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Survey of food habits associated with cancer prevention among citizens of Tehran: A cross-sectional study

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ABSTRACT

Background: : Cancer is one of the three health issues of the society and the third cause of mortality in Iran. Food habits play a significant role in preventing cancer. The present study therefore, was carried out to assess food habits of Tehran citizens for cancer prevention.

Methods: This study is a cross- sectional study was conducted with a sample of 2500 Tehran citizens who were recruited through systematic cluster random sampling. Data were collected using questionnaires including demographic factors and food habits. Validity and reliability of tool was gained through content validity and AlfaCronbach test. Data was collected in one time occasion and in person. All statistics were computed by the SPSS software using descriptive and inferential tests.

Results: The showed demonstrated that the 38.2% of Tehran citizens had their BMI at the level of being overweight and upper. The food habits for cancer prevention were relatively appropriate for most of them (61.3%), but no one was at the desired level.

Conclusion: Concerning the study results that no one had proper food habits for cancer prevention, public education and increasing awareness of people in this regards by ministry of health, cancer institutes, mass media, educational system, ministry of labour and social affairs is strongly recommended.

Keywords: ***Food habits, Cancer prevention, Iran.***

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Introduction

With its increasing global incidence,[1] cancer is predicted to affect 15 million of the 7.5 billion world population in 2020, of whom 12 million will die due to the disease.[2] Cancer is the third leading cause of death in Iran and claims 300,000 lives in the country each year. Considering the raised life expectancy and increasing percentage of the elderly in the country, the incidence of cancer is envisaged to double in the next two decades.[3]

About 150 cancer types and at least 500 distinct cancer causes have been identified in humans. However, researchers believe cancer to be the result of interactions between several factors.[1] Despite the role of genetics as a proven risk factor for cancer, studies have suggested nutrition as a major environmental factor associated with it [4] and have highlighted the role of nutrition in progression and prevention of cancer.[5] While nutrition is responsible for 30%-40% of all cancers [6, 7] (30% of those in developed countries and 20% of those in developing countries[1]), it is also regarded as a main factor in cancer prevention.[8] rospective studies on cancer in 10 European countries have indicated that increased consumption of fruits, vegetables, and fiber along with reduced intake of processed meat products can diminish the incidence of cancer by up to 50%.[9] Besides, 90% of colorectal cancers can be prevented through changes in diet.[5]

Many nutritional factors such as food type and preparation method, balanced calorie intake, meal size, and dietary patterns (e.g. high intake of fruits, vegetables, grains, and cereals as well as limited intake of meat, dairy, and other high-fat foods) can decrease cancer risk.[10] Moreover, ingredients like fat, alcohol, and pure salt, foods containing nitrites and nitrates, and high-calorie foods are considered carcinogenic. In contrast, high-fiber foods, fresh vegetables, and carotenoids like tomatoes, vitamins E and C, and selenium are known to lower cancer risk.[1]

Relationships of cancers, particularly breast and gastrointestinal cancers, with obesity and inappropriate dietary patterns have been well established.[11] In fact, people who weigh 40% more than normal weight are at risk of colon, breast, prostate, gallbladder, ovarian, and uterine cancers.[12]

Due to the links between health and dietary habits, improvement of these habits is indispensable to health management and promotion.[13] Many developed and developing countries are currently applying lifestyle modification strategies to prevent multiple conditions including cardiovascular diseases and cancers.[1] Health promotion and disease prevention are closely associated with lifestyle and food habits.[14] On the other hand, since hospital care is now mainly focusing on prevention and community-based care,[9] nurses, whose profession aims to help people achieve optimal health, are burdened with more responsibilities.[15]

Any kind of health and educational planning, particularly those dealing with prevention of chronic diseases like cancer, requires the recognition of various aspects of people's lifestyles and their food habits. After comprehensive research, we failed to find any studies on dietary habits to prevent cancer in Iran. Insufficient data in this field impelled us to perform a cross-sectional study to evaluate the dietary habits of Tehran (Iran) residents. We hope that our findings can provide the public, the Iranian Ministry of Health and Medical Education, cancer NGOs, and the media with necessary information and guidelines to alter dietary patterns.

Materials and methods

The statistical population in this cross-sectional study comprised permanent residents of Tehran. The inclusion criteria were over 18 years of age, not having cancer at the time of the study based on self-report, being Iranian, and willingness to participate. Based on previous studies, [16, 17] the following formula [with 95% confidence interval (CI) and error of 25%] was used and sample size was estimated at 1239.14, i.e. 1240 people. As we applied stratified cluster sampling, coefficient of variation of cluster size was computed and a sample size of 2480 (= 1240 × 2) was obtained which was finally rounded up to 2500.

$$n = \frac{(Z_{1-\frac{\alpha}{2}})^2 P(1-P)}{d^2} = \frac{(1/96)^2 (0/28)(0/72)}{(0/025)^2} = 1239/14$$

P = 0.28 fruit intake in healthy people

Z = 1.96

In order to ensure the appropriate distribution of the

subjects in the 22 districts of Tehran, 83 clusters were formed according to the map of the city. Overall, 17 clusters from north (northwest to northeast), west (northwest to southwest), south (southwest to southeast), and east (northeast to southeast) and 16 clusters from the center were formed. Each cluster comprised 10 households with an average of three members (a total of 30 individuals).

Based on a study by the Health Deputy of Shahid Beheshti University of Medical Sciences (Tehran, Iran) on health status of primary school students in Tehran, the number of cluster heads was determined as 230 (given the sample size). Since 83 clusters were randomly selected, 230 was divided by 83 and the interval between clusters was calculated as three. Therefore, a number between one and three was randomly selected and other clusters were extracted accordingly from the list of existing clusters heads.

Afterward, eight interviewers visited the selected individuals at their addresses. The other nine houses in each cluster were those adjacent to the first one. In case of absence or unwillingness of the residents, the next house was visited (or the next apartment in a complex). This procedure was repeated until the specified number in each cluster was reached. The absence of a family member compelled the interviewer to return and collect data the next day. Hence, the visits were arranged during the afternoon hours when all family members are usually home (except those on a trip).

The study protocol was approved by the ethics committee of Tehran University of Medical Sciences (Tehran, Iran). To comply with ethical requirements, the interviewers carried valid, photo ID cards on their visits and filled out the questionnaires anonymously after introducing themselves, explaining the objectives of the study, and obtaining informed consent. The subjects had the right to withdraw at any time, i.e. they could refuse to return the questionnaires even after completing them.

Nearly 100 individuals were excluded due to unwillingness to participate, not returning the questionnaires, or not answering all questions. While the highest response rate was seen in Pasteur area, the greatest level of non-cooperation was reported from Daroos, Gisha, and Khak-Sefid districts.

Data were collected once, in-person, and over a six-month period (spring and summer 2006). The designed questionnaire consisted of two parts to assess demographic details (15 items) and food habits to prevent cancer (52 items). The validity of the questionnaire was confirmed using content validity. In order to examine reliability, 100 questionnaires were distributed among seven households (approximately 20 people) from each of the five mentioned areas (north, south, east, west, and center) and Cronbach's alpha was computed as 85%.

The collected data were analyzed with descriptive and inferential statistics in SPSS for Windows 11.5 (SPSS Inc., Chicago, IL, USA). Desirable, fairly desirable, and undesirable levels were defined as 80%-100%, 60%-80%, and less than 60%, respectively. Moreover, subjects with body mass indexes (BMI) less than 20, 20-25, and 25-30, 30-40, and above 40 kg/m2 were considered underweight, normal-weight, overweight, obese and very obese, respectively. [18]

Results

The mean age of the participants was 35.0 ± 38.4 years. The majority of the subjects were 25-45 years old (43.9%), female (52.9%), married (58.9%), Farsi speakers (72.8%), and self-employed (66.7%). About half of the respondents (50.5%) had high school education and only 2.1% were illiterate. Besides, 27.2% of the studied individuals worked downtown. Roughly equal percentage of participants in northern, southern, eastern, western, and central areas of Tehran confirmed the accuracy of stratified sampling and uniform distribution of the respondents in the five selected areas. While 43.7% of the participating citizens had lost a relative due to cancer, 82.3% had no family history of cancer.

Evaluation of dietary habits preventing cancer revealed that most subjects had fairly desirable habits regarding the consumption of proteins, e.g. red meat, chicken, fish, and sheep liver, head, and hooves, (55.30%; 95% CI: 53.3-57.3), dairy, e.g. milk, yoghurt, cheese, butter, and Kashk (drained sour milk) (64.00%; 95% CI: 62.11-65.88), and starch, e.g. rice, potato, pasta, and various types of bread (82.17%; 95% CI: 80.6-83.6). Meanwhile, the majority of participants had fairly desirable or undesirable habits about eating pulses, e.g. peas, lentils, mung beans, and beans (67.10%; 95% CI: 68.94-65.26), canned foods, e.g. canned fish, beans, various sauces and dress-

ings, pickles, and peas (63.70%; 95% CI: 61.11-65.58), and oils, e.g. saturated and unsaturated vegetable and animal oils (97.7%; 95% CI: 97.11-98.29).

Furthermore, a good number of respondents had undesirable habits about the intake of pickles (74%; 95% CI: 72.28-75.72), dry nuts, e.g. pistachio, hazel nut, and almonds (69.7%; 95% CI: 67.89-71.50), drinks, e.g. tea and coffee (94.2%; 95% CI: 93.28-95.12), fruits (67.7%; 95% CI: 65.86-69.53), and vegetables (90.64%; 95% CI: 89.24-91.52) (**Table 1**). Generally, most of the studied residents of Tehran had fairly desirable dietary habits to prevent cancer (61.3%; 95% CI: 59.39-63.21). However, none of the subjects had completely desirable habits (**Table 2**).

On the other hand, knowing that BMI can reflect people's nutritional habits to some extent, we found more than one-third of the participants (38.2%) to have BMI levels equal to or above 25 kg/m2 (**Table 3**). Chi-square test showed a significant relationship between BMI and food habits associated with cancer prevention ($P < 0.001$) (**Table 4**). It also suggested significant relationships between food habits to prevent cancer and demographic characteristics such as aging 45 years and older, male gender, being married, being self-employed or in medical profession, education level of above high school diploma, death of a relative due to cancer (survival), and affliction of a relative with cancer (non-affliction).

Table 1. Frequency distribution of desirable dietary habits to prevent cancer among Tehran residents

Food habits	Dietary habits to prevent cancer							
	Desirable		Fairly desirable		Undesirable		Total	
	n	%	n	%	n	%	n	%
Protein	998	39.9	1383	55.3	119	4.8	2500	100
Dairy	593	23.7	1599	64	380	3.12	2500	100
Starch	5	0.2	2052	82.1	443	17.7	2500	100
Pulses	823	32.9	509	20.4	1168	46.7	2500	100
Canned foods and additives	908	36.3	1047	41.9	545	21.8	2500	100
Oils	56	2.2	566	22.6	1878	75.1	2500	100
Pickles	456	18.2	195	7.8	1849	74	2500	100
Dry nuts	461	18.4	296	11.8	1743	69.7	2500	100
Sweets and junk food	841	33.6	361	14.4	1298	51.9	2500	100
Fried foods	191	7.6	703	28.1	1606	64.2	2500	100
Food preservation	306	12.2	1405	56.2	789	31.6	2500	100
Drinks	19	0.8	125	5	2356	94.2	2500	100
Fruits	635	25.4	173	6.9	1692	67.7	2500	100
Vegetables	114	4.6	126	5	2260	90.4	2500	100

Table 2. Frequency distribution of Tehran residents based on their dietary habits to prevent cancer

Score of cancer prevention food habits	n	%
Desirable (80%-100%)	0	0
Fairly desirable (60%-80%)	1533	61.3
Undesirable (less than 60%)	967	38.7
Total	**2500**	**100**

Table 3. Frequency distribution of the participants' body mass index

Body mass index (kg/m2)	n	%
Underweight (< 20)	259	10.9
Normal-weight (20-25)	1212	50.9
Overweight (25-30)	707	29.7
Obese (30-40)	194	8.2
Very obese (> 40)	8	0.3
Missing value	120	---
Total	**2500**	**100**

Table 4. Absolute and relative frequency distribution of Tehran residents according to their body mass index and dietary habits to prevent cancer

Food habits	Body mass index											
	Underweight		Normal		Overweight		Obese		Very obese		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
Undesirable	130	14.2	484	53	237	26.0	58	6.4	4	0.4	913	100
Fairly desirable	129	8.8	728	49.6	470	32.0	136	9.3	4	0.3	1467	100
Total	259	10.9	1212	50.9	707	29.7	194	8.2	8	0.3	2380	100

Discussion

According to our findings, none of the studied Tehran residents had desirable dietary habits. In other words, most subjects had fairly desirable habits regarding proteins, dairy, and starch consumption, fairly desirable to undesirable habits about pulses, canned foods containing additives, and oils intake, and undesirable habits about pickles, dry nuts, drinks (tea, green tea, coffee, and packaged juices), fruits, and vegetables. These findings, especially the undesirable habits of fruits, vegetables, and cereals consumption are similar to those obtained by Cunningham et al. (1996). They studied a group of Native American students in the southwest of the country and found most participants to eat fruits and vegetables once a week or less (64.3% and 80.7%, respectively). Moreover, 50.0% and 40.5% of the students consumed cereals and pulses less than once a week, respectively. Pizza, hamburger, and taco (high-fat, low-fiber, salty foods) were the students' favorite foods nearly always (29.1%), occasionally (54.3%), and (16.6%). The researchers thus concluded that educational interventions involving families were essential.[19] Likewise, Champaux et al. (2006) showed that parents did not include the recommended amount of whole grains in the children's diet. Data from the U.S. Agriculture Department revealed that Americans consumed whole grains almost once a day, i.e. one-third of the recommended amount.[20] In the present study, Tehran residents had undesirable dietary habits regarding grains. This is particularly important when considering the critical role of grains in cancer prevention.

Several hypotheses have been proposed by previous research on the impact of diet on cancer risk in different societies. Western countries witnessed the highest levels of colorectal, breast, and prostate cancers due to diets rich in animal fat and sugar in the 1970s. Meanwhile, lower rates of cancer were reported from developing countries where starch-based diets and lower intake of animal products, fat, and sugar were present. However, change of lifestyle following the increased immigration to developed countries altered this trend. For instance, low rates of colorectal cancer among Japanese people rose dramatically after the immigration of citizens to the U.S. and adopting western lifestyle.[21]

In a study in Korea, Oh et al. (2005) detected significant relationships between intake of vitamins A and C and beta-carotene and reduced risk of colorectal cancer. They also underscored the effects of calcium and fiber in preventing colorectal cancer and reported high consumption of cakes, rice, and fish to increase the risk of colorectal cancer. Finally, they observed an inverse relationship between consuming milk, fruits, vegetables, and kimchi (a kind of Korean pickle) and colorectal cancer risk. [22] Kadkhodaee [2002] evaluated predisposing factors in esophageal cancer in Lorestan Province (Iran) and stated 12.5% of the case group and 3.5% of the control group to receive fresh vegetables and pulses every day. Moreover, daily intake of fruits was seen in 14.3% of the cases and 27.7% of the controls.[17] Stein and Colditz identified factors such as dietary habits, smoking, physical activity, obesity, and alcohol consumption as modifiable aspects of lifestyle whose modification can play an important role in cancer prevention.[23] A meta-analysis on 13 prospective studies indicated that daily consumption of 100 grams red meat and 25 grams processed meat increased colorectal cancer risk by 12%-17% and 49%, respectively. [24]

Based on available evidence, cancer-related deaths can be reduced by 35% through adopting a proper diet.[25]

Therefore, practical measures, such as adding vitamins and minerals to meals, are required to correct the existing dietary patterns and eventually prevent the incidence of cancer. The Cancer Prevention and Education Society has recommended eating various foods, emphasis on consumption of cereals, breads, pulses, fruits, vegetables, and low-calorie foods, and restricted intake of salt, alcohol, and caffeine as appropriate methods to improve nutritional conditions and prevent cancer.[1] Hence, health policymakers are obliged to design and implement accurate plans to change the dietary habits of families.

As we found a significant relationship between education level and desirable dietary habits, enhancing public awareness and knowledge is another effective approach to promote healthier diets. In addition, while 62% of the participants without a family history of cancer had fairly desirable dietary habits, 48.8% of those with a family history of cancer had undesirable dietary habits. Since positive family history has been proven to increase cancer risk, educating the public, particularly the relatives of cancer patients, about suitable dietary pattern needs to receive utmost attention from relevant authorities and the media (especially radio and television) who can have crucial effects on knowledge improvement and reinforcement of positive health behaviors and correct dietary habits.

Conclusion

Although 61.3% of the studied Tehran residents had fairly desirable dietary habits, none had completely desirable habits to prevent cancer. Therefore, taking serious measures, including comprehensive education to modify the dietary behaviors of citizens, are essential. Public knowledge regarding correct dietary patterns should hence be promoted by providing educational material through mass media and educational booklets and pamphlets. The authorities are also expected to pay extreme attention to cancer prevention educational programs. Community health nurses are another group with a major role in educating people. In conclusion, cancer prevention requires cooperation between the authorities, public organizations, non-governmental organizations, and medical staff.

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