Oral Nutritional Supplement Taste Preferences of Inpatients

Yatan Hastalarda Oral Beslenme Solusyonu Tat Tercihleri

Muhammet Cemal Kizilarslanoglu[1], Mustafa Kemal Kilic[1], Ezime Toruk[2], İrem Cevik[2], Hacer Demir[2], Hulya Altun[2], Melda Turkoglu[2], Gulbin Aygencel[2], Osman Yuksel[2], Mehmet Ibis[2], Ismail Kati[2], Zekeriya Ulger[1,2]

[1] Gazi University School of Medicine, Department of Internal Medicine, Division of Geriatrics
[2] Gazi University School of Medicine, Nutritional Support Unit

ABSTRACT

Objective: This study aims to determine oral nutritional supplement (ONS) taste preferences of inpatients, and show the relationship of these preferences to age and comorbidities.
Methods: Two-hundred patients were included in the present study. Patients' demographic characteristics, reasons for hospitalization, comorbidities, pharmaceuticals, smoking, alcoholism, depression status and NRS2002 scores were investigated. Five different tastes (vanilla, strawberry, coffee, bananas and peach) were tested. Visual analog scale (VAS: from 0 to 10 points) was used to detect patients' preference scores for each taste.
Results: Mean age of the participants was 58.4±16.3 years (51.5% male). Polypharmacy, chronic alcoholism and smoking cigarette were seen in 61.5%, 4.5% and 12% of the participants, respectively. Medians of VAS scores were 8 points for coffee (min-max: 1-10), 8 points for strawberry (min-max: 2-10), 8 points for bananas (min-max: 1-10), 7 points for peach (min-max: 1-10) and 6 points for vanilla (min-max: 1-10) ($p<0.001$). Median VAS scores were significantly lower in peach and vanilla group than others ($p<0.001$). When VAS scores were compared according to gender, age, chronic diseases, educational level, polypharmacy, malnutrition, smoking and alcoholism, it was seen that there were no significantly differences between groups. However, VAS scores of vanilla and peach groups were significantly lower than the other tastes according to the above mentioned status ($p<0.001$).
Conclusion: In this study, it was shown that peach and vanilla were the least preferred tastes. But, no association was detected between ONS taste preferences, on one hand, and gender, age, chronic diseases, educational level, polypharmacy, malnutrition, smoking and alcoholism, on the other.

Key Words: Malnutrition, oral nutritional supplements, nutrition, elderly, older adults, taste preference

ÖZET

Amaç: Yatan hastalarda oral beslenme solüsyonlarında tat tercihlerinin yaş ve ek hastalıklarla ilişkisinin belirlenmesi amacıyla bu çalışma planlanmıştır.
Yöntemler: Toplam 200 hasta çalışmaya alınmıştır. Hastaların demografik verileri, hastanede yatış nedenleri, altta yatan hastalıkları, kullandığı ilaçları, sigara ve alkol kullanımları, depresyon durumu, NRS2002 test skorları kaydedilmiştir. Beş farklı tat (vanilya, çilek, kahve, muz ve şeftali) hastalara denetilmiştir. Her bir tat için görsel analog skala (GAS: 0 ile 10 puan arasında) uygulanarak aldığı skorlar kaydedilmiştir. Veriler SPSS 16.0 versiyon programına kaydedilip analizler yapılmıştır.
Bulgular: Hastaların yaş ortalaması 58,4±16,3 yıldı (%51,5'i erkek). Polifarmasi, alkol ve sigara kullanım oranları sırasıyla %61,5, %4,5 ve %12 bulundu. GAS ortancalarına bakıldığında kahvenin 8 puan (min-maks:1-10), çileğin 8 puan (min-maks: 2-10), muzun 8 puan (min-maks: 1-10), şeftalinin 7 puan (min-maks: 1-10) ve vanilyanın 6 puan (min-maks: 1-10) aldıkları görüldü ($p<0,001$). GAS skor değerleri vanilya ve şeftali grubunda diğer gruplara göre anlamlı şekilde daha düşüktü ($p<0,001$). Yaş, cinsiyet, eğitim düzeyi, kronik hastalıklar, polifarmasi, malnutrisyon durumu, alkol ve sigara kullanımına göre tatların almış oldukları GAS skorları karşılaştırıldığında fark olmadığı ve vanilya ve şeftali grubunda diğer gruplara göre anlamlı şekilde daha düşük olduğu görüldü ($p<0,001$).
Sonuç: Bu çalışmada en az tercih edilen tatların şeftali ve vanilya olduğu gösterilmiştir. Ancak cinsiyet, yaş, kronik hastalıklar, eğitim düzeyi, polifarmasi, malnutrisyon ve alkol, sigara kullanımının ONS tat tercihinde etkisi olduğu gösterilememiştir.

Anahtar Sözcükler: Malnutrisyon, oral beslenme destek solüsyonu, beslenme, yaşlı hasta, tat tercihi

Address for Correspondence / Yazışma Adresi: Muhammet Cemal Kizilarslanoglu, MD Gazi University School of Medicine, Department of Internal Medicine, Division of Geriatrics, 06560, Besevler, Ankara, Turkey Tel: 0 312 202 50 70 Fax: 0312 215 42 04 E-mail: drcemalk@yahoo.com.tr

doi: http://dx.doi.org/10.12996/gmj.2015.16

INTRODUCTION

Malnutrition is an important condition causing morbidity and mortality, and has been found to result from inadequate intake of energy or nutritional elements. This situation may occur not only because of inadequate intake of energy, but also due to increased catabolic activities. The major reasons of malnutrition in the elderly people were impaired sense of taste, living alone, low income, immobility and not feeding without someone's help (1-4).

The prevalence of malnutrition and risk of malnutrition among inpatients is approximately 80 percent (5). These patients should be given adequate energy and protein through using some invasive and noninvasive methods such as enteral or parenteral nutritional interventions to improve clinical outcomes. One of these options is ONS. In the studies investigating ONS tolerability, it has been shown that only half of the patients are correctly using ONSs in line with physicians' recommendations while the other half of the patients are refusing to use these supplements (6). The patients taking ONS have some problems limiting ONS tolerability such as decreased appetite and sense of smelling and dislike of ONS taste and smell (1).

While ONSs are being prepared, a lot of nutritional elements are used and mixed with them to optimize the energy, protein, lipid and other compositions in the ingredients. The bad taste occurring in the procedure of preparing ONS was tried to be compensated for by using some aromas. But, often, these efforts are not successful, and the taste of ONS is not liked by the patients because of the bad taste and smell (7-9). On the other hand, patients' sense of taste is affected by some factors such as race, genetic, environment, age, weight loss, smoking cigarette, alcohol, oral health problems, medications, chronic diseases and depression (10-15).

In the literature, there are some studies showing a relationship between taste preferences of ONS and patients' age and chronic diseases (12; 16-18). However, there is no study showing this relationship in Turkey. In this study, it was aimed to determine ONS taste preferences of inpatients, and show the relationship of these preferences to patients' age, underlying comorbidities and other factors affecting taste preferences.

METHODS

Patients

The patients admitted to our hospital, and those in the consulting nutritional support unit were included in this study after taking their inform consent. The patients' demographic characteristics, reason's for hospitalization, comorbidities, medications, smoking cigarette and alcohol use were recorded. This study was approved by Gazi University School of Medicine, Clinical Investigation and Ethics Committee.

Implementation of ONSs

Five different tastes (vanilla, strawberry, coffee, bananas and peach) were tested. The patient was offered to drink some water before tasting the next taste to prevent taste interactions. All participants were tested for each five tastes. The order of tastes was randomly arranged for each patient.

Assessment of Taste Preferences of Patients

Visual analog scale (Table-1) was used for the evaluation of taste preferences for each taste.

Table 1. Visual Analog Scale

Tastes	☹very bad	very nice☺
	1…. 2…. 3…. 4…. 5…. 6…. 7…. 8…. 9…. 10	
	1…. 2…. 3…. 4…. 5…. 6…. 7…. 8…. 9…. 10	
	1…. 2…. 3…. 4…. 5…. 6…. 7…. 8…. 9…. 10	
	1…. 2…. 3…. 4…. 5…. 6…. 7…. 8…. 9…. 10	
	1…. 2…. 3…. 4…. 5…. 6…. 7…. 8…. 9…. 10	

Statistical analysis

Statistical Package for Social Sciences (SPSS) for Windows 15.0 (IBM SPSS Inc.. Chicago. IL) version was used for the statistical analysis.

Kolmogorov-Smirnov test was used for determining whether a numerical parameter is normally distributed or not. Normally distributed numerical parameters are shown as mean ± SD and skewed ones are shown as median (min-max). Numbers and frequencies were used for categorical parameters. Student-T and Mann-Whitney U tests were conducted for the comparison of normally distributed and skewed numerical parameters of independent groups, respectively. Chi-square test was used for the comparison of categorical parameters. Friedman test was used for the comparison of the median of VAS for 5 different tastes. The significant differences were further investigated to show which groups were different from each other and were Bonferroni-adjusted, Wilcoxon rank-sum test was used. $P < 0.05$ was considered as the statistical significance level.

RESULTS

In total, 200 patients were studied, and the mean age was 58.4±16.3 years (51.5% was male and 38% was in geriatric age group). Frequencies of diabetes mellitus, hypertension, coronary artery disease, renal failure, cancer, thyroid disease and depression were 28%, 45%, 20%, 5.5%, 11%, 10% and 2%, respectively (Table-2). Polypharmacy rate was 61.5%. Alcohol usage and smoking cigarette were seen in 4.5% and 12% of the patients, respectively. Malnutrition rate regarding NRS 2002 test was 25.5%.

Table 2. General Characteristics of the participants

	Number of Patients (n=200)	Percentage %
Number of geriatric patients	76	38
Gender		
• Male	103	51.5
• Female	97	48.5
Educational level		
• Illiterate	33	16.5
• Literate	12	6.0
• Primary school	73	36.5
• Secondary school	21	10.5
• High school	26	18.0
• University	25	12.5
Patient's ward		
• Internal ward	106	53.0
• Surgery ward	94	47.0
Patients with chronic diseases	159	79.5
Diabetes mellitus	56	28.0
Hypertension	90	45.0
Coronary artery disease	40	20.0
Chronic kidney disease	11	5.5
Cancer	22	11.0
Thyroid disease	20	10.0
Depression	4	2.0
Alcohol	9	4.5
Cigarette smoking	24	12.0
Polypharmacy	123	61.5
Nutritional status regarding NRS2002		
• Normal	124	62.0
• Malnutrition	51	25.5
• Not available	25	12.5

Median VAS scores for coffee, strawberry, bananas, peach and vanilla were detected as 8 points (min-max: 1-10), 8 points (min-max: 2-10), 8 points (min-max: 1-10), 7 points (min-max: 1-10) and 6 points (min-max: 1-10), respectively ($p<0.001$). When Bonferroni adjusted Wilcoxon rank-sum test was used, VAS scores of vanilla and peach were found to be significantly lower than the other tastes ($p<0.001$) (Table 3 and 4).

Table 3. Comparison of general characteristics of the participants with the score of VAS for each

Characteristics	Coffee	Strawberry	Bananas	Peach	Vanilla	*p value* $^{\gamma}$
All participants	8	8	8	7	6	***<0.001***
Groups regarding age						
• Elderly adults	8	8	8	8	6	***<0.001***
• Young adults	8	8	8	7	6	***<0.001***
• *p value **	*0.945*	*0.228*	*0.245*	*0.148*	*0.692*	
Gender						
• Male	8	8	8	7	7	***<0.001***
• Female	8	8	8	7	6	***<0.001***
• *p value **	*0.662*	*0.316*	*0.947*	*0.708*	*0.518*	
Patients' ward						
• Internal	8	8	8	7	7	***<0.001***
• Surgery	8	8	8	7	6	***<0.001***
• *p value **	*0.817*	*0.240*	*0.168*	*0.220*	*0.152*	
Malnutrition						
• Yes	8	8	8	7	6	***0.001***
• No	9	8	8	7	6	***<0.001***
• *p value **	*0.097*	*0.136*	*0.964*	*0.606*	*0.565*	
Alcohol						
• Yes	7	8	8	7	6	***0.039***
• No	8	8	8	7	6	***<0.001***
• *p value **	*0.068*	*0.659*	*0.283*	*0.644*	*0.344*	
Cigarette						
• Yes	8	8	7	6	6	*0.099*
• No	8	8	8	7	6	***<0.001***
• *p value **	*0.480*	*0.471*	*0.231*	*0.118*	*0.921*	

** Mann-Whitney U test was used for the evaluation of differences between independent groups.*

$^{\gamma}$ Friedman test was applied for the evaluation of differences between dependent groups. Vanilla and peach were the least preferences tastes. There were no statistically significant differences between vanilla and peach preference.

Medians of VAS score differences by age, gender, educational level, chronic diseases, polypharmacy, nutritional status, alcohol usage and smoking cigarette were not statistically significant. t. Vanilla and peach tastes were significantly less liked than the other tastes in all groups (p<0.001) except for the smokers (p=0.099) and the patients of coronary artery disease (p=0.209), chronic renal failure (p=0.830), thyroid disease (p=0.097) and depression (p=0.605) (Table 3 and 4).

Table 4. Comparison of chronic diseases of the participants by the score of VAS for each taste

Characteristics	Coffee	Strawberry	Bananas	Peach	Vanilla	*p value* $^{\gamma}$
Chronic diseases						
• Yes	8	8	8	7	6.5	***<0.001***
• No	8	8	8	7	6	***<0.001***
• *p value **	*0.661*	*0.396*	*0.572*	*0.945*	*0.218*	
Diabetes mellitus						
• Yes	8	8	8	7	7	***<0.001***
• No	8	8	8	7	6	***<0.001***
• *p value **	*0.721*	*0.669*	*0.636*	*0.164*	*0.543*	
Hypertension						
• Yes	8	8	8	7	6	***<0.001***
• No	8	8	8	7	6	***<0.001***
• *p value **	*0.944*	*0.781*	*0.103*	*0.464*	*0.572*	
Coronary artery disease						
• Yes	8	8	8	8	7	*0.209*
• No	8	8	8	7	6	***<0.001***
• *p value **	*0.980*	*0.814*	*0.560*	*0.091*	*0.060*	
Chronic kidney disease						
• Yes	8	8	7	7	9	*0.830*
• No	8	8	8	7	6	***<0.001***
• *p value **	*0.815*	*0.453*	*0.738*	*0.474*	*0.102*	
Cancer						
• Yes	8	8	8	7	6	***<0.045***
• No	8	8	8	7	6	***<0.001***
• *p value **	*0.383*	*0.422*	*0.292*	*0.261*	*0.342*	
Thyroid disease						
• Yes	8	7.5	8	7	7	*0.097*
• No	8	8	8	7	6	***<0.001***
• *p value **	*0.764*	*0.130*	*0.216*	*0.700*	*0.278*	
Depression						
• Yes	7.5	8	7	7.5	6	*0.605*
• No	8	8	8	7	6	***<0.001***
• *p value **	*0.387*	*0.933*	*0.280*	*0.784*	*0.905*	
Polypharmacy						
• Yes	8	8	8	7	6	***<0.001***
• No	8	8	8	7	6	***<0.001***
• *p value **	*0.786*	*0.471*	*0.832*	*0.374*	*0.707*	

** Mann-Whitney U test was used for the evaluation of differences between independent groups.*

$^{\gamma}$ Friedman test was applied for the evaluation of differences between dependent groups. Vanilla and peach were the least preferences tastes. There were no statistically significant differences between vanilla and peach preference.

DISCUSSION

In this study, it was found that vanilla and peach were the least preferred tastes of ONSs for Turkish inpatients. Also, gender, age, comorbidities, educational level, polypharmacy, nutritional status, alcohol usage and smoking were not associated with patients' taste preferences of ONSs.

Malnutrition prevalence is more than 10 percent in patients older than 65, and this rate is approximately 60% for inpatients (16). Importance of malnutrition is growing because its relation with morbidity and mortality are shown in various studies. The most important method of struggle with malnutrition is the mainly increased nutritional support. The patient not accomplishing an adequate intake of nutritional support should be supported with enteral or parenteral nutrition.

ONSs have important role in the treatment of malnutrition. A standard ONS is in a 200 ml box, and has 1-1.5 kcal per ml energy, 14-20% protein, 25-30% lipid, 50-60% carbonhydrate and enough vitamin and minerals (16). One of the most important problems about rejecting ONS usage is dislike of ONS taste. There are some studies showing that about 63 percent of ONSs are squandered because of this bad smell and taste (16).

A prospective, observational study by Kennedy et al. examined the taste preferences (chocolate, vanilla and strawberry) of ONSs with 36 young adults and 48 elderly patients, and showed that the sense of taste was lower in the elderly group than the younger ones, and chocolate was the most preferred taste for both age groups. In addition, the least preferred tastes were strawberry for the younger group and vanilla for the elderly group (16). Our results were similar to those. Namely,e we found in our study that vanilla is the least preferable taste, and also the most preferred tastes were the same as in this latter study. The results of this latter study also confirms ours in showing that there were no differences between age groups about the taste preferences.

In another study conducted by Darmon et al., it was shown that the taste preferences of ONSs in 109 hospitalized patients for malnutrition t were the highest for coffee, vanilla and strawberry, respectively, and the lowest for one tasteless ONS (9). The finding that vanilla was one of the most preferred tastes is contrary to the results of our study. This finding might have resulted from the specific nature of the population used in that study. In our study, age, race, and cultural factors were different.

McAlpine et al. examined ONS taste preferences in a prospective study. They included 21 patients and used 6 different tastes (apple, orange, vanilla, strawberry, chocolate and mixed fruit).They found that vanilla was the most preferred taste (1). This study had smaller number of participants than that of our study. Therefore, we believe that our finding that vanilla was the least preferred taste may be showing a relatively more reliable effect.

Our study has also some limitations. The most important one is that the number of patients included could have been increased. Greater number of tastes might have also been used for the taste evaluation. Also, before starting the study, patients' sense of taste might have been tested first, and later compared with the results obtained in the actual study.

CONCLUSION

The most important strength of our study is that this is the first study done in Turkey in its area, showing that vanilla and peach tastes may not be appropriate for people of Turkey. On the other hand, it did not detect any association between ONS taste preferences, on one hand, and gender, age, chronic diseases, educational level, polypharmacy, malnutrition, smoking and alcoholism, on the other. Further studies are needed in this area to improve ONS tolerance in the fight against malnutrition.

Conflict of Interest

No conflict of interest was declared by the authors.

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