



## Risk Factors and Screening Behaviours of Individuals Aged 50 and over years for Colorectal Cancer

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### Research Article

### ABSTRACT

This study was conducted to determine the risk factors and the screening behaviours of individuals aged 50 and over years for colorectal cancer. The study was carried out cross-sectionally and it included 419 individuals enrolled in a Family Health Centre by a systematic sampling method. Descriptive Characteristics Form, Colorectal Cancer Risk Form and Screening Behaviours of Individuals for Colon Cancer Form were used to collect data. It was determined that 74.4% of individuals were overweight or obese, 65.9% had a chronic disease, 51.1% were not exercising regularly. It was found that 24.3% of individuals knew of the early diagnosis tests of colorectal cancer and 14.8% of individuals have undergone a test for the early diagnosis of colorectal cancer. Knowledge about early diagnosis tests, family member with colon cancer and bowel disease were the main factors that increased rate to undergo an early diagnosis tests. In the study, there is a high prevalence of colorectal cancer risk factors and undergone a test for the early diagnosis of colorectal cancer was low. The study findings suggest individuals should be informed about preventive lifestyle behaviours from colorectal cancer and early diagnosis tests for colorectal cancer.

**Keywords:** Colorectal cancer, Risk factor, Screening

### History

Received: 19/09/2024

Accepted: 11/10/2024

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**How to Cite:** Gürler H, Gündoğdu Akgül N, Gündüz ES (2024) Risk Factors and Screening Behaviours of Individuals Aged 50 and over years for Colorectal Cancer, Journal of Health Sciences Institute, 9(3): 337-343

## Introduction

Colorectal cancer (CRC) is global health problem with a high cost and mortality. More than 1.9 million new cases of CRC and 904.000 deaths were estimated to occur in 2022 (Bray et al., 2024). It is the third most common cancer and leading cause of cancer-related deaths in Turkey (<http://hsgm.saglik.gov.tr>).

Cohort and case-control studies showed that being overweight, physical inactivity, meat-based diet, smoking and alcohol consumption, aging, medical history in polyp or inflammatory bowel diseases, family history and type 2 diabetes are risk factors for CRC (Ferreira et al., 2021; Pan et al., 2023; Ramadan, 2023, Amsdar et al., 2024). Studies indicate that approximately 70–75% of CRC cases was associated with modifiable risk factors (Pan et al., 2023; Ramadan, 2023) and it is troublesome to provide primary protection without diagnosing these risk factors (Tufail et al., 2024). Therefore, determining the preventable risk factors related to CRC and minimising these risks are crucial interventions in preventing CRC (Tufail et al., 2024).

CRC is generally diagnosed in late stages, when patients have distant metastases. Determination of cancer early and without metastases often saves lives and it is effective in reducing burden of treatment and mortality (Bray et al., 2024; Hsiao et al., 2024). According to American Cancer Society, the five year relative survival rates for CRC are 90%

in localized disease, %71 in disease with regional spread and 14% in disease with distant metastasis (Wolf et al., 2018). Therefore, The American Cancer Society recommends that people at average risk of CRC start regular screening at age 45 with highly sensitive guaiac-based fecal occult blood test (gFOBT) every year, visual (structural) exams of the colon and rectum and colonoscopy every 10 years as colorectal screening tests (American Cancer Society). However, screening rates for CRC are not desired level worldwide (Harper et al., 2021; Takahashi and Nakao, 2021; Yıldız et al., 2022; Ata and Gürler, 2024; Ola et al., 2024; Pham et al., 2024). In Turkey, majority of individuals aged of 50 and over had no knowledge of early diagnosis and screening tests for CRC and the participation rates in screening programs were very low (Pirinçi et al., 2013; Bulduk et al., 2017; Yıldız et al., 2022; Ata and Gürler, 2024). Nurses have the different roles of at the primary, secondary, and tertiary levels of colorectal cancer prevention. At the primary level, the most important role related to educating people to prevent cancer and reduce risk factors. At the secondary level, the roles consist of genetic counseling, sigmoidoscopy and colonoscopy, biopsy and screening test follow-ups, while at the tertiary level, their roles include pre-and post-operative care to prevent further complications, rehabilitation, and

palliative care (Çürük and Yüceler Kaçmaz, 2017; Hashemi et al., 2022). Each person's risk for CRC might be higher or lower than this, depending on their risk factors for CRC. Therefore, identifying CRC risk factors and screening behaviours of individuals aged 50 and over, informing and encouraging them to participate in screening behaviours will show the importance of educational role of nurses, contribute to improve activities in health promotion and disease prevention in communities and primary health facilities and reduce morbidity and mortality related to CRC. The aim of the study was to determine the risk factors and screening behaviours of individuals aged 50 and over years for CRC.

## Material and Methods

### Study Sample

A cross-sectional design was used to determine the risk factors and screening behaviours of CRC of individuals in a Family Health Center. Individuals aged 50 and over were detected from the registration system of Family Health Centre. The estimated number of individuals was 4.283 in the registration system of Family Health Centre. Since the universe is known, the number of individuals to be sampled was determined as 419 using the formula  $Nt2pq/d2(N-1)+t2pq$  ( $p=0.17$ ,  $q=0.83$ ,  $d=0.05$ ,  $t=1.96$ ).

The systematic sampling method was used to recruit the respondents. A list consisting of 4.283 individuals aged  $\geq 50$  years was created, and a sampling interval of 10 was used as the constant during study recruitment. A starting number of 6 was selected randomly from the Family Health Centre using a dice. Individuals who can communicate and speak in Turkish, who have no cognitive function disorders such as Alzheimer's and dementia, who are at the age of 50 and over were included in the study. Exclusion criteria were cognitive dysfunction (six individuals) and a diagnosis of CRC (one person).

### Data Collection

The data were collected with home visiting between May 2019 - December 2019. After data collection, the determined risk factors were discussed with individuals and they were informed about the screening programs.

### Data Collection Tolls

**Descriptive characteristics form:** Descriptive Characteristics Form consisted of 19 questions relating to age, gender, marital status, employment and income status, educational level, health insurance, height and weight, body mass index (BMI) and the presence of chronic disease. Body mass index was trichotomised into normal ( $< 25$  kg/m<sup>2</sup>), overweight ( $\geq 25$  kg/m<sup>2</sup>) and obese ( $\geq 30$  kg/m<sup>2</sup>) according to World Health Organisation (WHO) classification.

**CRC risk form:** CRC Risk Form based on the literature data obtained from the case-control studies (Angelo et al., 2016; Park et al., 2016; Alazzeah and Azzeah, 2018) and meta-analysis concerning CRC (Zandonai et al., 2012; Mafiana et al., 2018), consisted of 20 questions relating to smoking and alcohol consumption, regular physical activity (30-60

minutes/three pr four days/a week), eating habits, the presence of cancer or bowel disease, the medical history of CRC in the family. The Food portions were determined according to Turkey Nutrition Guide 2015. A cup of milk or yogurt, a small size fruit, a cup of cooked vegetable, one teaspoon of oil, 75-80 g cooked meat (9-19 cm in diameter and 1 cm thickened), one handful of thick slice fish and kitchen, 8-10 tablespoons cooked legume, 5-6 table spoons fibrous foods, six slices of sausage or salami were accepted a portion (Turkey Nutrition Guide, 2015). After the form was developed, the content validity of it was evaluated by three nursing faculties members and necessary arrangements were made according to their suggestions.

**The screening behaviours of individuals for CRC form:** Screening Behaviours of Individuals for CRC Form developed by the researchers based on the literature consisted of four questions relating to the tests performed for the early diagnosis of CRC (Baysal and Türkoğlu, 2013; Piringçi et al., 2013; Bulduk et al., 2017). In this form, knowledge about CRC screening tests, the status of undergoing the early diagnosis tests of CRC, the test undergone and reasons for undergoing screening tests were evaluated.

### Data Analyses

The data obtained from our study were evaluated with Statistical Package for the Social Sciences software (version 22.0; SPSS Inc., Chicago, IL) program and frequency and percentage were used for descriptive variables. In the evaluation of the data and percentage calculations and Logistic regression analyses were used.

### Ethical Considerations

Ethical committee permission was obtained from the Non-Invasive Clinical Research Ethics Committee of University (IRB No: 2018-03/42) and institutional approval was obtained from the Family Health Center. The participants were informed by the researchers about the aim and administration of the study and consents of those who agreed to participate was obtained.

## Results

It was detected that, 69% (n=289) of individuals were in the 50-65 age group, 57.8% (n=242) were women, 75.7% (n=317) were married, 84.2% (n=353) were unemployed, 64.4% (n=270) had a low income, and 62.9% (n=262) were primary school graduates. The average BMI of individuals was  $28.79 \pm 5.235$ , and of those, 37.9% (n=159) were overweight, 36.5% (n=153) were obese, 19.6% (n=82) were a smoker, 1.9% (n=8) were an alcohol drinker, 51.1% (n=214) were not exercising regularly and 65.9% (n=276) had a chronic disease (hypertension 37.2% (n=103), diabetes 26.7% (n=74), heart diseases 17.4% (n=48), asthma-chronic obstructive pulmoner disease (COPD) 5.5% (n=15) (Table 1). Of individuals, 11.2% (n=47) declared that they have a family member with CRC, 16.9% (n=71) had a bowel disease and the most common bowel disease was chronic constipation (73.2%, n=52). It was

determined that 24.3% (n=102) of individuals knew of the early diagnosis tests of CRC, the primary information source was healthcare personnel (37.4%, n=45) and the most known diagnostic test was colonoscopy (68.6%, n=70). It was found that 14.8% (n=62) of individuals have undergone a test for the early diagnosis of CRC, the most common test was faecal occult blood test (69.3%, n=43) and 40.5% (n=40) had undergone the screening tests for general control (Table 1).

It was detected that; 54.7% (n=229) of individuals consumed dairy products 1-2 portions a day, 58.7% (n=246) consumed red meat less than a portion a day, 54.4% (n=228) consumed vegetable and 62.5% (n=262)

consumed fruit 1-2 portions a day, 47.7% (n=200) consumed fowl less than a portion a day, 54.7% (n=229) consumed fibrous foods, 39.4% (n=165) consumed legume family, 38.7% (n=162) consumed olive oil 1-2 portions/week and 73% never (n=306) consumed fishery or sea products and 71.4% (n=299) never consumed daily coffee (Table 2).

The results of multivariate regression model demonstrated that knowledge about CRC screening methods (Odds ratio 6.545, CI 3.543-12.089) and have a bowel disease (odds ration 0.285, CI 0.146-0.554) increased the participation in the CRC screening programs (Table 3).

**Table 1.** Risk factors and screening behaviours of individuals aged 50 and over for colorectal cancer (n=419)

| Descriptive Characteristics                           |                                     | n(%)      | Mean (SD)    |
|---|-------------------------------------|-----------|--------------|
| Age   | 50-65 years                         | 289(69.0) | 62.13(8.71)  |
|   | 66-75 years                         | 90(21.5)  |              |
|   | 75 years and over                   | 40(9.5)   |              |
| BMI   | Normal (< 25 kg/m <sup>2</sup> )    | 107(25.6) | 28.79(5.235) |
|   | Overweight (≥25 kg/m <sup>2</sup> ) | 159(37.9) |              |
|   | Obese (≥30 kg/m <sup>2</sup> )      | 153(36.5) |              |
| Smoking status  | Never                               | 231(55.1) |              |
|   | Quit smoking                        | 106(25.3) |              |
|   | Smoker                              | 82(19.6)  |              |
| Alcohol usage   | Never                               | 364(86.9) |              |
|   | Quit alcohol                        | 47(11.2)  |              |
|   | Alcohol drinkers                    | 8(9.1)    |              |
| Regular exercises                                     | No                                  | 214(51.1) |              |
|   | Yes                                 | 205(48.9) |              |
| A chronic disease                                     | Yes                                 | 276(65.9) |              |
|   | No                                  | 143(34.1) |              |
| A family member with colon cancer                     | Yes                                 | 47(11.2)  |              |
|   | No                                  | 372(88.2) |              |
| A bowel disease                                       | Yes                                 | 71(16.9)  |              |
|   | No                                  | 348(83.1) |              |
| Bowel disease type                                    | Chronic constipation                | 52(73.2)  |              |
|   | Ulserative colitis                  | 11(15.6)  |              |
|   | Chronic diarrhea                    | 4(5.6)    |              |
|   | Irritable bowel syndrome            | 2(2.8)    |              |
|   | Polyp                               | 1(1.4)    |              |
|   | Colon cancer                        | 1(1.4)    |              |
| Have knowledge about screening tests for colon cancer | Yes                                 | 102(24.3) |              |
|   | No                                  | 317(75.7) |              |
| <b>Known Screening Tests</b>                          |                                     |           |              |
| Colonoscopy   | Yes                                 | 70(68.6)  |              |
| Faecal occult blood                                   | Yes                                 | 32(31.4)  |              |
| Primary information source                            | Healthcare professionals            | 45(37.4)  |              |
|   | Television                          | 36(29.7)  |              |
|   | Neighbor/Relative                   | 26(21.4)  |              |
|   | Internet                            | 14(11.5)  |              |
| Have Colorectal Cancer Early Diagnosis Tests          | Yes                                 | 62(14.8)  |              |
|   | No                                  | 57(85.2)  |              |
| Test  | Faecal occult blood test            | 43(69.3)  |              |
|   | Colonoscopy                         | 9(30.7)   |              |
|   | General control                     | 40(40.5)  |              |
|   | Doctor advice                       | 37(37.3)  |              |
| The Reason of Having Colorectal Cancer                | Intestinal complaints               | 11(11.1)  |              |
|   | A family member with colon cancer   | 11(11.1)  |              |

**Table 2.** Risk factors according to eating habits of individuals (n=419)

| Food Groups             | Less than a portion/day |      | 1-2 portions/day         |      | 3-5 portions/day         |      | More than 5 portions/day         |      |
|-------------------------|-------------------------|------|--------------------------|------|--------------------------|------|----------------------------------|------|
|                         | n                       | %    | n                        | %    | n                        | %    | n                                | %    |
| Dairy products          | 148                     | 35.3 | 229                      | 54.7 | 40                       | 9.5  | 2                                | 0.5  |
| Red meat                | 246                     | 58.7 | 140                      | 33.4 | 33                       | 7.9  | -                                | -    |
| Vegetable               | 94                      | 22.4 | 228                      | 54.4 | 75                       | 17.9 | 22                               | 5.3  |
| Fruid                   | 86                      | 20.5 | 262                      | 62.5 | 64                       | 15.3 | 7                                | 1.7  |
| Chicken                 | 200                     | 47.7 | 196                      | 46.8 | 23                       | 5.5  | -                                | -    |
| Coffee/day              | <b>Never</b>            |      | <b>1-2 cups</b>          |      | <b>3-5 cups</b>          |      |                                  |      |
|                         | 299                     | 71.4 | 114                      | 27.2 | 6                        | 1.4  |                                  |      |
|                         | <b>Never</b>            |      | <b>1-2 portions/week</b> |      | <b>3-5 portions/week</b> |      | <b>More than 5 portions/week</b> |      |
| Fibrous foods           | 105                     | 25.1 | 229                      | 54.7 | 66                       | 15.8 | 19                               | 4.5  |
| Legume family           | 132                     | 31.5 | 165                      | 39.4 | 95                       | 22.7 | 27                               | 6.4  |
| Olive oil               | 108                     | 25.8 | 162                      | 38.7 | 83                       | 19.8 | 66                               | 15.8 |
| Fishery or sea products | 306                     | 73.0 | 106                      | 25.3 | 7                        | 1.6  | -                                | -    |
| Processed meat          | <b>Never</b>            |      | <b>Everyday</b>          |      | <b>1-2 times/week</b>    |      | <b>3-5 times/week</b>            |      |
|                         | 277                     | 67.2 | 9                        | 2.1  | 114                      | 27.2 | 19                               | 4.5  |

**Table 3.** Categorical variables associated with colorectal cancer screening behaviours

| Variables   | Beta   | SE    | Crude OR | 95%CI        | p value | Wald   | Adjusted OR | 95%CI        | p value |
|---|--------|-------|----------|--------------|---------|--------|-------------|--------------|---------|
| Have a family member diagnosed with colon cancer      | -0.401 | 0.398 | 0.349    | 0.174-0.700  | 0.378   | 1.019  | 0.669       | 0.307-1.459  | 0.313   |
| Have a diagnosed bowel disease                        | -1.256 | 0.340 | 0.318    | 0.174-0.582  | p<0.001 | 13.650 | 0.285       | 0.146-0.554  | p<0.001 |
| Have knowledge about screening tests for colon cancer | 1.879  | 0.313 | 6.649    | 3.744-11.806 | p<0.001 | 36.005 | 6.545       | 3.543-12.089 | p<0.001 |

## Discussion

The incidence and prevalence of CRC has been steadily increasing worldwide. Despite the notable increases in the incidence and prevalence, potential risk factors such as chronic diseases, unhealthy diet, obesity are common, while preventive behaviours such as regular exercise are limited (Amsdar et al., 2024; O' Sullivan et al., 2024). WHO defines obesity as a global health hazard that its incidence tripled since 1975, and the data show that 43% of adults were overweight in 2022 (<https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight>). Obesity, amongst secondary reasons for the preventable deaths by causing 2.8 million deaths each year, is a risk factor for CRC as well (<https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight>; Pan et al. 2023; Ramadan, 2023). It is reported that obesity increase the incidence of CRC by 30-70% triggering the tumour development because of insulin resistance, hyperinsulinemia and an increase in serum leptin levels (Alazzeah and Azzeh, 2018). Lewandowska et al. (2022) found that the risk of CRC was 1.27 times higher in obese groups compared with nonobese subjects. We also determined that 74.4% of individuals were overweight and obese. This finding indicates approximately 3/4 of our sample group are in the risk of CRC because of obesity,

therefore, the community should be informed about the detrimental effects of obesity on health.

Experimental and epidemiological studies indicate there is a connection between eating habits and CRC, consumption of animal origin increases the incidence of CRC and consumption of fruits and vegetables decrease it (Ferreira et al. 2021; Veetil et al., 2021; Lewandowska et al., 2022; Tufail et al., 2024). An umbrella review of 45 meta-analyses suggested an association between dietary habits and the risk of CRC (Veetil et al., 2021). A meta-analysis study investigating the relationship between meat consumption and CRC, Zandonai et al. (2012) confirmed that red meat consumption increased CRC risk by 28-35% and processed meat by 20-40%. In our study, the daily red and processed meat consumption of individuals were found to be low. These rates indicate that the risk of CRC associated with meat consumption can be low.

A diet rich in vegetable, fruit, fibrous foods, fishery and dairy products may decrease the risk of CRC (Ferreira et al., 2021; Veetil et al., 2021; Tufail et al., 2024). These foods are antioxidants and they may reduce the CRC risk by 27% (Alazzeah and Azzeh, 2018). In our study, individuals have diets rich in fruit, vegetable and dairy products, but weekly poor in legumes, fibrous foods and fishery products and that olive oil consumption in meals was inadequate. The limited consumption of fish, olive oil

and fibrous foods in this group may result in the lack of protection against CRC. Therefore, it should be emphasized that diet affects the development and prevention of CRC and information about healthy eating habits should be provided for individuals by interdisciplinary cooperation.

Coffee contains more than 1000 bioactive compounds with antioxidant capacity including polyphenols, melanoidins, diterpenes and caffeine (Schmit et al., 2016; Cross and Gunter, 2018; Emile et al., 2023; Oyelere et al., 2024). These compounds contained in coffee can prevent CRC by decreasing bile acid secretion and improving intestinal function by showing chemopreventive, anti-mutagenic or antioxidant properties (Schmit et al., 2016). In our study, it was found that nearly half of individuals did not consume coffee on a daily basis. This finding indicates that coffee-induced CRC protection can be low in our sample group.

An active lifestyle including regular physical exercise prevents CRC by 12% causing an increase in antioxidant capacity as well as helping in the control of weight and blood glucose levels (Alazzeah and Azzeah, 2018). It was suggested that the rate of regular physical activity in cancer patients is lower than that of the control group (Chang et al., 2021; Lewandowska et al., 2022). In our study, it was found that 51.1% of individuals did not exercise, therefore we think that this will increase the risk of CRC in our sample group.

Although there are conflicting findings regarding chronic constipation causing CRC, studies determined that constipation can be one of the main cause (Alsheridah and Akhtar, 2018; Staller et al., 2022; Wu et al., 2023). It was reported that the risk of CRC increases in chronic constipation as a result of increased contact time of concentrated carcinogenic agents to the intestinal mucosa, such as bile acids and ammonium acetate (Alsheridah and Akhtar, 2018; Wu et al., 2023). In our study, 16.9% of individuals had a diagnosed bowel disease and the most common bowel disease was chronic constipation. Considering that constipation is a preventable health problem, developing educational programs to prevent constipation in the community will help to reduce the risk of CRC.

In the literature, it was emphasized that chronic diseases such as hypertension, diabetes and COPD are associated with CRC (Alazzeah and Azzeah, 2018; Tufail et al., 2024). In a study, hypertension, diabetes and COPD were the most common chronic diseases in individuals with CRC (Turan et al., 2012). In their study, Alazzeah and Azzeah (2018) found that 35.8% of patients with CRC had diabetes, 32.1% had hypertension, and the rate of incidence of CRC was 2.6 times higher in individuals with diabetes. We determined that 65.9% of individuals had a chronic disease and the most common chronic diseases were hypertension and diabetes, therefore, we think that these diseases will increase the risk of CRC for our sample group. In line with these findings, it is important to raise awareness in developing healthy lifestyle behaviours for the prevention of chronic diseases in the community.

The presence of a family member with CRC is an important risk factor for colon cancer (Amsdar et al., 2024; O' Sullivan et al., 2024). In a cohort study investigating colorectal cancer risk factors, family history of colorectal cancer was determined to be an important risk factor (O' Sullivan et al., 2024). Mafiana et al. (2018) showed that the risk of developing CRC was found to be three times higher in individuals with a medical history of CRC in the family. In our study, it was determined that 11.2% of individuals had a colorectal CRC in their families. It is important to inform these risky individuals to participate in the early diagnosis tests for CRC.

Screening is the gold standard for early diagnosis of CRC (Wolf et al., 2018). The detection of CRC at an earlier and more favourable stage have been shown to significantly reduce incidence and mortality (Harper et al., 2021; Takahashi and Nakao, 2021; Hsiao et al., 2024). Although the incidence and mortality rate of CRC is reduced with the development of early diagnosis and screening methods, early diagnosis and screening rates are inadequate throughout the world (Kahraman and Kurşun Kural, 2023; Ola et al., 2024) and therefore cases are late-diagnosed and the chance of treatment decreases (Costea et al., 2018). In this study, only 14.8% of individuals had undergone CRC screening mostly for the purpose of general control and the most common screening test was faecal occult blood test (10.3%). In similar studies conducted in our country, rates of a faecal occult blood test for CRC screening were found as 14.6% (Yıldız et al., 2022), 20.5% (Pirinççi et al., 2015) and 22.5% (Bulduk et al., 2017). In the studies conducted in other countries, they found that the rate of undergoing an early diagnosis test of CRC was low (Takahashi and Nakao, 2021; Ola et al., 2024; Pham et al., 2024). In a study included data from 129,750 respondents across 29 European countries, Ola et al. (2024) found that utilization of FOBT was high in countries such as Denmark (67.1%), Netherlands (64.5%), Slovenia (54.6%), Belgium (36.1%), it was below 10% in, Norway, Poland, Iceland, Romania, Bulgaria and Cyprus. These results obtained from our study and other national and international studies suggested that rates of screening tests for CRC were low and these insufficient rates of screening tests may lead to late diagnosis of CRC and increase CRC-related morbidity and mortality.

Studies have suggested that the level of education (Bulduk et al., 2017; He et al., 2018; Harper et al., 2021; Agunwamba et al. 2023), the presence of a history of CRC in the family (Agunwamba et al., 2023) and the lack of awareness and knowledge about CRC and screening behaviours (Agunwamba et al., 2023; Kahraman and Kurşun Kural, 2023) are important factors in participating in CRC screening behaviours of individuals. Literature showed that individuals with a high educational level, a family member with CRC and who had knowledge about diagnostic tests had higher rates of screening tests (Bulduk et al., 2017; He et al., 2018; Agunwamba et al. 2023; Kahraman and Kurşun Kural, 2023). In our study, the rate of undergoing CRC screening

tests was higher in individuals who knew the screening tests and who had a bowel disease and this rate was 6.5 times higher in those who had knowledge about screening tests. This results show that knowledge about CRC screening tests is very important to undergo a screening test.

## Conclusion

We showed that individuals aged 50 and over have risk factors such as overweight, physical inactivity, the lack of weekly legume, fibrous foods and fish consumption, inadequate use of olive oil in meals, chronic diseases such as type II diabetes and hypertension. Knowledge of early diagnosis tests and participation rates of individuals was low, and knowledge of screening tests and having a family member with CRC affected participation in screening programs. Therefore, nurses have important responsibilities to reduce CRC risk factors and improve the CRC screening rates. In this context, nurses, who are primary agents in the prevention of CRC, should identify the risk factors of the patients and inform them about the development of healthy lifestyle habits and early diagnosis tests by conducting CRC awareness programs in clinical and community areas. Early diagnosis tests should be announced by media and health care professionals, informative brochures should be provided for all hospitalised patients aged 50 and over and healthy individuals.

## Limitations of Study

The main limitation of this study is that the study is conducted only one family health center. Therefore, the sample does not represent the whole society and it would be difficult to generalize these results. Future studies should include more family centers to further determine CRC risk factors and screening behaviours of individuals aged 50 and over.

What did the study add to the literature?

- There is a high prevalence of CRC risk factors
- Undergone a test for the early diagnosis was low
- Knowledge about early diagnosis tests, family member with CRC and bowel disease were the main factors that increased rate to undergo an early diagnosis tests.
- Since this study evaluated CRC risk factors and cancer screening behaviors together, it is important in that it provides awareness of the importance of reducing risk factors as well as improving screening behaviors, especially in risky individuals.

## Conflict of Interest

The authors have no funding or conflicts of interest to disclose.

## Financial Disclosure

The authors have no funding for this study.

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