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RESEARCH ARTICLE

Determination of Cancer Risk Perceptions and Health Beliefs of First-Degree Relatives of Patients Who Were Operated with Colorectal Cancer Diagnosis

Kolorektal Kanser Tanısı ile Opere Edilmiş Hastaların Birinci Derece Akrabalarının Kanser Risk Algıları ve Sağlık İnançlarının Belirlenmesi

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ABSTRACT

Aim: The purpose of this study was to determine the risk perceptions and health beliefs of first-degree relatives of individuals who underwent surgery for a diagnosis of colorectal cancer.

Methods: This was a descriptive, cross-sectional study conducted between January 2014 and December 2015 in the general surgery department of a teaching hospital. The universe of the study consisted of first-degree relatives (children, siblings, parents) of patients who underwent surgery for colorectal cancer. The sample included all first-degree relatives who met the inclusion criteria and agreed to participate in the study during the specified period. Written and verbal consent was obtained from all participants after the study was approved by the ethics committee. Descriptive and sociodemographic characteristics and the health belief model scale were included in the data collection form. SPSS 15.0 package program was used for statistical analysis of the data. Descriptive statistics were used to analyze demographic data. Mann-Whitney U, Student's t, analysis of Variance, and Kruskal-Wallis tests were used in the analysis of dependent and independent variables. Linear regression analysis was used to evaluate the data related to the factors that may affect participation in colonoscopy and fecal occult blood screening.

Results: Participants included in the survey were between the ages of 21 and 75 years with a mean age of 47.69±11.20 years. Most of the participants were female (65%) and married (82%). Most participants did not use alcohol (92%) or cigarettes (73%). The mean body mass index of the participants was 26.42±4.51. Mean subscale scores were 48.14±6.54 [minimum (min)=26, maximum (max)=55] for confidence/benefit, 14.41±4.28 (min=6, max=26) for susceptibility, 16.19±3.86 (min=8, max=26) for barriers, 16.29±2.94 (min=7, max=25) for health motivation, and 16.73±3.43 (min=6, max=24) for seriousness.

Conclusion: Our results clearly indicate that participation in colorectal screening is inadequate in this group. It is important to plan the necessary interventions to increase the screening participation of first-degree relatives who are at risk for colorectal cancer.

Keywords: Colorectal cancer, health belief, first-degree relatives

ÖZ

Amaç: Bu çalışmanın amacı; kolorektal kanser sebebiyle opere edilmiş bireylerin birinci derece akrabalarının risk algılarını ve sağlık inançlarını belirlemektir.

Yöntem: Bu çalışma tanımlayıcı ve kesitsel olarak yapılmıştır. Araştırma Ocak 2014-Aralık 2015 tarihleri arasında bir eğitim hastanesinin genel cerrahi kliniğinde yapılmıştır. Araştırmanın evrenini kolorektal kanser tanısı ile opere edilen hastaların birinci derece akrabaları (çocukları, kardeşleri, ebeveynleri) oluşturmuştur. Çalışmaya katılmayı kabul eden tüm hastaların birinci derece akrabaları çalışmanın örneklemini oluşturmuştur. Etik kurul izni alındıktan sonra katılımcıların yazılı ve sözlü onamları alınmıştır. Veri toplama formunda, tanımlayıcı ve sosyodemografik özellikler ile sağlık inanç modeli ölçeği yer almaktadır. Elde edilen verilerin istatistiksel analizinde SPSS 15.0 paket programı kullanılmıştır. Katılımcıların demografik özelliklerinin analizinde tanımlayıcı istatistikler kullanılmıştır. Bağımlı ve bağımsız değişkenlerin analizinde Mann-Whitney U, Student

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ÖZ

t testi, Varyans analizi ve Kruskall Wallis testleri kullanılmıştır. Kolonoskopi ve Gaitada Gizli Kan testlerini yaptırma durumlarını etkileyebileceği düşünülen faktörlere ilişkin verilerin değerlendirilmesinde lineer regresyon analizi kullanılmıştır.

Bulgular: Araştırmaya dahil olan katılımcılar 21 ile 75 yaş arasında olup yaş ortalaması 47,69'dur [standart sapma (SS): 11,20]. Katılımcıların çoğu kadındır (%65) ve evlidir (%82). Katılımcıların çoğu alkol (%92) ve sigara (%73) kullanmamaktadır. Katılımcıların beden kitle indeksi ortalaması 26,42'dir (SS: 4,51). Alt ölçek puan ortalamaları; güven-yarar için 48,14±6,54 [min (minimum)=26, maksimum (maks)=55], duyarlılık için 14,41±4,28 (min=6, maks=26), engel için 16,19±3,86 (min=8, maks=26), motivasyon için 16,29±2,94 (min=7, maks=25), ciddiyet için 16,73±3,43'tür (min=6, maks=24).

Sonuç: Elde edilen verilerden yola çıkarak bu riskli grupta yeterli katılımın sağlanmadığı söylenebilir. Kolorektal kanser için riskli olan birinci derece akrabaların tarama programlarına katılımlarının artırılması için gerekli girişimlerin planlanması önemlidir.

Anahtar Kelimeler: Kolorektal kanser, sağlık inançları, birinci derece akraba

Introduction

Colorectal cancer (CRC) is one of the most common types of cancer worldwide. According to GLOBOCAN 2012 data published by International Agency for Research on Cancer, there have been 1.4 million new cases of CRC with an estimated 693.900 deaths.[1] Turkish cancer data for 2015 indicates that CRC was the third most common cancer in 2012 with a prevalence of 15.2 per 100.000 females and 24.7 per 100.000 males.[2] The risk of developing CRC is highest among people over the age of 50-55, those with a family history of CRC, and those with inflammatory bowel disease.[1,3,4] Lifestyle, diet, and physical activity have also been associated with CRC risk.[1,3,5] Dietary recommendations for primary protection from CRC include having a diet high in fiber, taking antioxidant vitamins, consuming mineral-enriched food, eating a vegetable-based diet, and reducing consumption of red meat, processed meat, and alcohol; lifestyle recommendations include avoiding smoking, maintaining a normal weight, and engaging in regular physical activity. Secondary protection measures involve screening the target population and removing precancerous polyps.[4,6,7] Screening programs are an important part of the efforts to reduce CRC incidence and mortality rates. These programs facilitate early diagnosis, which can prevent progression and enable more effective treatment.[7,8] For screening programs to be successful, there needs to be a high level of participation among the individuals at risk. The immediate family members of individuals with CRC have a higher risk of developing CRC themselves. Therefore, it is especially important for first-degree relatives of CRC patients to participate in screening programs. The participation rate among the at-risk family population in CRC screening varies between 38-90%.[9] This rate is higher than in the general population, but still not as high as it should be.[7] Cancer is a disease that raises sensory and cognitive awareness of its causes, effects, and treatments by creating anxiety in the community.[10] Similarly, when someone undergoes surgery because of cancer, it propagates a feeling of risk both in the patient and among his/her friends and relatives. Perceived risk may generate cognitive motivation, which in turn leads to health-promoting behaviors.[11] In many conceptual and theoretical models of health behavior, psychosocial dimensions are evaluated to investigate the factors that influence participation in screening programs. The Health Belief Model is an established guide for explaining and measuring what motivates or deters individuals from exhibiting health-promoting behaviors.[12,13,14] The model asserts that health behavior is affected by beliefs, values, and attitudes. The first-degree relatives of individuals who have undergone CRC surgery have a higher risk of developing CRC. Identifying the risk perceptions and health beliefs of this group is important in order to identify ways to increase their participation in screening.

Materials and Methods

This descriptive, cross-sectional study was conducted to determine the cancer risk perceptions and health beliefs of first-degree relatives of patients diagnosed and operated for CRC. The study was performed between January 2014 and December 2015 in the general surgery clinic of a training hospital. The research universe consisted of the first-degree relatives (children, siblings, parents) of patients who were diagnosed and underwent surgery for CRC. There was no sampling frame for the study; the sample comprised all of the patients' first-degree relatives who met the study criteria and volunteered to participate during the study period. Inclusion criteria included being the first-degree relative (mother, father, child, or sibling) of a patient who was diagnosed and operated for CRC in our general surgery department; knowing Turkish; being at least 18 years of age; and agreeing to participate in the research. Individuals who did not meet these criteria or withdrew their consent to participate at any stage of the study were excluded. The study was approved by University of Health Sciences, Gülhane Training and Research Hospital Ethics Committee prior to data collection (approval no: 50687469-

1491-140-16/1648-449). The participants were informed about the study and written and oral consent was obtained from all volunteers. The data collection form was prepared by the researchers and consisted of two sections. The first section included 27 questions regarding the participants' demographic information (such as age, gender, education) and their knowledge about the risks of CRC. The second section included the health belief model scale for CRC. Data were collected via face-to-face interviews.

Health Belief Model Scale for Colorectal Cancer

The health belief model scale for CRC was adapted from Champion's Health Belief Model Scale as adapted by Jacobs in 2002. Validity and reliability studies for the Turkish version of the scale were conducted in 2007 by Ozsoy et al.[12] The scale consists of 33 items scored on a 5-point Likert scale with the options of strongly agree, agree, somewhat agree, disagree, and strongly disagree. Its subscales are confidence and benefits (11 items), susceptibility (6 items), barriers (6 items), health motivation (5 items), and seriousness (5 items). The Cronbach's alpha reliability range is 0.54-0.88. The collected data were statistically analysed using SPSS 15.0 software package. Descriptive statistics were used to analyze the participants' demographic characteristics. Dependent and independent variables were analyzed using the Mann-Whitney U, Student's t, analysis of Variance, and Kruskal-Wallis tests. Logistic regression analysis was done to evaluate factors that may influence the decision to undergo colonoscopy and fecal occult blood (FOB) tests.

Results

Descriptive and Sociodemographic Characteristics

The study participants were between 21 and 75 years old, with a mean age of 47.69±11.20 years. Sixty-five percent of the participants were female and most (82%) were married. Ninety-two percent of the participants stated that they did not use alcohol and 73% were nonsmokers. The mean body mass index (BMI) of the participants was 26.42±4.51 (Table 1).

Health Behaviors and Health History

Sixty-five percent of the participants described their health as good or excellent. Most of the participants have no colorectal disease and 26% had undergone screening at least once. When asked about their perceived risk of developing CRC, 43% of the participants responded with 'I don't know', while 10% perceived themselves as being at high risk. Reasons given for not participating in CRC screening programs included 'I am not informed' for 36% and 'It was not recommended to me' for 21% of the participants (Table 2).

Health Beliefs

Mean subscale scores were 48.14±6.54 [minimum (min)=26, maximum (max)=55] for confidence/benefits, 14.41±4.28 (min=6, max=26) for susceptibility, 16.19±3.86 (min=8, max=26) for barriers, 16.29±2.94 (min=7, max=25) for motivation, and 16.73±3.43 (min=6, max=24) for seriousness.

Regression Analysis of the Factors Influencing Decision to Have Colonoscopy and FOB Tests

The logistic regression analysis of univariate and multivariate factors influencing colonoscopy performance is shown in

Table 1. Characteristics of participants (n=100)

Characteristic	n %
Age (years)	
Mean ± SD*	47.69±11.20
Sex	
Female	65
Male	35
Marital status	
Married	82
Single	18
Education level	
Primary school	29
High school	33
University or higher	38
Alcohol use	
Yes	8
No	92
Cigarette use	
Yes	27
No	73
Exercise	
None	26
Rarely	56
Frequently	11
Regularly	7
Diet	
High-fiber, fruit, vegetables	28
Low-fiber, protein-rich, fatty	20
Balanced fiber, protein, and fats	52
Body mass index	
Mean ± SD*	26.42±4.51

*Mean + Standard deviation, SD: Standard deviation

Table 3. Unemployed participants had a 4.376-fold higher risk of avoiding colonoscopy than employed participants. Perceived barriers was a significant factor in colonoscopy avoidance [odds ration (OR)=1.283]. In other words, individuals with higher perceived barriers were more likely to avoid colonoscopy. In univariate regression analysis, risk of avoiding colonoscopy was not associated with gender, age, BMI, marital status, employment status, smoking and use of alcohol, exercise habits, dietary habits, perceived risk, bowel diseases, awareness of screening methods, intent to have a screening test soon, barriers to participating in screening programs, desire for information, or perceived confidence/benefit, perceived susceptibility, health motivation, and perceived seriousness scores. After correcting for age, employment status, dietary habits, bowel diseases, awareness of screening methods, desire for information, perceived confidence/benefit, perceived susceptibility, and health motivation, risk of avoiding colonoscopy was significantly associated with being unemployed (OR=5.607), having a bowel disease (OR=0.168), desire for information (OR=5.329), perceived barriers (OR=1.310), and health motivation (OR=0.793). The logistic regression analysis of univariate and multivariate factors influencing FOB test performance is shown in Table 4. Individuals who were knowledgeable about screening methods were at 0.260 times higher risk of avoiding FOB. Participants who cited "I am afraid the procedures will hurt" as a barrier to participating CRC cancer screening programs had a 0.136 times higher risk of avoiding FOB testing. Those who desired information had a 3.354-fold higher risk of avoiding FOB, whereas stronger health motivation reduced the risk of avoiding FOB (OR=0.824). Gender, marital status, employment status, smoking and use of alcohol, dietary habits, exercise habits, perceived risk, bowel diseases, intent to have a screening test soon, age, BMI, and perceived confidence/benefit, perceived susceptibility, perceived barrier, and perceived seriousness scores were not associated with the risk of avoiding FOB testing in univariate regression analysis. After correcting for awareness of screening methods, desire for information, perceived susceptibility, health motivation, and perceived seriousness, there were statistically significant associations between risk of avoiding FOB and willingness to be informed (OR=5.188) and health motivation (OR=0.773).

Table 2. Health behaviors and medical history of the participants

Characteristic	n %
Perceived health	
Poor-fair	35
Good-excellent	65
Frequency of bowel movements	
≥2 per day	17
≥1 per day	55
1 per 2-3 days	26
≤1 per week	2
Colorectal disease	
Yes	22
No	78
Sreening tests performed	
Fecal occult blood	8
Colonoscopy	7
Both	11
Perceived risk of colorectal cancer	
I'm not at risk	14
I don't know	45
Average	15
Moderate	16
High	10
Wants information about colorectal cancer and screening tests	
Yes	37
No	63
Barriers to participation in colorectal cancer screening tests	
I am not informed	36
I am embarrassed	5
Pain	10
It was not recommended	21
Fear of cancer	15
Other (e.g. lack of time)	13

Discussion

This study evaluated CRC-related health beliefs and screening participation among first-degree relatives (mother, father, siblings, children) of patients diagnosed and operated for CRC. In Turkish society, visiting patients in the hospital is extremely important. In particular, the immediate family members of patients scheduled for an operation tend to visit the hospital before, during, and after the patients undergo surgery. Raised awareness of the disease and higher participation rates in CRC screening programs among these patients' relatives are desired consequences of their witnessing this difficult process. In the present study, the rate of undergoing colonoscopy and FOB tests among the first-degree relatives of CRC patients was very low (26%). Another study of individuals aged 50+ who were at risk,

including the first-degree relatives of CRC patients, also reported that a low proportion had undergone screening tests (30.7%).[13] Courtney et al.[15] also found that 33% of first-degree relatives who were at high risk of CRC had had no screening test. Similar results have been reported in other studies as well.[9,16] Counterintuitively, these results indicate that immediate family members of CRC patients, who are known to be at higher risk of developing CRC themselves, are not sufficiently motivated to participate in screening programs. Regarding their reasons for not participating, most of the respondents said that they were not informed about the screening programs or that they were not recommended to undergo screening. This highlights the need for health care professionals to prepare informational programs targeted at this risk group and actively recommend their participation. Shiloh et al.[11] reported a positive correlation between the degree of concern about colon cancer and perceived possibility and seriousness. Ensuring that this risk

Table 3. Results of univariate and multivariate logistic regression analysis of factors that may be associated with avoidance of colonoscopy

	First stage				Terminal model			
			95% Confidence interval				95% Confidence interval	
	OR	p	Lower	Upper	OR	p	Lower	Upper
Colonoscopy								
Employment status								
Employed								
Unemployed	**4.376**	**0.034**	1.120	17.100	**5.607**	**0.037**	1.110	28.326
Retired	1.242	0.745	0.336	4.588	1.459	0.649	0.288	7.398
Bowel disease								
No								
Yes	0.352	0.063	0.117	1.058	**0.168**	**0.018**	0.038	0.740
Barrier to participation								
I am not informed								
It was not recommended	0.400	0.214	0.094	1.697				
I am afraid of being diagnosed with cancer	0.500	0.407	0.097	2.571				
I am afraid that the procedures will be painful	0.188	**0.045**	0.036	0.964				
Desire for information								
No								
Yes	2.654	0.095	0.844	8.341	**5.329**	**0.025**	1.231	23.067
Benefit								
	0.915	0.097	0.824	1.016				
Susceptibility								
	0.938	0.285	0.834	1.055				
Barriers								
	1.283	**0.003**	1.091	1.509	**1.310**	**0.007**	1.078	1.592
Health motivation								
	0.871	0.119	0.731	1.036	**0.793**	**0.037**	0.638	0.986
Seriousness								
	0.919	0.294	0.785	1.076				

OR: Odds ratio

p<0.05 was accepted as statistically significant

group feels concerned about CRC, particularly while they are present in the hospital, may influence perceived risk and seriousness and thereby increase the rate of participation in screening programs. The mean total and subscale scores in our study are comparable to results obtained by Koc and Esin.[16] This suggests that the health beliefs of immediate family members are affected similarly when they witness the hospitalization process of patients who undergo surgery or oncological treatment for CRC. As for the perceived risk perception in the target population in our study, only 10% believed themselves to be at high risk and 45% did not know about their level of risk. In a study by Gimeno García et al.[9] 46.7% of the first-degree relatives of CRC patients considered themselves at high risk. Akhtar et al.[5] also concluded that 59% of the immediate family members of CRC patients in their study were aware of their high risk status. Furthermore, Cameron et al.[17] also determined that perceived risk was high in 46% of the target population in their study. Risk perception, which is incorporated in many health belief models, is a cognitive concept with significant influence on screening behaviors. The low levels of perceived risk observed among the participants in our

Table 4. Results of univariate and multivariate logistic regression analysis of factors that may be associated with avoidance of fecal occult blood testing

	First stage				Terminal model			
			95% Confidence interval				95% Confidence interval	
	OR	p	Lower	Upper	OR	p	Lower	Upper
Fecal occult blood								
Knowledge of screening methods								
No								
Yes	**0.260**	**0.012**	0.092	0.740				
Barrier to participation								
I am not informed								
It was not recommended	0.386	0.246	0.077	1.928				
I am afraid of being diagnosed with cancer	0.364	0.252	0.064	2.054				
I am afraid that the procedures will be painful	**0.136**	**0.024**	0.024	0.770				
I am embarrassed	0.364	0.426	0.030	4.385				
Other	0.205	0.062	0.039	1.085				
Desire for information								
No								
Yes	**3.354**	**0.033**	1.099	10.236	**5.188**	**0.011**	1.449	18.574
Benefit								
	0.964	0.406	0.885	1.051				
Susceptibility								
	0.894	0.059	0.795	1.005	0.889	0.065	0.785	1.007
Barriers								
	1.043	0.525	0.915	1.189				
Health motivation								
	0.824	**0.031**	0.691	0.983	**0.773**	**0.011**	0.634	0.942
Seriousness								
	0.881	0.120	0.751	1.033				

OR: Odds ratio

$p<0.05$ was accepted as statistically significant

study correspond to their low screening rates. The risk perception figures in the studies cited above are higher than those obtained in studies conducted in our country. The high levels of perceived risk in European countries may be due to cultural, educational, and institutional differences. According to available evidence, screening participation rates are higher in immediate family members than the general population but are still not at desired levels.[7] Educational and institutional activities should be organized in Turkey to encourage first-degree relatives who are at high risk of CRC to participate in screening programs. The screening participation rate in the target population is expected to be at least 70%. Delgado-Plasencia et al.[6] reported in their study that participation in screening programs among immediate family members of CRC patients in the hospital increased due to doctor recommendations. This indicates that health care personnel can improve rates of screening by advising first-degree relatives of CRC patients who stay with or visit them at the hospital to participate in these programs. In our study, unemployed individuals were at high risk of not undergoing colonoscopy. People must be able to meet their basic needs in order to be healthy, and having a source of income is an important part of this ability. The Turkish Statistics Institute reported an unemployment rate of 11.1% for January 2016. This high figure is an important problem for our country because it affects health-related behaviors just as it does all other aspects of life. Individuals in our study who had high perceived barriers were also at risk of not undergoing colonoscopy. In a research performed with the immediate family members of patients with CRC, Jacobs reported that those with high perceived barriers according to the Health Belief Model had a 2.99-fold higher risk of nonparticipation in screening programs.[8] Similar results were reported by Koc and Esin[16] Perceived barriers may have adverse effects on health behaviors. This is also supported by the data obtained in our study. We determined in this study that lower health motivation had a negative impact on screening participation. Koc and Esin[16] also concluded that health motivation influences decisions of whether or not to undergo screening tests. The stronger an individuals' health motivation, the greater the likelihood of exhibiting health-promoting behaviors. Consequently, it is important that first-degree relatives of CRC patients, as they comprise a high-risk group, should be informed and encouraged by health care personnel in the hospital to increase their likelihood of participating in screening programs. As stated in the 2013-2018 cancer control plan, there are several steps to be taken at a national level in Turkey to increase the public's participation in screening programs. These include implementing relevant standards in all hospitals, collaborating on education and public awareness activities, familiarizing screening programs, organizing campaigns in print and visual media for informing and incentivizing the public, producing short films with the help of popular Turkish artists, and broadcasting these films at appropriate times. In conclusion, it is crucial to encourage first-degree relatives of patients with CRC to participate in screening programs to ensure early diagnosis and treatment. The available data indicate that this high-risk group does not exhibit adequate rates of participation in CRC screening programs. Addressing this issue with them while in the hospital accompanying or visiting patients undergoing surgery for CRC may yield higher participation rates in this target population.

Ethics

Ethics Committee Approval: The study was approved by the University of Health Sciences, Gülhane Training and Research Hospital Ethics Committe (approval number: 50687469-1491-140-16/1648-449).

Informed Consent: Was taken.

Peer-review: External and internal peer-reviewed.

Authorship Contributions

Concept: B.Ö., E.İ., S.T., Design: B.Ö., E.İ., S.T., M.F.C., Data Collection or Processing: B.Ö., M.Ö., Analysis or Interpretation: B.Ö., E.İ., S.T., M.F.C., M.Ö., Literature Search: B.Ö., M.Ö., Writing: B.Ö., E.İ., S.T.

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