

# Turkish individuals' views on the relationship between nutrition and cancer and their nutrition behaviors; an example of South Western Turkey

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**Summary.** The aim of this research was to determine Turkish individuals' view of the relationship between nutrition and cancer as well as their nutrition behaviors in the South Western Turkey. This is a descriptive study. The mean age of the individuals was 35.4±11.9. Of the participants 75.7% thought that there was a relationship between nutrition and cancer while 38.4% thought that foods that contained hormones and chemical additives increased cancer risk. It was determined that 82.9% of the participants preferred raw fruits while 59.0% preferred fresh vegetables, and 53.2% preferred cooking in a saucepan. When the consumption frequency of the participants who had family history of cancer, regarding the foods that increase the risk of cancer was examined, it was determined that certain food groups were frequently consumed by the animal fats, delicatessen foods, snacks, fast-food. The rate of women who affirmed the relationship between nutrition and cancer was found to be similar to the men who were of the same opinion ( $X^2=0.848$ ;  $p=0.36$ ). The majority of the participants in this study affirmed the nutrition-cancer relationship and followed a diet rich in foods protective against the risk of cancer.

**Key words.** Nutrition, cancer, view, nutrition behaviors, Turkey

## Introduction

A healthy diet and positive nutritional habits are essential to overall health and well-being. Healthy diet could be defined as achieving a variety, balance and moderation in nutrition. As for positive nutritional habits, it is developing these preferences into conscious behaviors. Some examples are enjoying more fishes and nuts, cutting down on animal fat, shunning trans fats, curbing cholesterol consumption, keeping sodium down, potassium up, watching the level of calcium and vitamin d, choosing food over supplements, being aware of liquid calories, and limiting alcohol consumption (1).

For adequate and balanced nutrition and acting consciously in this respect, one should be informed about the energy and nutrition elements the body needs, with which foods these needs could be satisfied, and the food groups that should be taken in daily. Lack of information will cause the development of bad nutritive habits and that getting rid of such habits is very difficult (2).

The fact that people are informed about nutrition does not suggest that they are utilizing this information in practice. People's food choices are shaped by many factors such as cultural values, old habits, foods available in one's locality, prices, media, family members and friends (3). Food preferences in childhood,

level of information on nutrition, number of household members, and being happy/ unhappy with body weight could be listed among the factors that influence nutrition habits that vary according to individuals or societies (4).

Cancer is a major cause of death in Turkey and around the world and appears to be increasing in prevalence. Cancer is a leading cause of death worldwide, accounting for 8.2 million deaths. About 70% of all cancer deaths occurred in low- and middle-income countries in 2012 (5). Nutrient related cancers (especially colorectal and gastric cancers) are important for Turkey. It is observed that the age-standardized incidence rate of colorectal cancer in Turkey is 21.0 in men and 13.4 in women per 100,000 people. The estimated number of new patients with colorectal cancer in both genders is 7,218 (4,102 male and 3,116 female) (6,7). Gastric cancer is also one of the leading causes of cancer deaths in Turkey. Gastric cancer remains to be one of leading causes of cancer deaths despite worldwide decreasing incidence. In Turkey gastric cancer incidence is 9.6/100,000 in men and 5.7/100,000 in females (8).

Over recent decades, it has been incrementally established that many human cancers have a basis in lifestyle practices and environmental exposures, including the foods and beverages of the diet. The fact that only 5–10% of all cancer cases are due to genetic defects and that the remaining 90–95% are due to lifestyle factors, infections and environmental pollutants provides major opportunities for preventing cancer (3,9,10).

Research indicates a link between nutrition and cancer (3,5,9,10). There is evidence that the prevalence of breast, colon, pancreatic, and prostate cancer in Japanese emigrants in the United States (Hawaii or California) is dramatically increased, while that of gastric cancer is decreased when compared with Japanese in Japan. Chinese Americans have higher rates of certain types of cancer than the Chinese in Asia. These findings strongly suggest a role for nutrition intervention among immigrants to clarify risk factors for cancer development, more so because up to 70% of cancer risk is largely determined by dietary and lifestyle choices. For example, it has been demonstrated that food habits, dietary patterns, and nutrient intake play a role in the etiology of pancreatic, lung, breast, and colorectal cancers (11,16,17).

One of the healthiest diets accepted all over the world including the United States is the Mediterranean Diet which is the nutrition type of the Aegean region in our country. This diet involves cooking fresh plants, available in all seasons, in olive oil, consuming plenty of dairy products like cheese and yoghurt and the daily intake of a significant amount of fibrous foods (12). The difference between cancer incidence rates in Turkey is considered to be the nutrition habits varying from region to region (13,18) There are some studies indicating the role of regional nutrition traditions in cancer development (11,13-16).

The nurse's role in nutrition is to educate patients about good nutrition to promote health. Inadequate nutrition can lead to an increase in hospitalization and mortality. While caring for patients in hospital, community, and home settings nurses are taught to perform nutritional assessments and to collaborate with other health care team members to meet the nutritional needs of patients. In their role in health promotion and disease prevention, nurses provide lifestyle counseling to patients, including diet and physical activity. Nurses have a significant opportunity to provide members of society information on the role of nutrition in the prevention of cancer (15). However, the priority should be given to learning how much the society knows about the subject and their behavioral tendency. Nurses will need to understand people's current level of knowledge to help them develop healthy diet and positive nutritional habits. Drawing on this fact, this study aims to determine Turkish individuals' views of the relationship between nutrition and cancer as well as their nutrition behaviors in the South Western Turkey.

## Methods

### *Study design and sample*

The descriptive study was carried out in Bodrum. The town of Bodrum is situated on a peninsula in south-western Turkey in the province of Muğla. The population of the study consisted of 235 individuals was recruited from the marketplace in Bodrum. The marketplace was chosen because they are visited by individuals from every socioeconomic level. Nonprobability sampling method was used. The marketplace

was chosen because they are visited by individuals from every socioeconomic level. The inclusion criteria were being older than 18 years and having physical and mental competence to answer the questions. The exclusion criteria to the study were participant being age below 18 years.

#### *Data collection*

Data were collected using questionnaires. These forms were designed by the researchers. The final version of the questionnaires was given to three experts (two public health nurses and dietician). Its face and content validity were examined by them, and they reported back to the researchers. The questionnaires consisted of 27 questions. The demographic screening form included age, sex, education, marital status, profession and economic status (6 questions), health problems and family history of cancer (4 questions), individuals' view of nutrition-cancer relationship (5 questions), individuals' nutrition behaviors (6 questions), food consumption behaviors (4 questions), consumption frequency of basic food groups and foods increasing the risk of cancer (2 questions). The form which is designed to determine the individuals' nutrition - cancer relationship and their nutrition behaviors include 12 open-ended and closed-end questions. Before the data were collected, a pilot interview was applied to a similar sample (n=20) to verify its comprehensiveness and length. Data were collected in the marketplace by a researcher using one-to-one interviews technique.

#### *Statistical analysis*

Data analysis was performed using Statistical Package for the Social Sciences version 16.0 (SPSS Inc., Chicago, IL, USA). Descriptive statistics were used to describe the demographics. The participants' views of the relationship between nutrition and cancer were analyzed using Chi-square tests according to their sex and frequency of consuming foods increasing risk of cancer. Furthermore, their frequency of consuming foods increasing the risk of cancer was also analyzed by Chi-square tests according to their family history of cancer. A p value of <0.05 was considered statistically significant.

#### *Ethical consideration*

The research was performed according to the guidelines delineated by the Declaration of Helsinki. Verbal consent was obtained from the participants after they were informed about the purpose of the study. Participants in this study were voluntary. The authors declares that they have no competing interests.

## **Results**

#### *Participants' demographic characteristics and Cancer History in Family*

Of the participants, 42.1% were women, 79.6% were aged 18-40, and the mean age was  $35.4 \pm 11.9$  (min-max 18-85). Of the participants, 64.7% were married, 55.3% received higher education, 25.5% were high school graduates, 33.6% were civil servants, and 12.8% were housewives. Of the participants, 56.6% had normal BMI ( $X=24.28 \pm 3.40$ ) while 88.9% did not have any health problems. Of the participants, 21.7% stated that they had cancer history in their families.

#### *The Views on the relationship of between Nutrition and Cancer*

Of the participants; 75.7% thought that there was a relationship between nutrition and cancer while 38.4% thought that foods that contained hormones and chemical additives increased cancer risk, and 25.7% thought that dark green vegetables and fruits were protective against cancer. In addition, 67.7% stated that they had received information on the relationship between nutrition and cancer, and 35.9% stated that they received this information from TV programs (Table 1).

#### *Nutrition Behaviors*

As for food consumption; It was determined that 82.9% of the participants preferred raw fruit while 59% preferred fresh vegetables, and 53.2% preferred cooking in a saucepan (Table 2).

Consumption frequency of basic foods groups and foods increasing the risk of cancer; More than half of the participants stated that they rarely consumed red meat (53.1%) while they frequently consumed white meat (chicken, fish etc.) (57%), milk and dairy prod-

**Table 1.** Individuals Views of Nutrition-Cancer Relationship and Their State of Acquiring Information (n=235)

Views of Nutrition-Cancer Relationship	Number (n)	Percentage (%)
<b>Nutrition-cancer relationship</b>		
Affirmative	178	75.7
Negative	57	24.3
<b>Foods considered to increase cancer risk<sup>†</sup></b>		
Foods that contain hormones and chemical additives	96	38.4
Fast food and convenience foods	66	26.4
Foods exposed to direct flame or fried foods	44	17.6
Foods including animal fats	22	8.8
Alcoholic, carbonated and caffeinated beverages	14	5.6
All types of foods	8	3.2
<b>Foods considered to be protective against cancer<sup>‡</sup></b>		
Dark green vegetables and fruits	96	25.7
Tomatoes	70	18.8
Broccolis	63	16.8
Red and purple vegetables and fruits	60	16.0
Organic vegetables and fruits	52	13.9
Other vegetables and fruits	33	8.8
<b>State of receiving information</b>		
Yes	159	67.7
No	76	32.3
<b>Sources of information<sup>§</sup></b>		
Television programs	119	35.9
Newspaper/journal	92	27.7
Friend/neighbor	41	12.4
Doctor	35	10.5
Internet	28	8.4
Nutritionist	14	4.2
Other sources	3	0.9

<sup>†</sup>(n=250) It is thought that more than one type of food increases the risk of cancer. <sup>‡</sup> (n=374) It is thought that more than one type of food is protective against cancer. <sup>§</sup> (n=332) Information on nutrition-cancer relationship is received from more than one source.

ucts (83.8%), vegetables (93.1%), fruit (94.0%), legumes (51.0%), dried nuts (walnut, hazelnut) (54.1%), whole wheat, bran, rye, oat bread (66.8%), rice, cracked wheat, pasta (74.9%), and vegetable oils (83.4%) (Table 3).

When the consumption frequency of the individuals who negated the relationship between nutrition and cancer regarding the foods that increased the risk of cancer was examined, the percentage of participants and the types of food they frequently consumed were as follows; animal fats (56.1%) ( $p<0.05$ ), convenience/canned foods (50.9%) ( $p<0.01$ ), delicatessen foods (78.9%) ( $p<0.01$ ), snack foods (biscuits, chocolates

etc.) (77.2%) ( $p<0.01$ ), fast food (73.7%), ( $p<0.01$ ), carbonated beverages (75.4%) ( $p<0.01$ ), and caffeinated beverages (75.4%) ( $p>0.05$ ). On the other hand, 52.6 % of the participants never consumed salted/smoked foods ( $p>0.05$ ), and 47.4% never consumed alcoholic beverages ( $p<0.05$ ) (Table 4).

For the comparison among variables, the relationship between nutrition behaviors and influence of gender as well as family history was analyzed. When the consumption frequency of the participants who had family history of cancer, regarding the foods that increase the risk of cancer was examined, it was deter-

**Table 2.** Individuals' Food Consumption Behaviors (n=235)

Food Consumption Behaviors	Number (n)	Percentage (%)
<b>Consuming vegetables and fruits in season</b>		
Yes	196	83.4
No	39	16.6
<b>Fruit Consumption Preferences**</b>		
Raw	213	82.9
Fruit Juice	24	9.3
Cooked (Stewed or as dessert)	20	7.8
<b>Vegetable Consumption Preferences ***</b>		
Fresh	177	59.0
Cooking in a Saucepan	75	25.0
Dried	23	7.7
Frozen	16	5.3
Canned	8	2.6
Other Consumption Preferences	1	0.4
<b>Cooking Techniques*</b>		
Saucepan	158	53.2
Boiling	69	23.3
Deep-frying	39	13.1
Steaming	15	5.0
Roasting	11	3.7
Other	5	1.7

\*(n=297) More than one cooking methods were selected. \*\* (n=257) Fruits are consumed in more than one way. \*\*\* (n=300) Vegetables are consumed in more than one way.

**Table 3.** Individuals' Consumption Frequency of Basic Food Groups (n=235)

Food / Consumption Frequency	Frequently		Rarely		Never	
	Number	Percentage	Number	Percentage	Number	Percentage
Red Meat	99	42.2	125	53.1	11	4.7
White Meat (Chicken, Fish etc.)	134	57	98	41.7	3	1.3
Milk and Dairy Products	197	83.8	34	14.5	4	1.7
Vegetables	219	93.1	16	6.9	0	0.0
Fruits	221	94.0	14	6.0	0	0.0
Legumes	120	51.0	113	48.1	2	0.9
Dried Nuts (Walnut, Hazelnut)	127	54.1	99	42.1	9	3.8
Whole Wheat, Bran, Rye, Oat Bread	157	66.8	43	18.3	35	14.9
Rice, Cracked Wheat, Pasta	176	74.9	59	25.1	0	0.0
Vegetable Oils	96	83.4	26	11.1	13	5.5

mined that certain food groups were frequently consumed by the following percentages of participants; 45.1% frequently consumed animal fats ( $X^2=1.082$ ,  $p=0.58$ ), 54.9% delicatessen foods ( $X^2=1.342$ ,  $p=0.51$ ), 45.1% snacks (biscuits, chocolate etc.) ( $X^2=2.289$ ,

$p=0.31$ ), 41.2% fast-food ( $X^2=3.722$ ,  $p=0.155$ ), 49% carbonated beverages ( $X^2=5.28$ ,  $p=0.07$ ), and 80.4% caffeinated beverages ( $X^2=1.145$ ;  $p=0.56$ ) while 43.1% rarely consumed alcoholic beverages ( $X^2=0.241$ ,  $p=0.88$ ), and 60.8% never consumed salted/smoked

**Table 4.** Individuals' Views of Nutrition-Cancer Relationship and Their Consumption Frequency of Foods Increasing the Risk of Cancer

Consumption frequency of foods increasing cancer risk	Considering the existence of nutrition-cancer relationship				X <sup>2</sup> , p value
	Affirmative (n=178)		Negative (n=57)		
	Number	Percentage	Number	Percentage	
<b>Animal fats</b>					
Frequently	78	43.8	32	56.1	X <sup>2</sup> =6.196
Rarely	34	19.1	14	24.6	p=0.04**
Never	66	37.1	11	19.3	
<b>Salted/smoked foods</b>					
Frequently	30	16.9	17	29.8	X <sup>2</sup> =4.64
Rarely	41	23.0	10	17.5	p=0.09
Never	107	60.1	30	52.6	
<b>Convenience/canned foods</b>					
Frequently	27	15.2	29	50.9	X <sup>2</sup> =30.672
Rarely	70	39.3	11	19.3	p=0.001*
Never	81	45.5	17	29.8	
<b>Delicatessen foods</b>					
Frequently	99	55.6	45	78.9	X <sup>2</sup> =10.199
Rarely	60	33.7	8	14.0	p=0.001*
Never	19	10.7	4	7.0	
<b>Snacks food (biscuits, chocolates etc.)</b>					
Frequently	83	46.6	44	77.2	X <sup>2</sup> =16.469
Rarely	73	41.0	11	19.3	p=0.001*
Never	22	12.4	2	3.5	
<b>Fast-food</b>					
Frequently	63	35.4	42	73.7	X <sup>2</sup> =25.748
Rarely	69	38.8	10	17.5	p=0.001*
Never	46	25.8	5	8.8	
<b>Carbonated beverages</b>					
Frequently	98	55.1	43	75.4	X <sup>2</sup> =8.433
Rarely	63	35.4	9	15.8	P=0.01*
Never	17	9.6	5	8.8	
<b>Alcoholic beverages</b>					
Frequently	31	17.4	15	26.3	X <sup>2</sup> =6.475
Rarely	80	44.9	15	26.3	P=0.03**
Never	67	37.6	27	47.4	
<b>Caffeinated beverages</b>					
Frequently	136	76.4	43	75.4	X <sup>2</sup> =5.014
Rarely	29	16.3	5	8.8	P=0.08
Never	13	7.3	9	15.8	
<b>TOTAL</b>	<b>178</b>	<b>100.0</b>	<b>57</b>	<b>100.0</b>	

\*p&lt;0.01, \*\*p&lt;0.05



foods ( $X^2=1.561$ ,  $p=0.45$ ) and 41.2% never consumed convenience/canned foods ( $X^2=0.104$ ,  $p=0.94$ ). The rate of women who affirmed the relationship between nutrition and cancer (72.7%) was found to be similar to the men who were of the same opinion (77.9%). It was determined that the individuals' views of the nutrition-cancer relationship did not vary according to sex ( $X^2=0.848$ ;  $p=0.36$ ).

## Discussion

This study was designed to provide basic data regarding Turkish individuals' views of the relationship between nutrition and cancer, and their nutrition behaviors in the South Western Turkey.

### *The Views on the relationship of between Nutrition and Cancer*

The epidemiological studies conducted so far have linked 35% of all cancer types with factors related with food and nutrition (3,13,14,19-21). The World Health Organization has determined that dietary factors account for at least 30 percent of all cancers in Western countries and up to 20 percent in developing countries (5). In this study, many participants thought that there was a relationship between nutrition and cancer. In the study of Zaharek-Girgasky and et al. (2015) that most people may already have diet-related colorectal cancer prevention beliefs and having them is associated with a more healthful dietary intake. It was determined that more than half of the participants had been informed about nutrition-cancer relationship, and almost half of them had received this information from TV programs in our study. As it is seen, the rate of the participants who follow the news about nutrition is high.

In the literature, it is known that foods that contain additives, hormones and chemicals (22) fast food and convenience foods which are traditional (pita, meatball, kebab, etc.) or of western origin (pizza, hamburger, etc.) are potentially carcinogenic (13,19-20). Previous studies claim that frequent consumption of foods that are fried, smoked and exposed to direct flame cause stomach, esophageal and digestive system cancers while diets rich in animal fats cause breast cancer (23). There are also studies that demonstrate

the relationship between alcohol and excessive coffee consumption (15,16). In our study, the participants affirmed that foods containing hormones and chemical additives; fast food and convenience foods; foods exposed to direct flame or fried; foods containing animal fats, and alcoholic, carbonated and caffeinated beverages increased cancer risk in parallel with the literature.

It was seen that participants thought vegetables and fruits, especially tomatoes and broccolis were protective against cancer. Epidemiological studies demonstrated that consuming plenty of raw vegetables and fruits such as broccolis, tomatoes decrease the risk of skin, esophageal, oral cavity, thyroid, lung, stomach, bladder, colon and rectal cancer (21, 24-27). In a study conducted by Erman and Özçelik (2007) in Turkey, it was determined that 89.7% of the participants considered broccolis and 91.0% considered tomatoes to decrease the risk of cancer. In the Hawrysz1 et al.(2016) (20) study has shown that a lower level of nutritional knowledge was associated with a lower overall diet quality and more frequent consumption of non-healthy foods such as: alcoholic beverages, sweetened carbonated drinks, canned: meat, fish or vegetables-meat, instant or ready-to-eat concentrated soups, fast food and energy drinks. The finding of our study which indicates that participants are informed about foods that are either cancer-causing or cancer prevention is positive and promising in terms of demonstrating dietary behaviors for cancer prevention.

### *Nutrition Behaviors*

It is reported that 18- 40% of the men and 15-30% of the women in Turkish society, in which fruit and vegetable consumption is low, carry the risk of cancer (27). In our study, it was determined that the majority of the participants preferred consuming fruits and vegetables in season (83.4%), raw fruits (82.9%) and fresh vegetables (59%). Muğla is a province which is noteworthy for its variety of agricultural products and where agriculture of citrus fruits (orange, lemon, grapefruit) and olive production are widespread and developed (28). This can explain why the percentage of consumption of vegetables and fruits is so high in this region.

Cooking or food preservation methods can lead to the formation of substances hazardous to health (10,17). For instance, it was seen that deep-frying

causes the formation of carcinogenic substances (29). In their study which investigated the food consumption frequency of individuals in Argentina and the role of the methods of cooking meat in the risk of colorectal cancer, Navarro et al. (2004) (30) determined that barbecued and fried meats significantly increased the risk of colorectal cancer while boiled meat did not. In terms of food-cancer relationship, in addition to the cooking methods and preservative additives, certain social and personal cooking habits are also influential (29). It is known that cooking in a saucepan is generally preferred in Turkish society while methods such as barbecuing or steaming are preferred less when compared to other societies. Similarly, in our study, it was determined that more than half of the participants (53.2%) preferred the saucepan method.

In countries where red meat is frequently consumed and in high amounts, indicating a diet rich in animal proteins, breast, uterine, prostate, colorectal, pancreas and kidney cancers are more common. The studies conducted in various societies demonstrated that dairy products such as milk, yoghurt, cheese and skim-milk cheese are protective against cancer. Dietary fibers taken from fruits and vegetables, cereals (pasta, rice, cracked wheat), legumes and dried nuts decrease the concentration of carcinogens and in this way, significantly reduce the risk of cancer (24,27,30). In our study, it was determined that more than half of the participants rarely consumed red meat while they frequently consumed white meat (chicken, fish etc.), milk and dairy products, vegetables, fruits, legumes, dried nuts (walnut, hazelnut), whole wheat, bran, rye, oat bread, rice, cracked wheat, pasta and vegetable oils. Cultural diversity of populations, ethnic origin, religious beliefs, economic developments and other factors can affect the nutrition status. There are 20 countries in the Mediterranean region and dietary models have many common characteristics in this region. Cereals, olives, grapes, bread, pasta, olive oil, wine, vegetables, fruit, fish, meat (small amount), yogurt, cheese, legumes and oil germs are main components of the Mediterranean diet model (31). Gallus et al. (2004) (17) found that the Mediterranean diet reduced the risk of cancer incidence.

Our study shows that the participants follow a diet rich in food protective against cancer. The reason for this finding could be related with the fact that

Muğla is located in the Mediterranean coast where people mainly follow the Mediterranean diet.

Within the process of smoking and salting, which are among the oldest methods of preserving foods like meat and fish, more than 300 carcinogenic compounds are produced. Epidemiological studies demonstrate that frequent consumption of smoked foods cause a significant increase in stomach and esophageal cancers (1,29). In their study which investigated 928 individuals with colon cancer, 622 individuals with rectal cancer and 46.886 healthy individuals, Yang et al. (2003) (32) determined that consumption of salted/smoked fish increased cancer risk. As for our study, in terms of the affirmation of the nutrition-cancer relationship, it is seen that more than half of the participants in both groups never consume salted/smoked foods. This finding could be related with the fact that smoking and salting are not preferred cooking methods in our country.

Animal fats such as butter and tallow, delicatessen foods such as salami and sausages convenience/canned foods, snacks (biscuits, chocolates etc.) and carbonated beverages are among foods that increase cancer risk (10, 22). When the life style and social structure of the Turkish society is analyzed, it is seen that fast food has been a part of the diet system for centuries (Turkish bagels sold on trays, pastries in various shapes, tea breads, street vendors selling portions of pastries, chickpeas and rice, sandwiches with liver, fish). Similar to the fast food chains today, pita houses, kebab houses were followed by pizza and hamburger restaurants of western origin (18). In our study, it is seen that the participants who negate the nutrition-cancer relationship frequently consumed these foods which are known to be cancer-causing is an expected result.

Consumption of alcoholic beverages increases the risk of cancer of the oral cavity and pharynx, oesophagus, colorectum, liver, larynx and female breast. Some other cancers, such as pancreas and prostate cancer and melanoma, appear to be associated with consumption of alcohol, but more studies are needed to draw any final conclusion (33). In the research conducted by Eрман and Özçelik (2007) (1) the rate of those who claim that alcohol consumption should be reduced to prevent cancer was 83.7% while our study demonstrated that most of participants who affirmed the nutrition-cancer relationship rarely/never consumed alcohol. In Turk-



ish society, coffee and tea culture are quite rooted. After dining at home or at a restaurant, serving Turkish coffee is an old tradition which had long become a habit. In this case, the frequent coffee consumption of the participants in our study who either affirmed or negated the nutrition-cancer relationship is an expected result. In the literature a moderate consumption of coffee of 3-5 cups per day does not appear to be associated with an increased risk of developing cancer or an increased risk of dying from cancer (5).

According to the frequency of the consumption of foods increasing the risk of cancer, no significant difference was determined between the participants who had family history of cancer and those who did not. This indicates that even the participants who do not have family history of cancer have grasped the significance of the necessity of healthy behaviors.

There are studies which demonstrate that women are more sensitive about nutrition since they are more informed about nutrition-cancer relationship and they pay more attention to body image than men do (21, 34-35). However, a difference between the views of nutrition-cancer relationship according to sex was not detected.

#### *Limitations*

The limitations of the study include the non-probability sampling method and, which limits the generalizability of the study findings. The research was conducted in the one city of Turkey only. Another limitation is that all the data were based on self-report and the findings of this study might have been influenced by a self-report bias.

#### **Conclusions**

The results from this study provided exploratory data on the view of the nutrition – cancer relationship and nutrition behaviors in Turkish consumer who live in the South Western Turkey. The findings of this study indicated that the majority of the participants in this study affirmed the nutrition-cancer relationship while more than half of them received information about this relationship, and followed a diet rich in foods protective against the risk of cancer.

Furthermore, it was determined that the participants who negated the nutrition-cancer relationship frequently consumed cancer-causing foods. As expected, it is noted that individuals are more likely to consume fast food, delicatessen and carbonated beverages. As conclusion, nurses who worked different area (school, hospital, nursing home etc.) are seen as experts in disease prevention and management, and therefore must take advantage of teachable moments to educate individuals, families and community on diet and cancer prevention, encourage adherence to current nutritional guidelines, promote lifestyle modification interventions and provide information on existing resources about this subject.

#### **Author contributions**

SD, SCY and HK were responsible for the study conception and design and SCY and SD were responsible for the drafting of the manuscript. HK performed the data collection and SD and HK performed the data analysis. SD and SCY made the critical revisions to the paper.

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