Research of Awareness of University Students on Functional Foods

Üniversite Öğrencilerinin Fonksiyonel Gıdalar Konusundaki Farkındalıklarının Araştırılması

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ABSTRACT Objective: The aim of this research is to reveal the awareness of the students who receive education on nutrition dietetics on functional foods. **Materials and Methods:** The sample group selected in the research consists of first and fourth grade undergraduate students of Nutrition and Dietetics of a Private University selected by using Convenience Sampling Method. Within the scope of the research, a data collection form was applied to 80 students in total. **Results:** There is a significant difference between fourth grade students and first grade students regarding the variables of the level of education, age, monthly income, control over their own health, and where they first heard about functional foods ($p<0.05$). It was seen that there is a significant difference between the monthly income groups regarding the awareness and frequency of use of functional foods and that this difference arises from the group having a monthly income of 5001TL and more. Furthermore, when the general means of the responses to the awareness of the functional foods and the frequency of use are taken into consideration, it was determined that "Whole grain cereals, musli" was on the first rank with an average of 3.74, "garlic" was on the second rank with an average of 3.66 and "ginger" was on the third rank with an average of 3.65. This result indicates that these are the most recognized and used products among the participants **Conclusion:** It was seen that the education of the students who received nutrition and dietetics education contributed to their tendencies about functional foods. Fonctional foods should not only be encouraged among students whose study fields are related to nutrition, but also among other students in order to raise awareness.
Keywords: Functional foods, Healthy Food, Nutrition

ÖZ Amaç: Bu araştırmanın amacı beslenme ve diyetetik eğitimi alan öğrencilerin fonksiyonel gıda konusundaki farkındalığının ortaya konmasıdır. **Gereç ve Yöntem:** Araştırmada seçilen örneklem grubunu kolayda örnekleme yöntemi kullanılarak seçilen Özel Üniversitenin Beslenme ve Diyetetik birinci ve dördüncü sınıf lisans öğrencileri oluşturmaktadır. Araştırma kapsamında toplam 80 öğrenciye veri toplama formu uygulandı. **Bulgular:** Dördüncü sınıf öğrencileri birinci sınıf öğrencileri ile karşılaştırıldığında eğitim seviyesi, yaş, aylık gelir, kendi sağlığı üzerinde kontrol sahibi olma, fonksiyonel gıdaları ilk nereden duyduğu değişkenlerine ilişkin anlamlı bir fark vardır($p<0.05$). Fonksiyonel gıdalara yönelik farkındalığı ve kullanım sıklığı ortalamalarına ilişkin aylık gelir grupları arasında anlamlı bir fark olduğu, bu farkın 5001TL ve üzerinde aylık gelire sahip olan gruptan kaynaklandığı görüldü. Ayrıca fonksiyonel gıdaların farkındalığı ve kullanım sıklığına ilişkin verilen cevapların genel ortalamalarına bakıldığında birinci sırada 3,74 ortalama ile "Tam tahıllı gevrekler, müsli", ikinci sırada 3,66 ortalama ile "sarımsak" ve üçüncü sırada ise 3,65 ortalama ile "zencefil" olduğu belirlendi. Bu sonuç katılımcılar arasında en çok tanınan ve kullanılan ürünlerin bunlar olduğunu göstermektedir. **Sonuç:** Beslenme ve diyetetik eğitimi alan öğrencilerin aldıkları eğitimin, fonksiyonel gıdalar hakkındaki eğilimlerine katkı sağladığı görüldü. Fonksiyonel gıdaların sadece çalışma alanları beslenme ile ilgili olan öğrenciler arasında değil, diğer öğrenciler arasında da farkındalık sağlanmasına teşvik edilmelidir.
Anahtar Kelimeler: Fonksiyonel gıda, Sağlıklı gıda, Beslenme

Introduction

Functional food; in addition to its nutritional value, is defined as a food or food ingredient that has positive effects on an individual's health, physical performance or mood (1). Functional food(FF) can be divided into three groups which can be expressed as (1) 'adding wellbeing to your life'(e.g.improve the regular stomach and colon functions as in prebiotics and probiotics or 'improve children's life' by means of promoting their learning capacity and behaviour) (2) functional food is intended to reduce an present health risk problems like high cholesterol or hypertension and (3) is composed of the products that can render the consumers's life easier(e.g.lactose-free, gluten-free products) (2). Some authors note that the development

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of FF could be caused by the world's preoccupation with encouraging an absence of disease, longevity and enhanced performance and the developing world'saspiration to prevent diseases arising from micro-nutrient deficiencies (3).

Varying socio-economic factors, lifestyles and food consumption pattern could be among the important reasons of the increase in the demand for convenient, healthy and safe food, which can be stated as the three basic food needs of consumers (4). The most outstanding types of functional food components that are currently marketed are: fiber, whole grain products, omega-3 fatty acids and probiotics for a healthy digestive system, fiber-containing grain products for the prevention of colorectal cancer, calcium for the prevention of osteoporosis, antioxidants for anti-ageing purposes among others (5). The aim of this research is to reveal the awareness of the students who receive education on nutrition and dietetics on functional foods. Although functional foods products and brands are increasing day by day, the lack of studies in the literature reveals the importance of this study. It is also aimed with this study to measure whether the education the students who receive nutrition and dietetics education contribute to their tendency towards functional foods.

Materials, Methods

Research population and sample:

The population of the research is composed of students studying in the Department of Nutrition and Dietetics at a Private University in Istanbul. The sample group selected in the research consists of first and fourth grade undergraduate students of Nutrition Dietetics of a Private University selected by using Convenience Sampling Method(6). Within the scope of the research, a a data collection form was applied to 80 students in total and all a data collection form were evaluated.

The Ethical Aspect of the Study:

The approval of the institution has been taken. The voluntary participation of the individuals participating in the study was considered as the basis and the voluntary consent form was explained and their permissions were obtained.

Preparation of the Data Collection Form:

Firstly, various studies in the literature have been examined for the purpose of the research, as a result of the evaluations, at the first stage of the data collection form prepared for determining the consumer tendencies on functional foods, eight questions for the demographical characteristics (class, age, marital status, education status, monthly income, place lived, how much control he/she has over his/her health) of the participants and three questions regarding the recognition status of functional foods were asked. At the second stage of the data collection form 28 functional foods were listed for measuring the awareness on functional foods stated and their frequency of use and the participants were asked to answer under 5 titles as "I have never heard and used before", "I have heard but never have used", "I have tried a few times but I do not use", "I rarely/sometimes use" and "I frequently use". Two hypotheses were developed in t-test analysis when conducting the research. These are: H0: There is no difference between the mean value of two groups. H1: There is a difference between the mean value of two groups.

Results

In this study, 39 students from the first grade and 41 students from the fourth grade have participated. The highest age frequency for participants is 23 and 19, followed by ages 20 and 25. 70 of the participants were male, 10 were females. 38 of the participants live together with their family, 29 live in the student house and 13 live in the dormitory. The monthly income is 801-2500 TL for 25 participants and 5001 TL or higher for 20 participants. To the question of ' How much control do you have over your health?', 46 students gave the answer 'high', 27 students 'medium' and 7 students 'low'. According to the knowledge of the participants about functional food, 38 students answered 'yes' and 3 students answered 'not sure' from the first grade. It is worth noting here that 90% of the fourth grade students heard the term functional foods first in the university. Regarding the question of 'where participants first heard the functional food term; 36 students answered 'school/university', 3 students 'internet', 2 students 'not sure' from the fourth grade; 12 students answered 'not sure', 5 students 'TV', 3 students 'internet', and 3 students 'school/university' from the first grade.

Redarding the question of how participants define the functional food term; 19 students answered 'functional products', 18 students 'making the food products beneficial to the body by various methods', 2 students 'products beneficial to the body', 2 students 'natural products' from the fourth grade, 10 students 'making the food products beneficial to the body by various methods', 9 students 'functional products', 3 students 'products beneficial to the body', and 1 students 'natural products' from first grade. Table 1 shows the frequency of functional food use among students receiving nutrition dietetics education. Also,

the information on the mean value of the answers given regarding the awareness of the functional foods mentioned in the questions and their frequency of use

Table 1: General regarding the awareness of functional food and their frequency of use.

Functional foods	**The mean of value**
Whole grain cereals, muesli	3.74
Garlic	3.66
Ginger	3.65
Bitter chocolate	3.59
Red fruits (blueberry, blackberry, raspberry, strawberry)	3.55
Tomato	3.53
Energy drinks	3.43
Herbal teas	3.41
Mineral water	3.36
Dietary biscuits with increased fibre content	3.28
Accessory digestive yoghurt (probiotic yoghurt)	3.21
Salmon	3.16
Kefir	3.14
Omega 3 added oil	3.11
Enriched fruit juices	3.06
Bread enriched with vitamins and minerals	3.05
Salt with decreased sodium	3.01
Ginseng	2.99
Athlete foods	2.98
Eggs enriched with omega 3/selenium	2.95
Milk with high protein	2.94
Soya Bean	2.90
Tooth whitening gum	2.86
Milk with decreased calorie	2.80
Vitamin, mineral added milk	2.76
Yoghurt with decreased energy	2.76
Cholesterol lowering margarines	2.68
Cheese with decreased energy	2.65

are shown in Table 1. When we look at the mean value, it is seen that "whole grain cereals, musli" with the mean value of 3.74 is in the first rank, "garlic" is in the second place with the mean value of 3.66 and "ginger" with the mean value of 3.65 is in the third place. This result indicates that these are the most recognized and used products among the participants. It is understood that "cholesterol lowering margarines (2.68)", "cheese with decreased energy (2.65)" and "yogurt with decreased energy" products, which are below the mean and have the lowest three values, are the less known and used products. In the context, the following hypotheses regarding the functional food use of students have been suggested.

$H0_{O1}$: There is no significant difference between the status of 1st and 4th grades regarding their "the mean values of the awareness of functional foods and frequency of use". The $H0_{O1}$ hypothesis for the class variable was rejected ($p<0.05$). Therefore, in terms of awareness and frequency of use of functional foods, it was seen that there is a significant difference between the first and fourth grade students and the awareness and frequency of use of functional foods of the fourth grade students (mean=3.92) are higher than the first grade students (mean=2.33).

$H0_{O2}$: There is no significant difference between the status of the participants regarding "the mean value of the awareness of functional foods and their frequency of use" according to age variable of participants. When the results of hypotheses regarding age variable are examined, it is seen that there is a significant difference ($p<0.05$) between the age groups regarding the mean values of awareness and frequency of use of functional foods, that this difference arises from the groups at the age of 18 (mean=2.32), 19 (mean=2.43) and 20 (mean=2.51).

$H0_{O3}$: There is not a significant difference between the status of women and men regarding “the mean values of awareness and frequency of use of functional foods”.When the results of the hypothesis developed regarding the gender variable are examined, it is seen that there is not a significant difference ($p>0.05$) between women and men regarding the status of “the mean values of awareness and frequency of use”.

$H0_{O4}$: There is not a significant difference between the status of single and married individuals regarding “the mean values of groups of the awareness and frequency of use of functional foods”.When the results of the hypothesis regarding the marital status variable are examined, it is seen that there is not a significant difference ($p>0.05$) between the status of single and married individuals regarding “the mean values of groups of the awareness and frequency of use of functional foods”.

$H0_{O5}$: There is not a significant difference between the status of participants regarding “the mean value of the awareness and frequency of use of functional foods” according to the monthly income variable. When the results of the hypotheses related to the monthly income

variable are examined, it is seen that there is a significant difference($p<0.05$) between the monthly income groups regarding the mean values of the awareness for functional foods and their frequency of use, that this difference arises from the group having a monthly income of 5000 TL and more.

$H0_{O6}$: There is not a significant difference between the status of participants regarding "the mean value of groups the awareness and frequency of use of functional foods" according to having control over his/her own health variable. When the results of hypotheses regarding the variable of having control over his/her own health are examined, it is seen that there is a significant difference ($p<0.05$) between the groups having control over his/her own health regarding the mean value of groups of the awareness for functional foods and their frequency of use, that this difference arises from the group stating that they have a medium level of control over their own health.

$H0_{O7}$: There is not a significant difference between the status of participants regarding "the mean value of the awareness and frequency of use of functional foods" according to the variable of where the term functional foods was first heard. When the results of hypotheses developed regarding the variable of where the term functional foods was first heard are examined, it is seen that there is a significant difference ($p<0.05$) between the groups regarding the mean value of the awareness and frequency of use of functional foods, that this difference arises from the group stating that they first heard the term functional foods from the school/university.

$H0_{O8}$: There is not a significant difference between the status of participants regarding "the mean value of the awareness and frequency of use of functional foods" according to how functional foods are defined variable. When the results of the hypothesis on the definition of functional foods are examined, it is seen that there is not a significant difference between ($p>0.05$) the food definitions made regarding "the mean value of the awareness and frequency of use of functional foods". This indicates that how they define functional foods do not make a difference in functional foods awareness levels or frequency of use among students.

Discussion

Briefly, this study examines the current and preferred information sources for functional foods in addition to the awareness of functional foods among the students in terms of consumer segments. Among the participants, the most frequently reported factor was an increased awareness and knowledge pertaining to functional foods that would increase consumption and most of the participants stated that they are looking for information about functional foods actively, which suggests that students are intended to increase their knowledge and understanding about functional food products. Furthermore, it was tried to provide an overview on the awareness of functional foods. To this end, the tendencies of the students who received nutrition dietetics education about the functional foods were brought to light. The demographic features of the participants in sample generally consisted of males mostly between 18 and 37 years of age, who are first grade and fourth grade nutrition dietetic students. A significant difference was shown between first and fourth grade students regarding the awareness and the frequency of use of functional foods. It has been determined that the educational level has a significant effect on students' functional food awareness. Thus, the data supports the first hypothesis (H1) since it indicates that the fourth grade has a functional food awareness. The results of our study are similar to the earlier studies, stating an effect of education level on nutritional knowledge (7).In addition, regarding the specific approach of functional food awareness, it was shown that the educational level has a significant effect on functional food awareness. Also, the more educated consumers are, the better they are able to understand nutritional information on packages, for example the health claims, and the more accurate evaluation of health claims might have resulted in a higher functional food awareness. When the single determinants are examined, the significant effect of age was demonstrated on the student awareness. Accordingly, these results support the second hypothesis (H2). The awareness and perceptions of students related to functional foods is a subject of particular interest among consumers since the combination of functional foods with their diets could greatly benefit this population.

It has been stated that the gender does not have a significant effect. So, the third hypothesis (H3) should be rejected on the basis of this data. In other studies, age and gender which largely affect the food choice has an effect on the preference patterns for the assessed functional foods concepts. In addition, a questionnaire-based study on the motivating factors affecting the preference of purchasing functional foods in 959 adults concluded that participants having a

higher number of health concerns were more likely to prefer functional food products(8).The marital status did not show a significant influence. Therefore, based on the data the fourth hypothesis(H4) has to be rejected. In a study, it was concluded that there was a significant difference among consumers in terms of their knowledge, attitude and purchase frequency by gender and educational level, whereas the marital status revealed mixed results. There was a positive relationship of the age with the consumption of functional foods (2,9). Again another study revealed that a high-income level affected the high consumption of functional foods in consumers (10). The behaviour of functional foods consumption is also affected by the individual factors like knowledge and attitudes besides the demographic factors like age, gender, allowance.

The monthly income showed a significant influence on student's functional food awareness which supports the fifth hypothesis (H5)-the higher the monthly income variable for nutritional purposes, the higher is student's functional food awareness. It can be seen that the most important determinant showing a highly significant effect on functional food awareness is the monthly income. Regarding the monthly income as a factor that would support awareness, the students who have a monthly income > 5001TL were more likely to report the cost of functional foods in comparison with those having a monthly income <5001TL. This study indicates that the important indicators that affect the students' awareness of functional food are socio-demographic features like education level, age, monthly income, 'having control over his/her own health' and 'where the term functional foods was first heard'. The results show that higher monthly income (more than 5001 TL) in students aged 23 are more likely to reveal a higher awareness of functional food and a positive perception towards functional food in university. Because students with a higher monthly income levels can purchase these food products while the students with lower monthly income can't, given the fact that functional food is more expensive than conventional food (11).

The most important direct factor was student's having control over his/her own health variable. For that reason, the results support sixth hypothesis (H6). The variable of where the term functional foods was first heard showed a significant impact on student' functional food awareness. Thus, the data supports the seventh hypothesis (H7).

Students' information strategies have a positive effect on the functional food awareness. So, a media's expenditure on advertisement and a high media presence might also have an affect on the consumers' awareness of functional food (12). Furthermore, serving as a source of reliable information related to functional foods, school/university has a great potential to promote increased functional food acceptance and consumption among students. In terms of the awareness and knowledge, majority of students (90%) stated that they actively look for information about functional foods, of which most common sources of information being school/university, TV and internet. There is not a significant difference between grade of students according to how functional foods are defined variable. Therefore, based on the data the eighth hypothesis(H8) has to be rejected.

The practical aspect linked to the conducted research was included 28 different functional food. In the study, it was observed that the most used functional foods products of the students participating in the research were whole grain cereals, musli, garlic, ginger, bitter chocolate,red fruits, tomato, energy drinks, herbal teas, mineral water, dietary biscuits with increased fibre, probiotic yoghurt, salmon, kefir, omega-3 added oil, enriched fruit juices. whole grains for reduced risk of heart disease, probiotics for maintaining a healthy digestive system, probiotics for maintaining a healthy immune system, red fruits for protection against free radical damage, omega-3 for cognitive development, especially in youngs, prebiotics fiber for maintaining a healthy digestive system, herbal teas for reduced risk of chronic disease or we weight management (13,14). The majority of Americans are interested in functional foods that can improvide a host of benefits, from maintaining overall health, bone, and digestive health, or contributing to a healthy body weight (15).In a study conducted, it is stated that functional products that the consumers who participated in the data collection form most frequently used are mineral water, grain diet biscuits and whole grain cereals (16).

It can be seen that students' functional food awareness increases with the term of scientific evidence: a certain functional food with a longer scientific history is a more familiar functional food for a wide range of consumers. The large application areas in case of vitamins and minerals might be resulted from the longer research history. Although the previous study mainly focuses on one functional food or product category, this study contributes to the current structure of literature through providing a general view on consumers' awareness of 28 different functional foods.

When our results about the most popular functional products are compared with those acquired by other European authors, we can conclude that such products in Poland are juices, and drinks enriched with minerals, vitamins, fibre or inulin, probiotic yoghurts, energy and isotonic drinks, breakfast cereals and margarine with stanols (17).The most commonly consumed functional foods in Europe are also grain products that contain extra fibre and dairy (fermented and unfermented with probiotics) (18).In the presented study, it is concluded that there is a high consumption of energy drinks among the group of students. These findings support the studies conducted by Bulut et al. and Kopac et al., in which more than half of university students included have been reported to drink energy drinks for the purpose of staying awake and improving their mental performance (19,20). Students mostly drank energy drinks in the course of the examination period. Another very popular functional product was herbal tea among respondents in the presented study. These results also support the results acquired in the study conducted by Drywien et al (21). Generally, the level of knowledge about functional foods of the fourth grade students was assessed as higher than first grade students. This might be linked to the knowledge they acquire during the academic education and to their areas of interest, which is also affected by their fields of study. Other authors acquired similar results, indicating that higher education level and higher food awareness have a positive effect on the nutrition behaviours.

Conclusions

A three-phase model which monitors the functional food or markets trends for consumer acceptance is referred to by Braun and Venter (22). As the evolution of consumer acceptance of an ingredient or trend is linked to the consumer's awareness (emerging phase), knowledge (popularisation phase) and understanding (commercialisation phase), these three domains should be studied further.

Functional food products scientifically shown to have a positive effect on health are important for their contribution to a society consisting of healthy individuals. Additionally, the government should strengthen the food laws and regulations in order to protect consumers from high prices set by direct sellers in Turkey. Besides, the government or private sector should organize healthy diet and lifestyle campaigns for the education of the public and promoting their awareness of the benefits of functional food.

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