Journal of Behavioral Health
www.scopemed.org
DOI: 10.5455/jbh.20160504042553

Original Research

Determination of risk factors, knowledge level and awareness on colorectal cancers among Turkish women

Gonca Karataş Baran[1], Gül Pınar[2], Sevil Şahin[2]

[1]Department of Nursing, Institute of Health Sciences, Yıldırım Beyazıt University, Ankara, Turkey, [2]Department of Nursing, Faculty of Health Sciences, Yıldırım Beyazıt University, Ankara, Turkey

Address for correspondence: Gul Pinar, Assoc. Prof. Department of Nursing, Faculty of Health, Sciences, Yildirim Beyazit, University, Ankara, Turkey. E-mail: gulpinarybu@gmail.com

Received: March 12, 2016
Accepted: April 17, 2016
Published: May 04, 2016

ABSTRACT

Objective: This research was conducted as descriptive and cross-sectional to scrutinize risk factors, knowledge levels and awareness of women at the age of 50 and above about colorectal cancers (CRC). **Materials and Methods:** In a descriptive and cross-sectional study, 196 female participants were selected randomly at the age of 50 and above who applied to Ankara Keçiören Training and Research Hospital, gynecology and obstetrics polyclinic in Turkey during June 16-July 30, 2014. A questionnaire form was used in data collection. **Results:** The age mean of the women included in the research was 57.2 ± 7.9. At least one of the CRC risk factors was present in each of the women in this study. When examined according to CRC risk levels, 83.6% was at the low-risk group and 16.4% was at the moderate level-risk group. The mean knowledge score of the women to be protected from CRC was 6.4 ± 3.3 (min = 0, max = 10). 86.2% of the women indicated that they did not have CRC screening test until that moment, 85.7% indicated that they did not have adequate knowledge about CRC screening methods, and 22% considered themselves risky about developing CRC. Based on the conducted analyses, CRC risk level was found higher in the women who had bowel disease history, did not have adequate knowledge about CRC, had CRC screening history, were suggested CRC screening test by their physician, and had high CRC risk perception ($P < 0.05$). **Conclusion:** It was determined as a result of the study that the women had a considerable level of CRC risk, and despite this fact they did not have adequate awareness and knowledge about screening and prevention.

KEY WORDS: Attitudes, awareness, colorectal cancer, knowledge, risk factors, screening

INTRODUCTION

Colorectal cancer (CRC) is the third most common form of cancer and the third leading cause of cancer-related deaths worldwide. Based on GLOBOCAN estimates, the incidence and mortality of CRC varies over 10-fold worldwide, with 1.4 million new cases and approximately 694,000 deaths estimated each year [1,2]. In Turkey, it is also a major health problem in women following breast and thyroid cancer. In Turkey, CRC incidence is approximately 7/100,000 with around 6000 new cases seen each year and 3200 deaths annually. This is higher than that of the previous reports in Turkey and the risk of CRC increases steadily with age, especially in females [3]. Despite the high incidence of CRC, it is one of the most treatable types of cancer found early enough, which means they are found by the recommended CRC screening before the symptoms occur [4].

The Centers for Disease Control and Prevention (CDC) report revealed that about half of all CRC deaths a year could be prevented. Despite the vital role of CRC screening in saving lives, more than 20 million people over the age of 50 were not screened for CRC. In addition, CDC report revealed that the main reason for the individuals to fail to undergo the recommended screening for CRC is the lack of knowledge and awareness and the absence of a physician's recommendation regarding screening for CRC [5].

Previous studies have shown that the risk of developing CRC is affected by both environmental personal history, and genetic factors including low socioeconomic status, physical inactivity, unhealthy diet, smoking, obesity, and inflammatory bowel disease [6-13]. Although genetic risk factors cannot be changed, dietary and environmental factors can be modified to reduce CRC risk. CRC affects men and women almost equally but there a limited number of studies with special focus on CRC risk behaviors and knowledge of women [6,14,15]. Although screening standards in Turkey have been determined for CRC by the Turkish Ministry of Health Published National CRC screening standards in 2009 and 2012, screening test rates and the educational programs are rather inadequate [3].

In terms of literature background, CRC has become an issue that needs to be dealt with primarily. Nevertheless, it is observed

that studies for determination of factors that could cause CRC in Turkey are quite limited. This study aimed to determine the risk factors, awareness and the knowledge level of Turkish women about CRC risk.

MATERIALS AND METHODS

This descriptive and cross-sectional study were conducted at Ankara Keçiören Training and Research Hospital Maternity Polyclinic in Turkey during June 16-July 30, 2014. The sufficient sample size was calculated by the sampling formula with unknown population, where the margin of error is 0.07 and the confidence level is 95%. On this basis, 196 women aged 50 years old and older either being treated, as patients or applying for the purpose of control were included.

The women were randomly assigned to the study from the patient list. The inclusion criteria of the study were as follows: (1) Being 50 years old and older (2) not being a mental disability, (3) having open to communication and collaboration, and (4) being willing to participate in the study. The women, who were diagnosed with CRC, were not willing to participate in the study and did not complete the survey form were left out of the study. The study was conducted in compliance with principles of Helsinki declaration. Approval was obtained from the Ethical Board of the Ankara Keçiören Training and Research Hospital to conduct the study. The women were informed about the study by the researchers prior to study, and the ones who agreed to participate were enrolled in the study. 20 women who complied with the research criteria were approached by the researcher and a preliminary application was carried out for the clarity of data collection form and for not leading to deviation in perception. Following the preliminary application, feedbacks were received about the questions that were not understood and the requirement corrections were made. The obtained data were not included in the analysis. As a result of the preliminary application, it was decided that the study was going to be carried out by face-to-face interviews.

The data were collected by face-to-face interviews by using a questionnaire form that was prepared in three sections by the researchers by scanning the literature [3,4,7,8,11,13,16-18]. The first section was about investigating the demographic characteristics (e.g.; age, education, income, and health insurance), lifestyle characteristics (e.g.; smoking and alcohol use), and health-related histories of women including perceived risk and family history about CRC, participation in screening tests (e.g.; at least one of the fecal occult blood tests (FOBTs), sigmoidoscopy, digital rectal examination, colonoscopy), physician's suggestion, bowel diseases, defecation habits, body mass index (BMI), physical activity, and nutrition features. Dietary habits were investigated by using a 5-point Likert scale (never, seldom, sometimes, often, and very often) and consisted of 8 questions. Doing physical activity (swimming, walking, aerobics, etc.) regularly for 30 min 3 times/week was considered that the participants engaged in the regular physical activity. The second section comprised 10 specific knowledge questions about CRC. Responses to the knowledge questions were coded as True/False/I have no idea. In the third section, for grouping CRC risk level; the following classification system suggested by the Ministry of Health was used [3,19]. The data of the risk groups were obtained from risk examination data of the participants.

Very Low-risk Group

Individuals who were over 50 years of age, not having a previous adenomatous polyp, inflammatory bowel illness and family history were included in this group.

Low-risk Group

Individuals who were over 50 years of age, asymptomatic, not having a previous adenomatous polyp and inflammatory bowel illness, and who had a parent or sibling with colon polyp or cancer history at the age over 60 were included in this group.

Moderate Level of Risk Group

Individuals who had a previous adenomatous polyp or CRC history, having adenomatous or CRC history in one of the first-degree kin before 60 years of age, having adenomatous polyp or CRC history in one or more individuals in the family and having previous breast, endometrium or ovary cancer history were included in this group.

High-risk Group

Individuals who had hereditary non-polyposis CRC history, and long-term inflammatory bowel disease history were included in this group.

The data collection lasted approximately 15-20 min for each participant.

The data collected in the study were analyzed by SPSS 20 package program. Descriptive statistics of the socio-demographic and lifestyle characteristics of women are presented as numbers, percentages, mean, and standard deviation. Chi-square test was used to assess associations between variables (socio-demographic, patient, and lifestyle characteristics) and having a screening test. Analytical statistics included Pearson correlation analysis. Mann–Whitney *U*-test was used in the comparisons with two groups as a result of the normality tests of the data, and Kruskall–Wallis test was used in the comparison of 3 and more groups. The significance level was $P < 0.05$.

RESULTS

The mean age of the women was 57.2 ± 7.9 (min = 50, max = 86). Findings determined that 53.1% were elementary school graduates, 93.4% were housewives, 56.1% had their income equal to expenditure, and 83.4% were urban dwellers [Table 1].

All of the women had health insurance, 99.5% did not drink alcohol and 88.8% did not smoke, 71.9% had a chronic illness (diabetes and hypertension), 86.2% did not take a walk regularly and did not exercise (minimum 3 days for 20 min/week),

69.4% did not have regular health check, 49.5% were obese, and 71.4% had the habit to have 3 meals a day (mainly white meat, vegetables, and fruits). Only 18.4% of the women had a bowel disorder history (bowel disorders, polyps, spastic colon, hemorrhoid, ulcerative colitis), 17.4% had a "change in defecation habit" as "constipation" during the last 6 months, 9.7% had "anemia," 7.1% had "fatigue," 5.6% had "nausea-vomiting," 5.1% had "lasting stomach ache-cramp," and 2.6% had "bloody defecation." The majority of the women (74.5%) indicated that they defecated "at least once a day," 20.4% said the defecated "once every 2-3 days," and 5.1% defecated once every 4-5 days [Table 2].

Table 1: The distribution of socio-demographic characteristics of the women

Socio-demographic characteristics	*N* (%)
Educational status	
Illiterate	36 (18.4)
Literate	32 (16.3)
Elementary school	104 (53.1)
High school and above	24 (12.2)
Employment status	
Employed	13 (6.6)
Unemployed	183 (93.4)
Health insurance	
Yes	192 (98.0)
No	4 (2.0)
Income level perception	
My income is less than my expenditure	71 (36.2)
My income is equal to my expenditure	110 (56.1)
My income is more than my expenditure	15 (7.7)
Place of living for a long time	
City	141 (83.4)
County	12 (7.1)
District/Village	16 (9.5)

Table 2: The distribution of medical characteristics of the women

Medical history	*N* (%)
Chronic illness	
Yes	141 (71.9)
No	55 (28.1)
Having general health checks	
Yes	60 (30.6)
No	136 (69.4)
BMI (kg/cm^2)	
Thin (<18.5)	0 (0.0)
Normal (18.5-24.99)	29 (14.8)
Overweight (25-29.9)	70 (35.7)
Obese (30 and above)	97 (49.5)
Regular walking and exercise	
Yes	27 (13.8)
No	169 (86.2)
Bowel habits	
Minimum once a day	146 (74.5)
Once every two days	40 (20.4)
Once every three-four days	10 (5.1)
Bowel disease history	
Yes	36 (18.4)
No	160 (81.6)
Bowel disorder history in family (1st degree)	
Yes	17 (8.7)
No	179 (91.3)

BMI: Body mass index

In Table 3, it was determined that 22% of the women considered themselves risky for CRC, 11.2% were suggested to have CRC screening by their physician, 85.7% did not have knowledge about CRC screening methods, 64.8% did not want to get information about CRC screening methods, 86.2% did not have CRC screening test before, and 93.4% did not think to have CRC screening. The women indicated the reasons for not to have a screening test as; 33.3% said "no one directed them until that moment," 29.5% "did not consider themselves at risk," 25.7% "did not have knowledge about screening," 15.3% "refrained from the procedures," 9.3% "were shy," and 9.3% "were afraid to be diagnosed with cancer." It was determined that the women with CRC screening history had FOBT, colonoscopy, and digital rectal examination previously.

About 83.6% of the women who participated in the research were in the low-risk group and 16.4% were in the moderate level risk group according to CRC risk classification. There were no women determined to be in the high-risk group. There was no statistically significant difference between the socio-demographic characteristics ($P > 0.05$).

As it is shown in Table 4, there was no statistically significant difference in terms of dietary characteristics of CRC risk groups and dietary characteristics of women ($P > 0.05$).

Although it was not significant statistically, women who consumed little water daily (<3 glasses) ($\chi^2 = 6.73$, $P = 0.081$) and had a few meals (1-2 meals) ($\chi^2 = 0.77$, $P = 0.678$), did not walk and exercise regularly (at least 3 days 20 min/week) (Fisher's exact, $P = 0.163$), and smoked cigarettes ($\chi^2 = 0.54$, $P = 0.446$) and took alcohol (Fisher's exact, $P = 1.000$) had higher CRC risk ($P > 0.05$). There were no significant difference in terms of CRC risk groups and BMI ($\chi^2 = 2.16$, $P = 0.356$) ($P > 0.05$).

In Table 5, CRC risk was higher in women who had bowel disorder history in herself and her family, who did not have adequate knowledge about CRC screening methods, did not plan to have CRC screening, were suggested to have CRC

Table 3: The findings about CRC awareness of the women

CRC awareness and applications	*N* (%)
Risk perception to have CRC	
I don't have a risk	43 (21.9)
I have a risk	153 (78.1)
CRC screening suggestion of the doctor	
Yes	22 (11.2)
No	174 (88.8)
Having knowledge about CRC screening methods (*n*=196)	
Yes	28 (14.3)
No	168 (85.7)
Wanting to have knowledge about CRC screening (*n*=196)	
Yes	69 (35.2)
No	127 (64.8)
Planning to have a CRC screening	
Yes	13 (6.6)
No	183 (93.4)
CRC screening history	
I had at least one of them	27 (13.8)
I didn't have any one of them	169 (86.2)

CRC: Colorectal cancers

Table 4: Distribution of dietary characteristics of women according to CRC risk groups

Dietary characteristics	CRC risk groups	*N*	Average	Min	Max	SS	Analysis*
Vegetable-fruit based	Low	164	3.4	0.0	5.0	1.1	$Z=-0.431$
	Moderate	32	3.6	0.0	5.0	1.7	$P=0.667$
Rich in protein and fat	Low	164	1.7	0.0	5.0	1.2	$Z=-1.586$
	Moderate	32	1.9	0.0	4.0	0.9	$P=0.113$
Red meat	Low	164	1.2	0.0	5.0	0.9	$Z=0.323$
	Moderate	32	1.1	0.0	2.0	0.55	$P=0.747$
Fizzy drinks (coke, soda, etc.)	Low	164	1.4	0.0	5.0	0.9	$Z=-0.283$
	Moderate	32	1.5	0.0	5.0	1.3	$P=0.199$
Drinks consisting of caffeine	Low	164	1.5	0.0	5.0	0.9	$Z=-0.558$
	Moderate	32	1.6	0.0	5.0	1.8	$P=0.577$
Whole grains	Low	164	2.1	0.0	5.0	1.1	$Z=-0.028$
	Moderate	32	2.0	0.0	4.0	1.2	$P=0.977$
White meat	Low	164	1.3	0.0	5.0	0.6	$Z=-0.074$
	Moderate	32	1.3	0.0	4.0	0.8	$P=0.974$
Processed meat (bologna, pastrami, sausages, etc.)	Low	164	1.5	0.0	5.0	0.8	$Z=-0.159$
	Moderate	32	1.4	0.0	2.0	0.6	$P=0.874$

*Mann–Whitney *U*-test was used ($P<0.05$), CRC: Colorectal cancers

Table 5: The distribution of the women in CRC risk groups based on their characteristics about CRC

Characteristics about CRC	CRC risk groups, *N* (%)			Analysis*
	Low ($n=164$)	Moderate ($n=32$)	Total	
Perception of CRC developing risk				
I have a risk	26 (60.5)	17 (39.5)	43 (21.9)	$\chi^2=19.5$
I have no risk	138 (90.2)	15 (9.8)	153 (78.1)	$P=0.0001$
CRC screening suggestion of physician				
Yes	12 (54.5)	10 (45.5)	22 (11.2)	Fisher's exact
No	152 (87.4)	22 (12.6)	174 (88.8)	$P=0.001$
Having knowledge about CRC screening methods				
Yes	15 (53.6)	13 (46.4)	28 (14.3)	Fisher's exact
No	149 (88.7)	19 (11.3)	168 (85.7)	$P=0.0001$
Thinking about having a CRC screening				
Yes	8 (61.5)	5 (38.5)	13 (6.6)	Fisher's exact
No	156 (85.2)	27 (14.8)	183 (93.4)	$P=0.041$
CRC screening history				
Yes	18 (66.7)	9 (33.3)	27 (13.8)	Fisher's exact
No	146 (86.4)	23 (13.6)	169 (86.2)	$P=0.021$
Bowel disorder history				
Yes	25 (69.4)	11 (30.6)	36 (18.4)	Fisher's exact
No	139 (84.8)	21 (13.2)	160 (81.6)	$P=0.014$
Bowel disorder history in family (1st degree)				
Yes	0 (0.0)	17 (100.0)	17 (8.7)	Fisher's exact
No	164 (91.6)	15 (8.4)	179 (91.3)	$P=0.0001$

*Chi-square analysis and Fisher's exact test was used, CRC: Colorectal cancers

screening by a physician, had a high risk perception about CRC development, and had CRC screening history. This difference was also found statistically significant ($P < 0.05$).

In Table 6, moderate knowledge level of the women was 6.4 ± 3.3'dir (min = 0, max = 10). The women in general thought that CRC risk increased with obesity, inactive living, alcohol consumption-smoking, bowel illness, and having CRC history in family.

In Table 7, CRC knowledge scores of educated young age group, living in city center and having a bowel illness in family were found to be higher ($P < 0.05$). A significant relationship was observed negatively between CRC knowledge score and age of the women ($r = -0.288$, $P < 0.05$). According to this, as the age increased, CRC knowledge score decreased.

In Table 8, mean CRC knowledge scores of the women, who had high-risk perception about CRC, who wanted to have more information about the issue and who had bowel illness in family were found higher ($P < 0.05$). Although not significant statistically, CRC knowledge scores of the group who had high CRC risk level, and who thought that they had adequate knowledge about CRC, who had CRC screening and thought of having CRC screening were found higher ($P > 0.05$).

DISCUSSION

Having knowledge about CRC is important because it affects the possibility that an individual will engage in appropriate primary prevention behaviors [9,11,13,16-18,20]. Our sample was drawn from the patients who visited the gynecology clinic. As such, our subjects were likely to be motivated by concerns

about risk of cancer. We expected that our groups were more knowledgeable than other women, but we did not receive a great score on CRC knowledge. In this study, it was determined according to CRC knowledge scores that the women had knowledge in "moderate" level (6.4 ± 3.3, min = 0, max = 10). According to this analysis, the women did not have adequate information about CRC screening. In the study of Kalkım *et al*., it was 7.73 ± 2.03 (min = 1, max = 10) [16], in the study of Christou and Thompson, it was 13.3 ± 4.3 (min = 0, max = 18) [11], and in the study of Wong *et al*., it was 3.2 and 4.1 (min = 0, max = 9) [13]. These results are similar to our research findings. Therefore, educational program about CRC in health-care facilities and public health policies should ensure women's educational needs and be overviewed again from this aspect. In the study of Jillson *et al*.; the mean CRC knowledge baseline score of the women was 8 ± 3.02 after the educational intervention, the mean post-intervention CRC knowledge score was 12.94 ± 0.88 ($P < 0.0001$), and the mean correct answer average following the education increased significantly [15].

Table 6: The distribution of knowledge level of the women about CRC

CRC knowledge score (*N*=196) (Mean=6.4±3.3, min=0, max=10)	*N* (%)		
	Right	Wrong	I have no idea
Being overweight is a risk factor for CRC	142 (72.4)	7 (3.6)	47 (24.0)
Alcohol consumption is a risk factor for CRC	158 (80.6)	4 (2.0)	34 (17.4)
Cigarette smoking is a risk factor for CRC	160 (81.6)	3 (1.5)	33 (16.9)
Regular exercise protects you from CRC	135 (68.9)	14 (7.1)	47 (24.0)
Antioxidants such as Vitamins A, C, E, Beta carotene and selenium, calcium and fish oil protects you from CRC	118 (60.2)	14 (7.1)	64 (32.7)
Consumption of low fiber and high fat is a risk factor for CRC	120 (61.2)	11 (5.6)	65 (33.2)
CRC is observed in men and women in similar rates	31 (15.8)	48 (24.5)	117 (59.7)
CRC risk increases in individuals who had a bowel disease before	135 (68.9)	5 (2.5)	56 (28.6)
CRC risk increases with age	112 (57.1)	36 (18.4)	48 (24.5)
Cancer development risk in individuals who have CRC history in first-degree relatives increases	142 (72.4)	6 (3.1)	48 (24.5)

CRC: Colorectal cancers

According to the study conducted in Turkey, CRC knowledge score was found higher in younger age. Zervoudakis *et al*. reported in their study; the level of sufficient knowledge about CRC decreased as the age increased [6]. Similarly, we found that the younger women were disposed to response to knowledge questions correctly than the older ones ($P < 0.05$). Our findings were consistent with those of the previous studies. Recent studies have found a relationship between high educational level and CRC knowledge scores [6,7,9,21,22]. Kosgeroglu *et al*., in Turkey reported that there was a linear relationship between education levels of women and the level of knowledge about cancer [23]. In the study of Sahin *et al*., similar results were obtained that CRC knowledge increased with high education level [17]. Our results are similar to other studies.

It is thought that employed women could have sufficient knowledge and high awareness level about CRC since they are exposed to more materials and social interaction related with CRC early-diagnose [12,13,17,22]. In contrast, we have not found out any significant relationship between employment status and CRC knowledge level ($P > 0.05$).

Physical activity has consistently been linked to having a lower risk for CRC. A hypothesis states that the mechanisms behind physical activity and obesity may lie with the condition of having hyperinsulinemia, and it appears to influence the risk for CRC. Some studies reported that inadequate physical activity was responsible for 10-50% of CRC cases in the world [4,11,24,25]. It was reported in the literature that there was a stronger relationship between obesity and CRC in comparison to other gastrointestinal system cancers [16]. In this study, although less physical activity and obesity were not related with CRC risk ($P > 0.05$), we think that sedentary life and accompanying obesity is an indication of living style of our society and this is a significant risk for CRC.

Table 7: The distribution of CRC knowledge scores of the women according to socio-demographic characteristics

Socio-demographic characteristics	CRC knowledge score						Analysis	
	N	Average	Min	Max	SS	Row average		
Educational status								
Illiterate	36	4.8	0.0	10.0	3.5	71.3	χ^2=17.97	Paired comparison
Literate	32	5.6	0.0	10.0	3.3	83.8	*P*=0.000*	1-3
Elementary school	104	6.8	0.0	10.0	3.0	106.5		1-4
High school and above	24	7.6	0.0	10.0	3.0	124.4		2-3
								2-4
Place of living for a long time								
City	164	6.6	0.0	10.0	3.2	101.9	χ^2=10.39	Paired comparison
County	14	5.7	0.0	9.0	3.2	83.3	*P*=0.006*	1-3
District/village	15	3.8	0.0	9.0	3.5	56.2		
Age								
		r						−0.288
		P						0000**
		N						196

*Kruskall–Wallis test was used, **Pearson correlation analysis was used

Table 8: The distribution of CRC knowledge scores of the women according to their characteristics about CRC

Characteristics related to CRC	CRC knowledge score						Analysis*
	N	Average	Min	Max	SS	Row average	
Perception of CRC development risk							
I have a risk	43	7.3	0.0	10.0	2.7	113.3	$Z=-1.96$
I don't have any risk	153	6.1	0.0	10.0	3.4	94.3	$P=0.049$
Having knowledge about CRC screening							
Yes	28	7.1	0.0	10.0	2.9	110.7	$Z=-1.24$
No	168	6.2	0.0	10.0	3.3	96.5	$P=0.213$
Wanting to have knowledge about CRC screening							
Yes	69	6.8	0.0	10.0	3.5	112.2	$Z=-2.52$
No	127	6.1	0.0	10.0	3.1	91.1	$P=0.012$
Thinking about having CRC screening							
Yes	13	6.4	0.0	9.0	3.2	88.7	$Z=-0.65$
No	183	6.0	0.0	10.0	3.3	99.2	$P=0.511$
CRC screening history							
Yes	27	6.9	0.0	10.0	2.9	105.0	$Z=-0.65$
No	169	6.3	0.0	10.0	3.3	97.5	$P=0.514$
History of bowel illness in family							
Yes	17	7.3	0.0	10.0	3.1	117.9	$Z=8.89$
No	179	6.3	0.0	10.0	3.3	99.3	$P=0.012$
CRC risk groups							
Low	164	6.3	0.0	10.0	3.3	97.0	$Z=-0.829$
Moderate	32	6.8	0.0	10.0	3.3	106.0	$P=0.407$

*Man–Whitney *U*-test was used, CRC: Colorectal cancers

Important risk factors for CRC are unhealthy diet and diet rich in red meat [10,26]. In the other studies, it was reported that red meat and processed meat increased the risk of CRC while a diet high in fruits, vegetables, fiber and antioxidant compounds such as Vitamin C and E, beta-carotene, folic acid and selenium content may be responsible for this protective effect. Fiber increases fecal bulk, which decreases the transit time and diminishes contact with potential carcinogens [27-29]. However, as contrary to the other studies, we did not find a relationship between the overall eating patterns and decreased risks for CRC ($P > 0.05$).

Recent studies have shown that the women who were diagnosed with a bowel disease could have been more consciousness about CRC than others [27,30-33]. Bowel illness, especially adenomatous polyps are considered to be the primary lesion of CRC [27,31]. Therefore, in chronic ulcerative colitis, inflammatory colon disease and Crohn illness, CRC risk increases in parallel to the disease period [26,34]. The conducted analyses in our study, as similar to other studies, showed that persons who had a bowel disease were at higher risk for CRC ($P < 0.05$). There was bowel disease history in 18.9% of the women (22.2% polyp-adenoma, 16.7% spastic colon, 38.9% hemorrhoid, 11.6% ulcerative colitis, and 10.8% Crohn illness). In addition, the women experienced the indications during the last 6 months such as "bloody stool, irregular defecation, feeling mass by hand, anal flow or mucus coming with stool, gas with bad odor, bulge, stomach ache/cramps, loss of appetite, nausea-vomiting, and fatigue." Screening of the bowel disease can identify CRC in early stages and thereby improve the survival rates of CRC. In our study, the women diagnosed with a bowel disease at an early stage had a higher level of knowledge about CRC ($P < 0.05$). In this study, it was found that the women who had high CRC risk perception had a higher risk level ($P < 0.05$). Risk perception can be effective on the level of taking protective health behaviors seriously.

In Turkey, the Ministry of Health CRC Screening Program National Standards were updated in 2012. The program stipulates that all women and men between the ages 50-70 are screened by FOBT once every 2 years and by colonoscopy once every 10 years [19]. Thus, it was aimed that colorectal pathologies are determined before malignancy or at an early malignancy stage, and invasive cancer frequency and accompanying morbidity and mortality is decreased.

The literature has also reported that screening the individuals who are at average risk for CRC is as cost-effective as screening for other cancers [32,33]. For individuals with a family history, screening should begin at age 40 rather than 50 years, or at 5 years younger than the age of the relatives affected with CRC [31]. It was proven that CRC screening tests ensured early diagnosis and increased the expected lifespan [16].

Family history is an important contributor to all risk factors for CRC [10,12]. As reported in several studies, the risk of developing CRC is 2.5 to 3 times greater among the relatives of the affected individuals [27,31,35]. In a descriptive study performed in western Turkey, women with no family history of CRC were at higher risk of having insufficient knowledge of CRC than women with a family history of CRC [8]. In this study similarly, CRC risk in persons who have first-degree kin with a bowel disease increased significantly ($P < 0.05$). In our study, only 13.8% of the women had CRC screening done, and the rest of them thought to participate in the screening. It was observed in the studies conducted in Turkey about having CRC screening and awareness, the ratios of the individuals who did not have CRC screening were 91.2% [18], and 72.8% [16]. According to CDC 2012 research result, having a CRC screening test in the United States of America was 65% and it was quite higher than that in Turkey [36]. Randomized controlled trials showed that there was a strong relation

that FOBT could reduce CRC mortality by 15% to 33% in a population of 50-74 years old [37].

Whereas it was reported in the literature that suggestion for a screening by health personnel was a significant determinant for having a screen [20], in the present study, it was observed that 88.8% of the women did not receive such a suggestion. In the study of Şahin *et al*., the number of participants who were suggested for receiving a cancer screening by their doctor was 25.9% [17]. In this study, not having a suggestion for screening was listed in the first rank among the reasons for not having a CRC screening test. Furthermore, the research showed that more people may get tested if health care providers used an organized approach to identify people who were needed to be screened; and if they contacted them at their home or community setting; and advised them of each test; carefully monitored to make sure they completed their test. Health providers should focus on the health beliefs that positively influence screening participation and the barriers that hinder the screening behavior especially of the population groups who had cancer history in their family.

CONCLUSION

This study demonstrated that the women had risk factors about CRC. Furthermore, it was observed that early diagnosis applications and awareness of women about CRC screening programs was inadequate. In this sense, females should be comprehensively informed about CRC counseling by their primary health-care providers. We still need to acknowledge the potential impact of certain preventive practices and educational needs on CRC risk. Therefore, further epidemiologic studies related to CRC knowledge and risk factors are required to explore the relationships between the possible implications. This study data will be beneficial for health professionals working in oncology and primary health care setting.

LIMITATIONS

The information about knowledge of CRC was gathered from a self-administered questionnaire, so we cannot eliminate informative bias issues. The results could not be generalized to all Turkish women and cannot be the representative of the entire population since the sample was selected from Ankara, Turkey.

ACKNOWLEDGMENTS

We would like to express our deepest gratitude to all participants who helped us conduct this study.

REFERENCES

1. Torre LA, Bray F, Siegel RL, Ferlay J, Lortet-Tieulent J, Jemal A. Global cancer statistics, 2012. CA Cancer J Clin 2015;65:87-108.
2. Siegel RL, Miller KD, Jemal A. Cancer statistics, 2016. CA Cancer J Clin 2016;66:7-30.
3. Türkiye Halk Sağlığı Kurumu Kanser Daire Başkanlığı Değerlendirme Raporları. Kolorektal kanser taramaları. (Turkey Cancer Institute Department of Public Health Evaluation Reports. Colorectal cancer screening). Available from: http://www.kanser.gov.tr/dosya/tarama/kolorektal_kanser_tarama_programi.pdf. [Last accessed on 2014 Jun 12].
4. Potter JD, Hunter D. Colorectal cancer. In: Adami HO, Hunter D, Trichopoulos D. editors. Textbook of Cancer Epidemiology. 2nd ed. New York: Oxford University Press; 2008. p. 275-307.
5. Centers for Disease Control and Prevention, Colorectal Cancer. 2015. Available from: http://www.cdc.gov/cancer/colorectal/sfl/index.htm. [Last accessed on 2014 May 01].
6. Zervoudakis A, Strickler HD, Park Y, Xue X, Hollenbeck A, Schatzkin A, *et al*. Reproductive history and risk of colorectal cancer in postmenopausal women. J Natl Cancer Inst 2011;103:826-34.
7. Smith SK, Simpson JM, Trevena LJ, McCaffery KJ. Factors associated with ınformed decisions and participation in bowel cancer screening among adults with lower education and literacy. Med Decis Making 2014;34:756-72.
8. Koc S, Esin MN. Screening behaviors, health beliefs, and related factors of first-degree relatives of colorectal cancer patients with ongoing treatment in Turkey. Cancer Nurs 2014;37:E51-60.
9. Mitsutake S, Shibata A, Ishii K, Oka K. Association of eHealth literacy with colorectal cancer knowledge and screening practice among internet users in Japan. J Med Internet Res 2012;14:e153.
10. Doubeni CA, Laiyemo AO, Major JM, Schootman M, Lian M, Park Y, *et al*. Socioeconomic status and the risk of colorectal cancer: An analysis of more than a half million adults in the National Institutes of Health-AARP Diet and Health study. Cancer 2012;118:3636-44.
11. Christou A, Thompson SC. Colorectal cancer screening knowledge, attitudes and behavioural intention among Indigenous Western Australians. BMC Public Health 2012;12:528.
12. Tuohy TM, Rowe KG, Mineau GP, Pimentel R, Burt RW, Samadder NJ. Risk of colorectal cancer and adenomas in the families of patients with adenomas: A population-based study in Utah. Cancer 2014;120:35-42.
13. Wong MC, Hirai HW, Luk AK, Lam TY, Ching JY, Griffiths SM, *et al*. The knowledge of colorectal cancer symptoms and risk factors among 10,078 screening participants: Are high risk individuals more knowledgeable? PLoS One 2013;8:e60366.
14. McKinney SY, Palmer RC. The influence of gender on colorectal cancer knowledge, screening intention, perceived risk and worry among African Americans in South Florida. J Community Health 2014;39:230-8.
15. Jillson I, Faeq Z, Kabbara KW, Cousin C, Mumford W, Blancato J. Knowledge and practice of colorectal screening in a suburban group of Iraqi American women. J Cancer Educ 2015;30:284-93.
16. Kalkım A, Dağhan Ş, Taşkın C. Yaşlı bireylerin kolorektal kanserin riskleri ve erken tanısına yönelik bilgi düzeylerinin ve bu kanserle ilişkili risklerinin incelenmesi (Examination knowledge levels of elderly people about colorectal cancer's risks and early diagnosis and their this cancer's risks). Süleyman Demirel Univ Health Sci J 2014;5:88-93.
17. Şahin NŞ, Üner BA, Aydın M, Akçan A, Gemalmaz A, Dişcigil G, *et al*. Aydın merkez ilçede kolorektal kanser taramasına ilişkin bilgi, tutum ve engeller. (Knowledge of, attitudes toward, and barriers to participation of colorectal cancer screening in Aydın central region). Turk J Fam Pract 2015;19:37-48.
18. Baysal HY, Türkoğlu N. Birinci basamağa başvuran bireylerin kolorektal kanserden korunmaya yönelik sağlık inançlarının ve kolorektal kanser ile ilgili bilgi düzeylerinin belirlenmesi. (Evaluation of health beliefs and knowledge levels on protection from colorectal cancer in individuals). Int J Human Sci 2013;10:1238-50.
19. Türkiye Halk Sağlığı Kurumu Kanser Daire Başkanlığı. Kolorektal Kanser Tarama Programı Ulusal Standartları. (Turkey Cancer Institute Department of Public Health National Standards for Colorectal Cancer Screening Program). Available from: http://www.kanser.gov.tr/Dosya/tarama/kolorektal.pdf. [Last accessed on 2015 Jun 14].
20. Sanchez JI, Palacios R, Thompson B, Martinez V, O'Connell MA. Assessing colorectal cancer screening behaviors and knowledge among at-risk hispanics in Southern New Mexico. J Cancer Ther 2013;4:15-25.
21. Taha H, Jaghbeer MA, Shteiwi M, AlKhaldi S, Berggren V. Knowledge and perceptions about colorectal cancer in Jordan. Asian Pac J Cancer Prev 2015;16:8479-86.
22. Bidouei F, Abdolhosseini S, Jafarzadeh N, Izanloo A, Ghaffarzadehgan K, Abdolhosseini A, *et al*. Knowledge and perception toward colorectal cancer screening in east of Iran. Int J Health Policy Manag 2014;3:11-5.

23. Kosgeroglu N, Ayranci U, Ozerdogan N, Serhan N, Unsal A, Sayiner FD. Knowledge of women on early diagnosis methods and risk factors for breast cancer in a province of Western Turkey: A descriptive study. Pak J Med Sci 2011;27:646-50.
24. Wolin KY, Yan Y, Colditz GA, Lee IM. Physical activity and colon cancer prevention: A meta-analysis. Br J Cancer 2009;100:611-6.
25. Boyle T, Keegel T, Bull F, Heyworth J, Fritschi L. Physical activity and risks of proximal and distal colon cancers: A systematic review and meta-analysis. J Natl Cancer Inst 2012;104:1548-61.
26. Jones R, Scobey M, Cheng J. The risk of colon cancer in inflammatory bowel disease. Gastroint Dig Syst 2014;4:164.
27. Dolatkhah R, Somi MH, Kermani IA, Ghojazadeh M, Jafarabadi MA, Farassati F, *et al.* Increased colorectal cancer incidence in Iran: A systematic review and meta-analysis. BMC Public Health 2015;15:997.
28. Cross AJ, Ferrucci LM, Risch A, Graubard BI, Ward MH, Park Y, *et al.* A large prospective study of meat consumption and colorectal cancer risk: An investigation of potential mechanisms underlying this association. Cancer Res 2010;70:2406-14.
29. Orlich MJ, Singh PN, Sabaté J, Fan J, Sveen L, Bennett H, *et al.* Vegetarian dietary patterns and the risk of colorectal cancers. JAMA Intern Med 2015;175:767-76.
30. Erichsen R, Baron JA, Stoffel EM, Laurberg S, Sandler RS, Sørensen HT. Characteristics and survival of interval and sporadic colorectal cancer patients: A nationwide population-based cohort study. Am J Gastroenterol 2013;108:1332-40.
31. Patel SG, Ahnen DJ. Prevention of interval colorectal cancers: What every clinician needs to know. Clin Gastroenterol Hepatol 2014;12:7-15.
32. Jacobs LA. Health beliefs of first-degree relatives of individuals with colorectal cancer and participation in health maintenance visits: A population-based survey. Cancer Nurs 2002;25:251-65.
33. Rawl SM, Champion VL, Scott LL, Zhou H, Monahan P, Ding Y, *et al.* A randomized trial of two print interventions to increase colon cancer screening among first-degree relatives. Patient Educ Couns 2008;71:215-27.
34. Sunkara S, Swanson G, Forsyth CB, Keshavarzian A. Chronic inflammation and malignancy in ulcerative colitis. Ulcers 2011;2011:Article ID: 714046, 1-8.
35. Cameron E, Rose S, Carey M. Assessment of family history of colorectal cancer in primary care: Perceptions of first degree relatives of people with colorectal cancer. Patient Educ Couns 2014;94:427-31.
36. Centers for Disease Control and Prevention (CDC). Vital signs: Colorectal cancer screening test use – United States, 2012. MMWR Morb Mortal Wkly Rep 2013;62:881-8.
37. McGregor S, Hilsden R, Yang H. Physician barriers to population-based, fecal occult blood test-based colorectal cancer screening programs for average-risk patients. Can J Gastroenterol 2010;24:359-64.

© SAGEYA. This is an open access article licensed under the terms of the Creative Commons Attribution Non-Commercial License (http://creativecommons.org/licenses/by-nc/3.0/) which permits unrestricted, noncommercial use, distribution and reproduction in any medium, provided the work is properly cited.

Source of Support: Nil, Conflict of Interest: None declared.