residents that scored 12–30 were screened for xerostomia.

The PI (a Geriatric Nurse Practitioner) screened each potential subject for xerostomia using a three-step process: Drug Review, Oral Inspection, and Subjective Evaluation. Oral inspection (step 2) and subjective evaluation (step 3) are described in Table 1. Residents that took two or more xerogenic drugs, displayed 3 of 5 visual indicators of xerostomia, and reported 3 of 6 subjective symptoms were identified as suffering from xerostomia (a positive screen).

Procedures: measuring the effects of sorbet on resident food intake

A plate waste protocol was used to determine actual food intake for each resident during lunch and dinner meals during the last 7 days of both comparison and intervention periods. This accurate procedure uses a gram food scale to weigh and compare weights of original food servings to weights of the same foods left 'on the plate' after meals.¹⁵ Research assistants weighed filled food plates as they were served and then reweighed the plates at the end of each meal (after residents were finished eating). The two ounces of sorbet was not included in the amount of food consumed. Fluid intake was calculated at each meal by measuring the amount of fluids left in the glass/cup at the end of the meal.

Procedures: measuring the effects of the intervention on body weight

Body weight was determined by weighing each participant at the same time of day, at baseline and post comparison and intervention periods, wearing approximately the same amount of clothing each time. The research assistant documented the time of day and amount of clothing worn by each resident so that this process could be accurately replicated on each occasion.

Data analysis

Before embarking on analyses related to the study aims, summary statistics (means, standard deviations, proportions) were determined to describe the study sample. The methods used were repeated measures ANOVA to measure the effects of sorbet on resident food intake and resident body weight and Bonferroni pairwise comparison tests.

Results

A total of 39 residents met study inclusion/exclusion criteria and participated in the study. Of those, 22 residents (11 from each site)

Table 1
Steps for screening xerostomia.

Step one – Drug review		
Step two – Oral inspection		
Positive indicators of xerostomia:		
Dry, cracked lips	Present	Absent
Oral mucosa dry or shiny	Present	Absent
Tongue furrowed, dry or sticky	Present	Absent
Food debris stuck to teeth or soft tissue	Present	Absent
Normal pooling of saliva in mouth absent	Present	Absent
Step three – Subjective evaluation		
1. Do you have difficulties swallowing any foods?	Yes	No
2. Does your mouth feel dry while eating a meal?	Yes	No
3. Do you sip liquids to aid in swallowing dry foods?	Yes	No
4. Does the amount of saliva in your mouth seem to be too little?	Yes	No
5. Do your lips feel dry?	Yes	No
6. Does your mouth feel dry?	Yes	No

Adapted from Gupta A, Epstein JB, & Stroussi H. Hypo salivation in elderly patients. *JCDA*, 2006;72:841–846.

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