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Original article

The liking and preferences of people with thoracic cancer for oral nutritional supplement drinks

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SUMMARY

Background and aims: Maintaining an appropriate nutritional intake is recommended in patients with cancer, using oral nutritional supplements (ONS) if necessary. However, adherence to ONS can be poor, in part because some patients find them unpalatable. Differences in the liking of ONS between patients and healthy volunteers have also been reported. To explore this further, we have examined the initial liking and preferences of patients with incurable thoracic cancer to selected ONS as well as healthy volunteers.
Methods: Participants tasted four ONS (juice-, milk-, yoghurt- and skimmed milk powder-based) in a flavour of their choice. ONS were presented in identical sealed containers, in random order, with one repeated as an internal control. Participants rated each ONS using a Likert 'like–dislike' scale and indicated their favourite.
Results: Thirty-one patients and 32 healthy volunteers took part, with all 22 flavour options of the four ONS selected by one or more participants. Overall, participants generally liked the ONS, with median scores ranging between 1 'definitely like' and 3 'mildly like'. However, scores differed significantly between patients and healthy volunteers, who respectively rated the skimmed milk powder- and the yogurt-based ONS the best (median [IQR] scores 1 [1–3] and 2 [1–3]; $P = 0.05$) and also their most favourite (by 12/31 and 16/32; $P = 0.02$).
Conclusions: Healthy volunteers and patients with thoracic cancer exhibit different likes and preferences for ONS, with the latter most preferring a skimmed milk powder-based ONS. Further studies should explore the effect this may have on long-term acceptance and adherence.

1. Introduction

Weight loss is common in lung cancer, present in 30–60% of patients at diagnosis.[1,2] It is associated with reduced tolerability and response to chemotherapy, poorer performance status, increased requirement for hospitalisation and shorter survival.[2,3] Generally, weight loss results from cancer cachexia which is defined as a multifactorial syndrome characterised by an ongoing loss of skeletal muscle mass (with or without loss of fat mass) that cannot be fully reversed by conventional nutritional support and leads to progressive functional impairment.[4] The pathophysiology is characterised by a negative protein and energy balance driven by a variable combination of reduced food intake and abnormal metabolism.[4] The management of cachexia is difficult and no standard treatment exists. Nonetheless, maintaining an appropriate level of nutritional intake is considered important, and specialty guidelines support the use of oral nutritional supplements (ONS) to help achieve this.[5,6]

Adherence to ONS can be poor, in part because some patients find them unpalatable.[7,8] Contributing factors include altered taste and smell caused by treatments such as chemotherapy,[9] or by the cancer itself,[10] with altered sensitivity to sour, bitter and sweet tastes demonstrated in patients with lung cancer not on anticancer treatment.[11] Xerostomia and malnutrition, e.g. via zinc deficiency, can also alter taste.[12] Despite the widespread use of ONS, there have been relatively few studies exploring the preferences of patients with thoracic cancer for the different types currently available.[13] Thus, the objective of this study was to explore initial liking and preferences of patients with thoracic cancer for the main types of ONS used locally, and to compare these with age-matched healthy volunteers.

Abbreviations: IQR, inter-quartile range; NSCLC, non-small-cell lung cancer; ONS, oral nutritional supplements; SCLC, small cell lung cancer; SD, standard deviation; UK, United Kingdom.

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2. Materials and methods

The study formed part of a Master of Nutrition degree for one of the authors (JS-J) undertaken in 2007.

2.1. Participants

Patients with thoracic cancer not suitable for curative treatment, either at diagnosis or as a result of recurrence, were recruited from oncology outpatients and a specialist palliative day care unit in a teaching hospital. Age-matched healthy volunteers were recruited from patients' family and friends, and from staff and volunteers at the day care unit. Exclusion criteria were chemotherapy within the past month, diabetes mellitus, renal failure, inflammatory bowel disease, hypothyroidism, alcoholism or intolerance to milk. Patients gave written informed consent, and the study was approved by the Nottingham Local Research Ethics Committee (07/H0407/46).

2.2. Oral nutritional supplements

The four ONS studied represented the main different types of supplement (juice-, milk-, yoghurt- and skimmed milk powder-based) used in our hospital, which are available in a range of flavours (Table 1). All are produced by Nutricia Clinical, Trowbridge, Wiltshire, UK. During the course of the study, production of the milk-based formulation, Fortisip Protein, was discontinued and replaced by Fortisip Extra, which had identical protein content, but differed marginally in energy (320 vs. 300 kcal/200 ml), micronutrient content and available flavours (no apricot). Given both were similar and representative of the locally available milk-based formulation, we considered it reasonable to combine the results for Fortisip Protein and Fortisip Extra products.

It was explained to participants that the study involved them tasting several ONS. They were shown four anonymised lists of flavours and asked to select their most preferred from each (Table 1). These were subsequently used in the tasting, undertaken on a separate visit.

2.3. Procedure and assessments

The ONS were numbered 1–4 and, to act as an internal control, Fortisip Yogurt Style was repeated and assigned number 5. A computer was used to generate sets of numbers 1–5 in random order, which determined the order in which the ONS were tasted. A researcher prepared the ONS and was not blinded. Scandishake was prepared using 240 ml of fresh full-fat milk mixed with 85 g of powder. The ONS were stored in a refrigerator and presented chilled as recommended by the manufacturers.

The assessments were undertaken in a quiet room, free of interruption. Each supplement (30 ml) was presented in an identical opaque paper cup with a black lid and straw, numbered 1–5 as appropriate. Participants were instructed to use tap water to clear the palate before tasting each ONS and to drink as much of the sample as they wished. After each tasting, participants completed a 7-point Likert agree–disagree scale, with scores of 1, 4 and 7 representing 'definitely like', 'neither like or dislike' or 'definitely dislike' respectively.[14] After tasting all five samples, the participants were asked to indicate which ONS was their favourite. No prompting or additional guidance was given by the researcher present.

Table 1
Oral nutritional supplements studied.

Name	Fortijuce	Fortisip Protein/Fortisip Extra	Fortisip Yogurt Style	Scandishake
Type	Juice-based	Milk-based	Yogurt-based	Skimmed milk powder-based
Flavours	Apple Blackcurrant Forest Fruit Lemon Orange Strawberry Tropical	Apricot (Fortisip Protein only) Chocolate Forest Fruit Mocha Strawberry Vanilla	Peach & orange Raspberry Vanilla & lemon	Banana Caramel Chocolate Strawberry Vanilla Unflavoured

2.4. Statistical analysis

Independent *T*-Test or Chi-squared test were used to compare age, gender and choice of favourite supplement between patients and healthy volunteers. The Mann-Whitney test was used to compare Likert scores between groups and the Wilcoxon signed-rank test the first and second scores for the repeated sample of Fortisip Yogurt Style. Data were analysed using the Statistical Package for the Social Sciences version 17 and a P value of ≤ 0.05 was considered statistically significant.

A sample size calculation was performed, based on one undertaken in a similar study.[14] Using a standard deviation of 1.3, to reliably detect a one point difference in Likert scores between the patient and healthy volunteer groups, requires 27 participants per group (80% power, $P = 0.05$).

3. Results

3.1. Participants

Over a recruitment period of one year, 52 patients and 36 healthy volunteers meeting the inclusion criteria were approached. Of these 34 and 35 respectively consented to take part with 31 patients and 32 healthy volunteers undertaking and completing the study. The groups were matched for age (mean (SD) age 69 (9) vs. 69 (7) for patients and volunteers respectively; $P = 0.87$) but differed in gender with 18 and eight males in the patient and healthy volunteer groups respectively ($P = 0.005$), in part reflecting the high proportion of women volunteer staff at the palliative care unit. All participants were Caucasian except for two patients (a Black African and a Black Caribbean). Thirty patients had a histological diagnosis of thoracic cancer; the majority had metastatic non-small-cell lung cancer and had previously received radiation treatment and/or chemotherapy. One patient had a radiological diagnosis of mesothelioma (Table 2). No patients were already receiving ONS. To date, 25 patients have died, with a median [IQR] survival of 73 [28–195] days.

Table 2
Selected patient demographics.

Number	31
Male:female	18:13
Mean (SD) age (years)	69 ± 9
Thoracic cancer type (n)	
NSCLC	23
Mesothelioma	7
SCLC	1
Stage	
Metastatic	23
Locally advanced	8
Previous anticancer treatment[a]	
Radiation therapy	20
Chemotherapy	16
No treatment	5
Surgery	3

NSCLC, non-small cell lung cancer; SCLC, small cell lung cancer.
[a] Some patients had received more than one treatment.