

Evaluation of the Knowledge Levels of 50-Year-Old and Older Individuals Regarding Colorectal Cancer

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Abstract Our aim was to determine some risk factors for colorectal cancer and evaluate the knowledge levels about it among individuals aged 50 and over. A cross-sectional study was conducted among 1161 patients aged 50 and over in 2014. The data were collected by a questionnaire form consisting of 46 questions. The chi square test and the logistic regression analysis were performed in the data analysis. The mean age of the participants was 57.9 ± 5.6 , 60; 4 % were women, and 77.7 % were married. It was determined that 23.0 % of the elderly people were smokers, and 46.5 % did not do regular physical exercises. It was detected that 29.8 % had fatigue, 27.5 % had abdominal pain, 14.9 % had melena, and 10.3 % had constipation or diarrhea in the last 3 months. The mean colorectal cancer knowledge score was 6.84 ± 2.46 . It was determined that the socio-demographic variables and the risk factors that were based on self-report of the elderly influenced the knowledge scores on colorectal cancer and its early diagnosis ($p < 0.05$). Consequently, it has been determined that the elderly people have the risk factors of colorectal cancer; however, they do not have adequate knowledge about this disease.

Keywords Colorectal cancer screening · The elderly · Knowledge level · Risks

Introduction

Cancer is an important problem of public health because of the fact that it is very common and has a high rate of mortality [1].

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According to the World Health Organization (WHO) and the International Agency of Cancer Research, nearly 12 million people were diagnosed with cancer in 2008 in the global scale, and it has been anticipated that this figure will exceed 26 million in 2030 (<http://www.saglik.gov.tr/TR/belge/1-15486/dunya-ve-turkiyedekanser.html>).

The most common malignancy of the gastrointestinal tract is colon cancer. Nearly one million new cases of colon cancer is detected annually, and about 500,000 people die of this disease [2]. Prevalence of colorectal cancer (CRC) is around 20 per 100,000 people in the world whereas it is 37 per 100,000 people in Europe in average, and 17 per 100,000 people in Turkey [3]. Based on the 2007–2008 statistics of our country, colorectal cancer ranks fourth among the most common cancer types in men with a rate of 7.5 % and ranks third in women with a rate of 7.8 % [2]. While colon cancer is rare before 40 years of age, its incidence increases after the age of 40–50. People over 50 years of age make 90 % of all the cancer cases. The most common symptoms include presence of blood in the fecal specimen and changes in the defecation habits [4].

Manifestations of colorectal cancer are usually detected in late stages. Colorectal cancer is common and diagnosable, and its chance of being treated successfully increases if it is diagnosed earlier. Because of this, colorectal cancer is an important problem of public health and is one of the diseases that are most appropriate for investigation [5].

For cancer, in addition to early diagnosis and screening, it is also important to increase the awareness in the community on the risk factors and the signs of cancer and to create behavioral changes in this direction [6]. It is possible to increase the awareness for CRC, and the behavioral changes can be created toward primary prevention in the community by means of education on the causes, signs, screening, prevention, and early diagnosis of colon cancer by those seeking to improve the public health. It may be ensured that individuals with clinical

signs and symptoms and those in the high-risk group without any sign of colorectal cancer apply to the clinics at early stages of their disease [7]. Thus, the International Cancer Research Institute of the WHO emphasized the necessity of men and women above 50 years of age to join colorectal screening [3].

In Turkey, Centers for Early Diagnosis, Screening, and Education for Cancer (KETEM) were founded upon the recommendation of the WHO in order to conduct community-based screening programs for cancers for which screening should be performed [3]. The community-based CRC screening was launched in 2014 in Turkey. Men and women between 50 and 70 undergo the test for occult blood in the fecal specimen once in every 2 years and colonoscopy once in 10 years. Screening is stopped for those if the last two occult blood test results are negative [1].

Colorectal cancer is a preventable disease with healthy lifestyle behaviors. Thus, it is also of great importance to evaluate the risk factors for which measures must be taken, like smoking, alcohol use, obesity, low-level physical activity, nutritional habits, and genetic factors [8].

In the light of this information, the present study was carried out to detect the knowledge levels of people at the age of 50 and over. The participants were invited to KETEM for the purpose of community-based CRC screening in the context of Cancer Control Program in our city and to investigate the risk factors that might be associated with this cancer type, as well as to evaluate the compliance to the test for occult blood in the fecal specimen.

Methods

The present study was conducted in 2014 in 7 Family Health Centers (FHCs) determined through random sampling from 22 FHCs in Karsiyaka district of the city of Izmir. The Study Group consisted of 14,637 individuals above 50 years of age. The size of the sample was calculated as 1200 people with 50 % prevalence and 3 % deviation within 97 % confidence interval (CI). The contact information of the people in the age group that was appropriate for the CRC screening (50–70 years of age) registered in 7 FHCs was obtained, and a list was made based on this information. The individuals selected by systematic sampling method from this list were reached by telephone. After giving pre-information for the CRC screening by phone, these individuals were invited to the KETEM. These individuals were informed on the test for occult blood in the fecal specimen used in the CRC screening and on how to use the test kits. After taking written consents of the individuals, the test kits used for screening were given to them. The study was approved by Izmir Public Health Directorate, Research Ethics Committee. At the same time, a structured questionnaire on the subject prepared by the investigator was completed through face-to-face interviewing. The

structured questionnaire used in the present study consisted of 13 items on socio-demographical characteristics, lifestyle, and history of the disease, 14 items on nutritional habits, 9 items on history of symptoms of the colorectal diseases, and 10 items on the knowledge level on the risks and early diagnosis of colorectal cancer. Correct answers (one point) were summed in each item on the knowledge level for colorectal cancer, and the knowledge level was categorized by taking the intersection points (seven points) as the median value from the total points. Appropriate answers (one point) were summed in each item on the nutritional habits, and the level of healthy nutrition was categorized by taking the intersection points (eight points) as the median value from the total points. The positive answers (one point) to each sign of early diagnosis related to the symptom history of the colorectal diseases were summed, and the symptom level for the colorectal diseases was categorized by taking the intersection points (four points) as the median value from the total points.

Dependent variables of the present study were the knowledge level on colon cancer and the positivity of the test for occult blood in the fecal specimen. The independent variables included the socio-demographical characteristics, lifestyle, history of the disease, nutritional habits, and the symptom history of the colorectal diseases.

Of the participants, 96.7 % ($n=1161$) returned the occult blood test kits to KETEM as they were instructed. A total of 1161 test results were evaluated for the presence of occult blood in the fecal specimen, and their questionnaires were included in the study. The data entry and the analyses were performed by using the SPSS v.13.0 Software. The chi-square test and the logistic regression analysis were used to evaluate the data. The individuals found to be under the risk for colorectal cancer (those with positive occult blood test results) were referred to a hospital for further investigations.

Results

The mean age of the participants in the present study who were 50 years old or older was 57.9 ± 5.6 years; 60.4 % of them were female, and 77.7 % of them were married. The socio-demographic characteristics of the participants are given in Table 1.

The lifestyle behaviors of the participants who were 50 years old or older including their risk factors for colorectal cancer are given in Table 2. Of the participants, 45.1 % ($n=470$) were non-smokers, and 23.0 % of them were current smokers. Of the participants, 46.5 % ($n=491$) were regularly exercising, and 16.7 % of them reported that they were not used to consume fruits and vegetables. Of them, 12.9 % were not consuming whole-wheat bread at all, and 24.3 % of them were not consuming legumes. Of the participants, 14.5 % had a personal history, 12.0 % had a family history of the

Table 1 Socio-demographic characteristics of the participants

Socio-demographic characteristics	Number	Percentage
Age		
50–54 years	397	34.2
55–59 years	294	25.3
60–64 years	278	23.9
65–70 years	192	16.5
Total	1161	100.0
<i>Mean ± SD 57.9 ± 5.6, (min-max value 50–70)</i>		
Sex		
Female	701	60.4
Male	460	39.6
Total	1161	100.0
Marital status		
Single	157	13.8
Married	884	77.7
Divorced	10	0.9
Widow	86	7.6
Total	1137	100.0
Educational level		
Illiterate-literate	38	3.3
Primary/secondary school	472	41.2
High school-college-university	637	55.5
Total	1147	100.0
Social security		
Government retirement found	504	44.5
Social security institute	481	42.5
Social security organization for artisans and the self-employed	100	8.8
Green card	4	0.4
Private insurance	9	0.8
None	34	3.0
Total	1132	100.0
History of chronic disease		
Yes	793	71.6
No	314	28.4
Total	1107	100.0
Continuous use of medication		
Yes	787	71.5
No	314	28.5
Total	1101	100.0

colorectal disease, and 9.2 % had a family history of colon cancer. Of the individuals, 29.8 % were 50 years old or older who had experienced fatigue, 8.1 % had weight loss, 27.5 % had abdominal pain, 14.9 % had malodorous and dark-colored fecal specimen (melena), and 10.3 % had constipation or diarrhea in the past 3 months.

The knowledge level of the participants on the risk factors and early diagnosis of colorectal cancer is given in Table 3.

The phrases most frequently answered correctly included the following: *Examinations should be performed for colorectal cancer after the age of 50* (88.5 %), *Early diagnosis facilitates the treatment of the colorectal cancer* (83.6 %), *Almost all of the colon cancers may be early detected or prevented through regularly performed examinations* (81.4 %), and *One of the examinations to be performed regularly in diagnosis of the colon cancer is the fecal examination* (80.4 %). The participants knew that the risk for colon cancer increased after the age of 50 by 50.8 %; colon cancer was related to the food by 47.1 %; colon cancer might not cause any symptoms by 53.5 %; the presence of blood in the fecal specimen and changes in the intestinal habits might be the most prominent signs of colon cancer by 70.4 %; and colon cancer might be hereditary by 51.4 %. The average point of the knowledge of the individuals who were 50 years old or older on the risk factors and the early diagnosis of colorectal cancer was 6.84 ± 2.46 . In the Study Group, the knowledge level of 709 individuals was calculated as 7 points or higher and the knowledge level of 53 individuals was calculated as 10, and 66.4 % of the individuals who were 50 years old or older were observed to be competent for the knowledge level on colon cancer.

In the analysis made to determine the relationship between the socio-demographic variables, the risk factors, and the knowledge level on colorectal cancer, it was found that high level of education, not using alcohol and being a non-smoker, having a previous diagnosis of intestinal disease (polyp, inflammatory bowel disease, etc.), family history of colorectal cancer, and having more than four signs for early diagnosis of colorectal cancer were found to be associated with the knowledge level for colorectal cancer (Table 4).

In the analysis made to determine the relationship between the socio-demographic variables, the risk factors and the positive test results for occult blood in the fecal specimen, age, marital status, smoking status, alcohol use, having previous diagnosis of intestinal disease (polyp, inflammatory bowel disease, etc.), family history of intestinal disease (polyp, inflammatory bowel disease, etc.), not exercising regularly, absence of regular nutritional habits, and having more than four signs for early diagnosis of colorectal cancer, were found to be statistically significant for a positive test result ($p < 0.05$) (Table 4).

In the logistic regression analysis based on the significant variables for the knowledge level on colorectal cancer, the variables in the model included the educational level, being a smoker, previously being diagnosed with intestinal disease, family history of colorectal cancer, and having signs for early diagnosis of colorectal cancer. The knowledge level on colon cancer was 10.227 (3.313–731.572) and 16.968 (5.508–52.271) times higher in the groups of primary/secondary school and high-school graduates when compared with the group of illiterate/literate participants: 1.848 (2.283–2.629)

Table 2 Distribution of the participants by the risk for colorectal cancer

Risk factor	Number	Percentage
Not exercising regularly (<i>N</i> = 1057)	491	46.5
Current alcohol use (<i>N</i> = 979)	326	33.3
History of excessive fatigue (<i>N</i> = 1086)	324	29.8
Absence of the feeling of full evacuation of the intestines (<i>N</i> = 1081)	302	27.9
History of abdominal pain (<i>N</i> = 1081)	297	27.5
Not consuming the legumes (<i>N</i> = 1082)	263	24.3
Current smoking (<i>N</i> = 1042)	240	23.0
Not consuming fruits and vegetables (<i>N</i> = 1082)	181	16.7
Age equal to or above 65 years (<i>N</i> = 1161)	192	16.5
Melena (<i>N</i> = 1081)	161	14.9
Previous diagnosis of intestinal diseases (polyp, inflammatory bowel disease) (<i>N</i> = 1061)	154	14.5
History of nausea and vomiting (<i>N</i> = 1086)	154	14.2
Not consuming whole-grain bread (<i>N</i> = 1082)	140	12.9
Changes in the shape of the fecal specimen (<i>N</i> = 1081)	135	12.5
Family history of intestinal diseases (polyp, inflammatory bowel disease) (<i>N</i> = 1065)	128	12.0
Presence of constipation or diarrhea (<i>N</i> = 1086)	112	10.3
Familial history of colorectal cancer (<i>N</i> = 1045)	96	9.2
History of weight loss (<i>N</i> = 1086)	88	8.1
Hematochezia (<i>N</i> = 1081)	79	7.3

times higher in the group who were non-smokers; 3.099 (1.893–25.071) times higher in the group of individuals who were diagnosed previously with bowel disease (polyp, inflammatory bowel disease); 1.965 (1.118–3.454) times higher in the group with family history of colorectal cancer; and 9.415 (4.947–17.917) times higher in the group of individuals with more than four signs for early diagnosis of colorectal cancer (Table 5).

In the logistic regression model built on the significant variables for the positive occult blood test in the fecal specimen, the age, being a smoker, alcohol use, having previous diagnosis of intestinal disease, family history of intestinal disease, absence of healthy nutrition habits, and having signs for early diagnosis of colorectal cancer were the variables which were retained in the model. The risk of positive test for occult blood in the fecal specimen was 6.229 (3.305–11.740) times

Table 3 Knowledge level of the participants on the risk factors and early diagnosis of colorectal cancer

Questions on colorectal cancer (<i>N</i> = 1067)	Expected correct answer	Correct answers Number	%
Examinations should be performed for colorectal cancer after the age of 50.	Correct	944	88.5
Early diagnosis facilitates the treatment of colorectal cancer.	Correct	892	83.6
Almost all of the colorectal cancers may be detected early through regular examinations.	Correct	869	81.4
Fecal examination is one of the examinations to be performed regularly in the diagnosis of colorectal cancer.	Correct	858	80.4
Colorectal cancer may develop in the individuals without family members with colorectal cancer.	Correct	828	77.6
Presence of blood in the fecal specimen and change in defecation habits are the most important signs of colorectal cancer.	Correct	751	70.4
Colorectal cancer may not give any manifestation.	Correct	571	53.5
Colorectal cancers may exert familial inheritance.	Correct	548	51.4
Risk for colorectal cancer decreases after age of 50.	False	542	50.8
Colorectal cancer is not related to food.	False	503	47.1
Average knowledge point = 6.84 ± 2.46 (min = 0, max = 10)			

Table 4 Comparison of the socio-demographic variables and the risk factors on colorectal cancer (CRC), and positive test result for occult blood in the fecal specimen

Socio-demographic variables and the risk factors	Result for occult blood				Knowledge level on colorectal cancer*			
	Positive ^a number %	Negative ^a number %	Total ^b number %	<i>p</i> value	Adequate ^a number %	Inadequate ^a number %	Total ^b number %	<i>p</i> value
Age (years)								
50–54	20 (5.0)	377 (95.0)	397 (34.2)	<i>p</i> < 0.000*	220 (66.9)	109 (33.1)	329 (30.8)	<i>p</i> < 0.834
55–59	18 (6.1)	276 (93.9)	294 (25.3)		179 (66.3)	91 (33.7)	270 (25.3)	
60–64	30 (10.8)	248 (89.2)	278 (23.9)		192 (67.8)	91 (32.2)	283 (26.5)	
65–70	39 (20.3)	153 (79.7)	192 (16.5)		118 (63.8)	67 (36.2)	185 (17.3)	
Total	107 (9.2)	1054 (90.8)	1161 (100.0)		709 (66.4)	358 (33.6)	1067 (100.0)	
Gender								
Female	60 (8.6)	641 (91.4)	701 (60.4)	<i>p</i> < 0.339	433 (66.3)	220 (33.7)	653 (61.2)	<i>p</i> < 0.904
Male	47 (10.2)	413 (89.8)	460 (39.6)		276 (66.7)	138 (33.3)	414 (38.8)	
Total	107 (9.2)	1054 (90.8)	1161 (100.0)	709 (66.4)	358 (33.6)	1067 (100.0)		
Educational level								
Illiterate/literate	6 (14.0)	37 (86.0)	43 (3.7)	<i>p</i> < 0.344	12 (34.3)	23 (65.7)	35 (3.3)	<i>p</i> < 0.000*
Primary/secondary school	45(9.5)	427(90.5)	472(41.0)		270(61.6)	168(38.4)	438(41.2)	
High school-college-university	56 (8.8)	581 (91.2)	637 (55.3)		425 (72.2)	164 (27.8)	589 (55.5)	
Total	107 (9.3)	1045 (90.7)	1152 (100.0)	707 (66.6)	355 (33.4)	1062 (100.0)		
Marital status								
Married	73 (8.3)	811 (91.7)	884 (77.5)	<i>p</i> < 0.015*	547 (66.1)	280 (33.9)	827 (77.9)	<i>p</i> < 0.968
Single/divorced/widowed	34 (13.3)	222 (86.7)	256 (22.5)		160 (68.4)	74 (31.6)	234 (22.1)	
Total	107 (9.4)	1033 (90.6)	1140 (100.0)	707 (66.6)	354 (33.4)	1061 (100.0)		
Smoking status								
Non-smoker	38 (8.1)	432 (91.9)	470 (45.1)	<i>p</i> < 0.004*	330 (72.1)	128 (27.9)	458 (46.1)	<i>p</i> < 0.000*
Former smoker	31 (9.3)	301 (90.7)	332 (31.9)		201 (67.2)	98 (32.8)	299 (30.1)	
Currently smoking	38 (15.8)	202 (84.2)	240 (23.0)		136 (57.4)	101 (42.6)	237 (23.8)	
Total	107 (10.3)	935 (89.7)	1042 (100.0)	667 (67.1)	327 (32.9)	994 (100.0)		
Alcohol use								
Never used	60 (9.2)	593 (90.8)	653 (66.7)	<i>p</i> < 0.011*	461 (70.7)	191 (29.3)	652 (67.1)	<i>p</i> < 0.001*
Current Use	47 (14.4)	279 (85.6)	326 (33.3)		193 (60.3)	127 (39.7)	320 (32.9)	
Total	107 (10.9)	939 (89.1)	979 (100.0)	654 (67.3)	318 (32.7)	972 (100.0)		
Previous diagnosis of intestinal diseases in the family members								
Yes	21 (16.4)	107 (83.6)	128 (12.0)	<i>p</i> < 0.016*	90 (70.3)	38 (28.7)	128 (12.2)	<i>p</i> < 0.293
No	86 (9.2)	851 (90.8)	937 (88.0)		607 (65.6)	318 (34.4)	925 (87.8)	
Total	107 (10.0)	958 (90.0)	1065 (100.0)		697 (66.2)	356 (33.8)	1053 (100.0)	
Previous diagnosis of intestinal diseases (polyp, inflammatory bowel disease)								
Yes	26 (16.9)	128 (83.1)	154 (14.5)	<i>p</i> < 0.006*	121 (78.6)	33 (21.4)	154 (14.8)	<i>p</i> < 0.000*
No	81 (8.9)	826 (91.1)	907 (85.5)		567 (63.9)	321 (36.1)	888 (85.2)	
Total	107 (10.1)	954 (89.9)	1061 (100.0)		688 (66.0)	354 (34.0)	1042 (100.0)	
Family history of colorectal cancer								
Yes	12 (12.5)	84 (87.5)	96 (9.2)	<i>p</i> < 0.512	72 (79.1)	19 (20.9)	91 (9.3)	<i>p</i> < 0.008*
No	95 (10.0)	854 (90.0)	949 (90.8)		577 (65.3)	307 (34.7)	884 (90.7)	
Total	107 (10.2)	938 (89.8)	1045 (100.0)	649 (66.6)	326 (33.4)	975 (100.0)		
Regular exercising								
Yes	46 (8.1)	520 (91.9)	566 (53.5)	<i>p</i> < 0.026*	355 (65.5)	187 (34.5)	542 (54.0)	<i>p</i> < 0.723
No	61 (12.4)	430 (87.6)	491 (46.5)		297 (64.4)	164 (35.6)	461 (46.0)	

Table 4 (continued)

Socio-demographic variables and the risk factors	Result for occult blood				Knowledge level on colorectal cancer*			
	Positive ^a number %	Negative ^a number %	Total ^b number %	<i>p</i> value	Adequate ^a number %	Inadequate ^a number %	Total ^b number %	<i>p</i> value
Total	107 (10.1)	950 (89.9)	1057 (100.0)		652 (65.0)	351 (35.0)	1003 (100.0)	
Healthy nutrition habit								
Yes	58 (8.2)	649 (91.8)	707 (65.4)	<i>p</i> < 0.011*	447 (68.1)	209 (31.9)	656 (67.3)	<i>p</i> < 0.893
No	49 (13.1)	325 (86.9)	374 (34.6)		216 (67.7)	103 (32.3)	319 (32.7)	
Total	107 (9.9)	974 (90.1)	1081 (100.0)		663 (68.0)	312 (32.0)	975 (100.0)	
Signs for early diagnosis of colorectal cancer								
Four or more	37 (19.7)	151 (80.3)	188 (17.4)	<i>p</i> < 0.000*	153 (87.4)	22 (12.6)	175 (17.1)	<i>p</i> < 0.000*
Three and less	70 (7.8)	822 (92.2)	892 (82.6)		512 (60.4)	335 (39.6)	847 (82.9)	
Total	107(9.9)	973 (90.1)	1080 (100.0)		665 (65.1)	357 (34.9)	1022 (100.0)	
History of chronic disease								
Yes	83 (10.5)	710 (89.5)	793 (71.6)	<i>p</i> < 0.121	463 (66.6)	232 (33.4)	695 (71.0)	<i>p</i> < 0.657
No	24 (7.6)	290 (92.4)	314 (28.4)		185 (65.1)	99 (34.9)	284 (29.0)	
Total	107 (9.7)	1000 (90.3)	1107 (100.0)		648 (66.2)	331 (33.8)	979 (100.0)	

^a Line percentage was used

^b Column percentage was used

*significant at 0.05

higher in the age group of 50–54 compared to the age group of 65–70; 1.923 (1.077–3.436) times higher in the group who were currently smoking; 2.032 (1.252–3.297) times higher in the group who were currently using alcohol; 2.582 (1.455–4.583) times higher in the group who were previously diagnosed with intestinal disease (polyp, inflammatory bowel disease, etc.); 2.044 (1.120–3.730) times higher in the group who had family members with previously diagnosed bowel disease (polyp, inflammatory bowel disease, etc.); 2.100 (1.299–3.394) times higher in the group without healthy nutrition habits; and 3.885 (2.367–6.377) times higher in the individuals with more than four signs for early diagnosis of colorectal cancer (Table 5).

Of the participants, 96.7 % (*n* = 1161) returned the occult blood test kits to KETEM as they were instructed. The investigation was made on these samples for the occult blood in the fecal specimen, and the test was found to be positive in 9.2 % (*n* = 107) of the samples.

Discussion

In the present study, the average point of the individuals who were 50 years old or older on the risk factors and the early diagnosis of colorectal cancer was 6.84 ± 2.46 . It was observed that 66.4 % of the individuals in the study group had sufficient knowledge on colon cancer. The knowledge level of

709 individuals was calculated as 7 points or higher, and the knowledge level of 53 individuals was calculated as 10 points. There is scarcity of the studies on the knowledge level on colorectal cancer in our country. The average point of the knowledge on colorectal cancer was found as 7.73 ± 2.03 in the study by Kalkim et al. [3], and similarly, it was found as 7.3 ± 1.9 in the study by Vaizoglu et al. [9]. In the study by Vaizoglu et al., the average points of the knowledge was found to be 5 or less in 16.3 % of the participants whereas it was calculated as 10 in 20.7 % of the participants [9]. Worldwide, a substantial body of evidence pointed towards a low level of knowledge of CRC in many countries [10]. In an abroad study on English men and women between 16 and 74 years of age, the knowledge level on colorectal cancer was found to be very low. It was especially found that more than half (58 %) of the subjects did not know any of the risk factors for colorectal cancer and about one fourth (24 %) of them did not know the most important signs of colorectal cancer [11]. In a study by Christou and Thompson on native Australians above 35 years of age, it was found that most of them (78 %) had heard about colorectal cancer, but only 15 % of them could define it correctly. Additionally, it was found that most of the participants knew the important risk factors, but only 56 % of them knew the familial inheritance as a risk factor for colorectal cancer [12]. In another study by Salimzadeh et al. conducted on the subjects who were 50 years old or older, most participants pointed out that their knowledge level on

Table 5 Factors associated with the knowledge scores of colorectal cancer (CRC) and positive test result for occult blood in the fecal specimen

Socio-demographic variables and the risk factors	Test positivity for occult blood		Socio-demographic variables and the risk factors	Knowledge level on colorectal cancer	
	Adjusted odds ratio (95 % C.I.)	<i>p</i> value		Adjusted odds ratio (95 % C.I.)	<i>p</i> value
Age (years)			Educational level		
50–54	1.00 (referent)		Illiterate/literate	1.00 (referent)	
55–59	2.510 (1.406–4.480)	0.002*	Primary/secondary school	10.227 (3.313–31.572)	0.000*
60–64	5.579(2.903–10.721)	0.000*	High school-college-university	16.968 (5.508–52.271)	0.000*
65–70	6.229(3.305–11.740)	0.000*			
Smoking			Smoking		
Non-smoker	1.00 (referent)		Currently smoking	1.00(referent)	
Former smoker	1.294 (0.714–2.345)	0.395	Former smoker	1.252 (0.838–1.871)	0.273
Currently smoking	1.923 (1.077–3.436)	0.027*	Non-smoker	1.848 (2.283–2.629)	0.001*
Alcohol			Previous diagnosis of intestinal diseases		
Never used	1.00 (referent)	0.004*	No	1.00 (referent)	0.000*
Current use	2.032 (1.252–3.297)		Yes	3.099 (1.893–5.071)	
Previous diagnosis of intestinal diseases			Family history of colorectal cancer		
No	1.00 (referent)	0.001*	No	1.00 (referent)	0.019*
Yes	2.582 (1.455–4.583)		Yes	1.965 (1.118–3.454)	
Previous diagnosis of intestinal diseases in the family members			Signs for early diagnosis of colorectal cancer		
No	1.00 (referent)	0.020*	3 and below	1.00 (referent)	0.000*
Yes	2.044 (1.120–3.730)		4 and above	9.415 (4.947–17.917)	
Healthy nutrition habit					
Yes	1.00 (referent)	0.002*			
No	2.100 (1.299–3.394)				
Signs for early diagnosis of colorectal cancer					
3 and below	1.00 (referent)	0.000*			
4 and above	3.885 (2.367–6.377)				

*significant at 0.05

colorectal cancer was low, and thus it was concluded that providing training on this type of cancer was necessary [13]. Other studies on the CRC knowledge among American Indians [14], an ethnically diverse population in Australia [15], and Hong Kong [16] also found low levels of knowledge of CRC, including the awareness of its symptoms and the risk factors. In the present study, similarly, it was found that the knowledge level of the individuals who were 50 years old or older on the early diagnosis and the risk factors of colorectal cancer was low. It was observed that especially the knowledge on the manifestations and the relationship between the food and colorectal cancer and its familial inheritance was observed not to be at the adequate level. Based on this, it is considered that it is necessary to inform the individuals in the society and especially those with risk factors on colorectal cancer and on the signs and familial inheritance of colorectal cancer, as well

as to emphasize the importance of correct nutrition in the prevention of the disease.

Smoking is still one of the risk factors for colorectal cancer [17]. It was observed in the current study that about one fourth (23.0 %) of the individuals who were 50 years old or older were current smokers. It was found that currently smoking increased the risk of a positive test for occult blood in the fecal specimen by 1.92 times. The rate of smoking was 18.5 % in the study by Kalkim et al. [3], 10 % in the study by Vaizoglu et al. [10], and 52.7 % in the study by Kolutek et al. [18]. Since smoking is a significant risk factor for the development of colorectal cancer, it would be appropriate to perform activities and programs to reduce and eliminate smoking.

As in other types of cancer, the risk for colorectal cancer increases with alcohol consumption [3]. The risks tend to increase with the increasing amount of ethanol which is drunk.

In the study of Kalkim et al. [3], it was found that one fifth (20.7 %) of the participants were using alcohol. In the present study, it was found that one third (33.3 %) of people who were 50 years old or older were using alcohol and that the risk of a positive test for the occult blood in the fecal specimen was 2.03 times higher in those who were currently using alcohol. It is obvious that the alcohol consumption is a risk factor that should be prevented to reduce the risk for colorectal cancer.

It is known that the risk for chronic diseases may be reduced by an adequate and balanced diet [18]. The habit of healthy nutrition plays an important role in preventing colorectal cancer. According to Nahas and Othman, the epidemiological studies reported in the literature emphasize that the food coming from animal origin and increased amounts of oil consumption increase the incidence of colorectal cancer, while increased amounts of the consumption of fruits and vegetables reduce its incidence [19]. In accordance with the literature, it was observed in our study that there was a statistically significant difference between the positive test result for occult blood in the fecal specimen and the lack of nutritional habits. The risk of positive test result for occult blood in the fecal specimen was found to be 2.1-fold higher compared to the healthy-nutrition group.

Genetic changes play an important role in the development of colorectal cancer [3]. The risk for colorectal cancer is increased in the subjects with medical or familial history of colorectal cancer or in those with intestinal polyps and chronic inflammatory bowel disease. According to a study in which the incidence and the risk factors for CRC was analyzed, the risk for CRC was observed to increase by 2.9-fold in the subjects with inflammatory bowel disease, and by 1.8-fold in those with a history of CRC in their first-degree relatives [20]. In another study, the familial history of CRC increased the risk for CRC by 2.8-fold [21]. In the present study, the number of the individuals with family members who were diagnosed with colorectal cancer was determined as 96 (9.2 %). The number of the individuals previously diagnosed as having polyp or inflammatory bowel disease was 154 (14.5 %). In accordance with the literature, it was observed in the present study that the previous diagnosis of intestinal polyps or inflammatory bowel disease increased the risk for positive test result for occult blood in the fecal specimen by 2.58-fold. In the present study, a significant relationship was observed between family history of colorectal cancer and the previous history of intestinal polyps or inflammatory bowel disease with high level of knowledge. Having family members diagnosed with colorectal cancer and previous diagnosis of intestinal polyps or inflammatory bowel disease together may have led the subjects to feel themselves more sensitive and suspicious to this disease. Thus, they may have been detected to have higher level of knowledge on CRC. Studies have been observed in the literature, similar to the present one, showing that the individuals having high risk for

colorectal cancer due to family history of CRC have higher level of knowledge [10, 16].

When the literature is reviewed, it is observed that the most common complaints of the patients with colorectal cancer are rectal hemorrhage, fatigue, anemia, abdominal pain, weight loss, and constipation [3, 22]. The present study revealed that the most common complaints of the individuals aged 50 or more were excessive fatigue (29.8 %) and abdominal pain (27.5 %) and that the least common complaints were weight loss (8.1 %) and hematochezia (7.3 %). In the present study, having more than four signs for early diagnosis of colorectal cancer was an important factor to increase the knowledge level on it. At the same time, the risk for positive test result for occult blood in the fecal specimen was found to be 3.88 times higher in the group with more than four signs for early diagnosis of colorectal cancer.

As a conclusion, it was observed that the participating individuals who were 50 years old and over had the risk factors that were associated with colorectal cancer and that nearly 35 % of them had the knowledge levels on the disease at seven points or below (inadequate). It was determined that only 4.9 % of the participants had average knowledge points as 10. Based on this conclusion, it is considered that the physicians and nurses working in the field of public health should inform the individuals in the society, and especially those with high risks, on the signs of colorectal cancer, the risk factors, and the familial inheritance; smoking and alcohol use should be discouraged; and healthy nutrition should be emphasized in prevention studies. Colorectal cancer is a disease that may be detected and treated early through community-based screening. Therefore, awareness on screening methods must be aroused via trainings with the purpose of early diagnosis within the entire community, especially to the individuals with family members diagnosed previously with colorectal cancer. By means of such trainings, it should be ensured that the first-degree relatives of the patients with colorectal cancer undergo screening at earlier age by increasing the awareness on cancer.

Compliance with Ethical Standards

Conflict of Interest No conflict of interest was declared by the author.

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