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Comparison of the taste and acceptability of a new high protein ice cream (Nottingham-Ice cream) with standard hospital milkshake oral nutritional supplement in older people with fragility fractures: a short report

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ABSTRACT

Introduction Oral nutritional supplement (ONS) prescription iscommonly recommended for older patients with hip fractures. However, ONS compliance is often low. Ice cream may be a promising nutritional intervention. Using a Plan-Do-Study Act methodology we describe the second cycle of a project using an ice cream based nutritional supplement called Nottingham-Ice cream (N-ICE CREAM) to address malnutrition in older adults. The project aimed to identify whether N-ICE CREAM is a suitable option/alternative to standard ONS.

Methods Fifty older (≥ 65 years) inpatients with hip or spine fractures were recruited. Both groups received two days each of N-ICE CREAMand milkshake ONS. We measured compliance, acceptability (rating 0“dislike a lot” to 7 “like a lot”), attitudes towards prescription length (rating 0 “very unconfident” to 4 “very confident”) and preference.

Results Mean (standard deviation, SD) patient age was 80.6 (7.7) years. The majority (n = 21, 67.7%) preferred N-ICE CREAM. Mean compliance to N-ICE CREAM was greater in both groups (group A (n = 22) 69.9 (30.0)% and group B (n = 26) 56.3 (39.3)%) compared to milkshake ONS (group A (n = 22) 43.4 (4.7)% and group B (n = 26) 53.6 ± (40.2)%). Mean acceptability ratings were higher for N-ICE CREAM, thus the overall impression score was greater. Confidence score for both products decreased with increasing time.

Conclusions N-ICE CREAM is more accepted by older patients with hip or spine fractures compared to milkshake ONS. Further research should explore long-term compliance and clinical outcomes.

INTRODUCTION

Oral nutritional supplements (ONS) are commonly recommended in malnourished patients and patients with hip fractures regardless of nutritional status.[1] Unfortunately, good compliance to ONS, a primary determinant of the effectiveness presents as a significant challenge.[2 3] Using a plan-do-study act methodology, we describe the second cycle of a project using an ice cream based nutritional supplement to address malnutrition in older adults. The first cycle investigated the effectiveness of ice cream in improving energy intake in older trauma and orthopaedic patients.[4] A new ice cream named Nottingham-Ice cream (N-ICE CREAM) providing increased protein, vitamin D and leucine was developed for the second cycle. The second cycle investigated the acceptability of N-ICE CREAM compared with routinely prescribed hospital milkshake ONS in older adults with hip and spine fractures. This quality improvement project aimed to identify whether fortified ice cream is a suitable option/alternative to standard ONS.

METHODS

Fifty older (≥65 years) inpatients with hip or spine fractures were recruited. Patients were randomised into two groups. Both groups received 2 days of N-ICE CREAM two times per day (one 80 g tub comprising 155 kcal, 15.4 g protein) and milkshake ONS two times per day (one bottle comprising 125 mL, 300 kcal and 18 g protein). Group A received N-ICE CREAM for the first 2 days and group B, milkshake ONS first. We measured compliance, acceptability (hedonic characteristics; rating 0 dislike a lot to 7 like a lot), attitudes towards length of prescription (rating 0 very unconfident to 4 very confident) and preference for each product.

RESULTS

Fifty patients were included in the baseline demographic and clinical characteristic’s

Table 1 Mean (±SD) daily compliance to and additional mean (±SD) energy and mean (±SD) protein provision from N-ICE CREAM and milkshake ONS

	N-ICE CREAM			Milkshake ONS		
	Compliance (%)	Additional daily energy (kcal)	Additional daily protein (g)	Compliance (%)	Additional daily energy (kcal)	Additional daily protein (g)
Group A	69.9±30.0	217±91	21.5±4.5	43.4±4.7	260±256	15.6±15.2
Group B	56.3±39.3	175±122	17.3±6.1	53.6±40.2	322±237	19.3±14.2
Overall	62.5±35.7	194±111	19.3±11	49.9±41.5	293±248	17.6±14.8

N-ICE CREAM, Nottingham-Ice cream; ONS, oral nutritional supplement.

analysis. Mean (SD, ±) age was 80.6±7.7 years (range: 68–101 years, 82% female and 18% male). The most common fracture in both groups was neck of femur (group A; 95.7%, n=22 and group B; 96.3%, n=26).

Compliance

Mean compliance to N-ICE CREAM was higher in both groups (table 1).

Observed factors impeding N-ICE CREAM compliance included patients falling asleep, feeling full from mealtimes or not being present on the ward. Similarly, nausea, pain, confusion and disliking the taste were reasons for reduced compliance to both products.

Preference

From 31 responses recorded, 67.7% preferred N-ICE CREAM to milkshake ONS.

Acceptability

From all hedonic ratings collected for N-ICE CREAM, 88.8% were positive. For the milkshake ONS, 62.8% were positive. N-ICE CREAM was rated higher for all sensory characteristics than the milkshake ONS (figure 1) thus, the overall impression score was greater.

Confidence

There was a negative correlation between length of time and confidence (i.e., patients felt less confident about having the products for a longer period). Both products had an overall confidence score of 2.9 representing a negative response.

DISCUSSION

To our knowledge, this is the first study directly comparing a high protein, fortified ice cream with standard ONS in

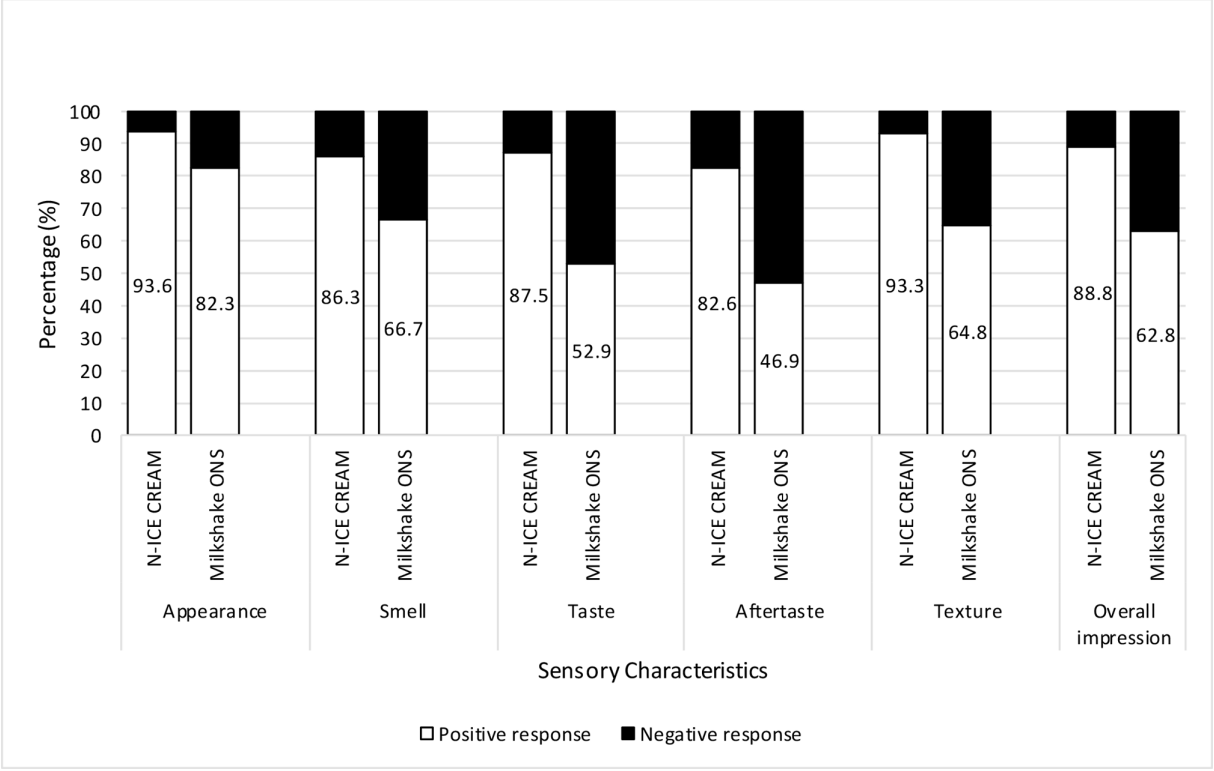

Figure 1 A bar chart to show the proportion of positive and negative responses towards sensory characteristics of N-ICE CREAM and the milkshake ONS. N-ICE CREAM, Nottingham-Ice cream; ONS, oral nutritional supplement.

older adults. The results prove our hypothesis that N-ICE CREAM would be just as 'accepted' if not more than the milkshake ONS, with 88.8% and 62.8% of responses positive towards N-ICE CREAM and the milkshake ONS, respectively.

Compliance to ONS is critical for successful outcome. Compliance was highest to N-ICE CREAM in both groups. ONS 'shall provide at least 400 kcal/day including 30 g or more of protein/day'.[1] Our results suggest this recommendation is unrealistic in older hip fracture patients and are consistent in reporting low ONS compliance in older adults.[2 3] Having a variety of N-ICE CREAM flavours may have improved compliance due to decreased flavour/taste fatigue.[5]

On average 37.5% of N-ICE CREAM was uneaten. Over half the milkshake ONS was wasted. Despite increase in wastage, the milkshake ONS still provided substantially higher energy. Protein intakes from both products remained similar. Strategies to reduce ONS wastage is an area for further exploration.

The majority of patients preferred N-ICE CREAM (67.7%). Preference to a 'higher' protein ice cream (160 kcal, 3.2 g protein) over standard ONS has reported in one study where 88% of patients preferred the ice cream.[6]

Project limitations

This project was only a small, short-term evaluation. The small sample size limits conclusions about compliance and acceptability. Additionally, the results from this study have reduced generalisability to other settings due to the nature of it being single centre and predominantly white British and female population; taste preferences may differ by gender and culture.

CONCLUSION

High protein N-ICE CREAM is more accepted and preferred by older patients with a hip or spine fracture compared with standard milkshake ONS and presents as a promising alternative/option for improving dietary intake. Further research should explore optimal timing for N-ICE CREAM administration, long-term compliance and clinical outcomes.

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REFERENCES

1 Volkert D*et al*. European society of parenteral and Enteral nutrition guideline on clinical nutrition and hydration in Geriatrics. *Clinical Nutrition* 2018;38:10–47.
2 Gosney M. Are we wasting our money on food supplements in elder wards *J Adv Nurs* 2003;43:275–80.
3 Lawson RM, Doshi MK, Ingoe LE, *et al*. Compliance of Orthopaedic patients with postoperative oral nutritional supplementation. *Clinical Nutrition* 2000;19:171–5.
4 Taib A, Ong T, Mulvaney E, *et al*. Can an ice-cream based supplement help address malnutrition in Orthogeriatric patients *J Nutr Gerontol Geriatr* 2021;40:280–9.
5 Nieuwenhuizen WF, Weenen H, Rigby P, *et al*. Older adults and patients in need of nutritional support: review of current treatment options and factors influencing nutritional intake. *Clin Nutr* 2010;29:160–9.
6 Wright CL, Marks M, McDougall T. Ice cream, a new alternative to oral nutritional supplements. *J Hum Nutr Diet* 2008;21:406.