Original Article

The Cancer Risk Perceptions and Health Improvement and Protection Behaviors of Individuals with a Family History of Cancer

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Abstract

Objective: This study was conducted to determine the relationship between the cancer risk perceptions of individuals with a family history of cancer and their health improvement and protection behaviors.

Method: The cross-sectional study was conducted with 170 individuals who were first-degree relatives of the inpatients of the Oncology and Hematology clinics between January and August 2020. Data were obtained using personal information form and the Health Improvement and Protection Behaviors Scale.

Results: Among the individuals with a family history of cancer, 52.9% stated that their probability of getting cancer was the same as most people. The health improvement and protection behaviors of the participants were on a moderate level. The individuals who assessed their cancer risk perceptions to be very high were generally observed to have low levels of health improvement and protection behaviors ($p<0.05$). Additionally, it was found that the participants' education level, status of thinking that they had sufficient knowledge on fighting against cancer and perceived cancer risk level explained 16% of the total variance in their health improvement and protection behaviors.

Conclusion: It was observed that the individuals with a family history of cancer had low cancer risk perceptions, and their health protection and improvement behaviors were not on a sufficient level. It is important for healthcare professionals to target primarily this risk group, plan information programs and monitor them closely.

Keywords: Cancer, family history, first degree relatives, protective behaviors, risk perception

Introduction

In addition to being globally the second most prominent cause of death, cancer is one of the most significant health problems of our time with its high morbidity, treatment cost, time and side effects (Gursu et al., 2012). Nevertheless, with the correct protection strategies, one-third of cancer cases may be prevented, and it may be possible to extend life with early diagnosis and treatment (WHO, 2020). With the help of developments in the field of molecular genetics, different genes that lead to predisposition to cancer have been defined. It is known that family members carrying mutations belonging to these genes carry a high risk of cancer. Studies conducted on different cancers show that the risk of cancer in the first- and second-degree relatives of an affected patient is increased in comparison to the general population

(Pharoah et al., 1997; Murff, Spigel, & Syngal, 2004).

In these studies, it has been emphasized that the cancer risk attributed to individuals with a family history of cancer increases considering both genetic and environmental factors, and in relation to this, a significant target audience is clear for prevention of cancer (Pérez-Losada, Castellanos-Martín, & Mao, 2011; Czene, Lichtenstein, & Hemminki, 2002). For this group, it is important to know about individual risk perception levels and how these levels are reflected on their health protection and improvement behaviors. There are various psychosocial factors that affect individuals' tendency towards health protection and improvement behaviors such as not smoking, not drinking, eating healthy, being mobile and getting cancer screening tests (Condit, 2001). Cancer risk perception has been known for a long time as a significant factor affecting health behaviors (van Dooren et al., 2004). The concept of risk perception may be defined as the perception of people regarding their likelihood of getting a disease (Shiloh & Ilan, 2005). Accordingly, the risk perception regarding the possibility of getting a disease is among the most significant factors that affect expectations of the harmful outcomes of the disease and its severity, as well as tendencies towards health protection and improvement behaviors (Gooding et al., 2006; Katapodi et al., 2004; Kiviniemi, Jandorf, & Erwin, 2011). In general, high risk perceptions are expected to direct individuals towards behaviors for protection. In the context of cancer, it is assumed that individuals who see their probability of getting cancer as high will take part in protective behaviors against cancer. Studies supporting these assumptions have observed a positive relationship between high risk perceptions and trying to live more healthily in general (Howel et al., 2013; Audran et al., 2001). On the other hand, there are also several findings indicating that the relationship between risk perceptions and taking part in behaviors protective against cancer is not always in the parallel direction (Caman, Bilir, & Ozcebe, 2014; Bowen et al., 2004; Kasparian et al., 2010; Santos, Lourenço, & Rossi, 2011; Drosseart, Boer, & Seydel, 2012).

Application of risk mitigation strategies is increasingly gaining more importance in reducing mortality and morbidity in cancer. On what level and how individuals who have a history of cancer in their family perceive cancer risk and the effect of the level of perceived risk on health protective and improving lifestyles are not sufficiently clear in the literature. It is believed that this study will contribute to healthcare professionals in terms of raising awareness on the risk of cancer in genetically predisposed individuals, determining the cancer-preventive behavior levels of these individuals with risk and improving shortcomings.

Methods

Study Design and Sample: This cross-sectional study was carried out to determine the cancer risk perceptions and health improvement and protection behaviors of individuals with a family history of cancer. The study was carried out with a cross-sectional design. The population of the study consisted of the relatives (parents, siblings, children, relatives) of patients receiving inpatient treatment at the Oncology and Hematology clinics of a university hospital in Turkey between January and August 2020. Using power analysis, with an error rate of α=0.05 and a medium effect size of 0.25, as well as the targeted testing power of 0.80, the minimum required sample size was determined as 110. In this context, the study included 170 individuals who were relatives of the patients receiving cancer treatment, providing care for the patients at least for a month, did not have a previous diagnosis of benign and malignant cancer, did not have a speech, hearing or perceptual impediment and agreed to participate in the study.
Measures: The data of the study were collected by using personal information form and the Health Improvement and Protection Behaviors Scale.
Personal information form: The form consisted of 30 questions on the sociodemographic characteristics (age, gender, marital status, education, employment status, smoking and drinking habits, general health assessment) of the individuals who had family history of cancer, the disease-related characteristics of their cancer patient relatives (type of cancer, form of cancer treatment, etc.) and the risk perceptions of the individuals regarding cancer (risk factors in cancer, status of having sufficient knowledge in the fight against cancer, cancer-related risk assessment, etc.).

Health Improvement and Protection Behaviors Scale: The scale which was developed by Bostan, Orsal, & Karadag (2016), includes 24 items. The scale has three dimensions as the physical, psychosocial and protection dimensions. The physical dimension describes the extent to which the individual keeps themselves active in daily life, their regular exercise behaviors and behaviors in relation to meeting their physiological requirements such as eating and drinking. The psychosocial dimension describes the individual's psychosocial skills like interpersonal relationships and coping with stress and behaviors like spending time with their environment. The protection dimension refers to the behaviors the individual should take part in to protect their existing health status. The five-point Likert-type scale is scored as "Never 1", "Rarely 2", "Sometimes 3", "Usually 4" and "Always 5". The minimum and maximum possible scores in the scale are 24 and 120. It is considered that a person receiving a low score from the scale does not show health improvement (e.g., regular exercising, meeting physiological requirements like eating and drinking, spending time with one's environment) and protection behaviors. The Cronbach's alpha value of the entire scale was reported as 0.83 (Bostan, Orsal, & Karadag, 2016). In this study, the Cronbach's alpha value of the scale was found as 0.82.

Statistical analysis: The SPSS 22.0 software was used to analyze the data obtained from the study. Percentage and mean tests were used on the distribution of the sociodemographic characteristics of the participants, their thoughts about cancer risk and mean scores in the Health Improvement and Protection Behaviors Scale, whereas Kruskal-Wallis test was used to determine the relationship between perceived cancer risk and mean scores in the Health Improvement and Protection Behaviors Scale. Additionally, to determine the effects of age, gender, education level, status of thinking that one had sufficient knowledge in terms of fighting against cancer, having participated in a cancer screening program and perceived cancer risk level on health improvement and protection behaviors, multiple regression analysis was conducted. In the analysis of the data, the level of statistical significance was assessed over 0.05.

Ethical Approval: Before starting the study, written approval was obtained from the Clinical Studies Ethics Board of a university (Decision No: 2019-03/12), and after receiving written and verbal consent from the individuals who agreed to participate in the study, the data were collected by the researchers by using the face-to-face interview technique. The study was conducted in accordance with the ethical standards of the Helsinki declaration.

Results

Table 1 shows the sociodemographic characteristics of the participants. The participants' mean age was 43.36±14.10 years, and 64.1% of them were women. Among the participants, 77.6% were married, 10.6% were illiterate, and 33.5% had primary-secondary school degrees. 71.8% were not working at any job, and 57.6% assessed their economic status as medium. Among the individuals, 31.2% were current smokers, and 4.1% consumed alcohol. 28.8% of the participants had chronic diseases, while 54.7% stated their general health status as good. 31.8% of the participants were the child of the patient, whereas 25.9% were relatives.

Regarding the characteristics of the cancer patient relatives of the participants, it was determined that the patients' mean age was 57.98±15.76 years, 34.1% were leukemia, 17.1% were lung cancer and 10.6% were stomach cancer patients, while 45.9% of them could perform daily life activities like nutrition, going to the toilet and hygiene with help, and 28.2% could not perform these at all. Additionally, 28.8% of the participants had been caring for the cancer patient for less than three months, and 26.5% had been doing so for more than a year. The thoughts of the participants on cancer risk are shown in Table 2. Among the individuals with a family history of cancer, 17.1% stated that they did not have a risk of cancer at all, while 10% said they had a very high risk. Moreover, 52.9% of the participants stated that their risk of getting cancer was the same as most people, whereas only a third (31.8%) said their risk of getting cancer was higher than that of most people. According to the mean score that the participants obtained in the Health Improvement and Protection Behaviors Scale (84.92±12.82), their health improvement and protection behaviors were on a moderate level (Table 3).

Table 4 presents the comparison of the cancer risk perceived by the participants and their mean Health Improvement and Protection Behaviors Scale scores. Accordingly, the individuals who assessed their cancer risk perceptions as very high generally had low levels of health improvement and protection behaviors. When the relationship between perceived cancer risk and scale dimension scores was examined, while there was no significant relationship between perceived cancer risk levels and the psychosocial and protection dimensions ($p>0.05$), it was determined that the individuals with very high cancer risk perceptions had low levels of health improvement behaviors in the physical dimension ($p<0.05$).

Table 5 presents the results of the multiple regression analysis on the health improvement and protection behaviors of the participants based on different variables. In the multiple regression analysis, it was determined that the education levels of the individuals, their status of thinking that they had sufficient knowledge on fighting against cancer and their perceived cancer risk levels were significantly effective factors on their health improvement and protection behaviors ($R=0.399$, $R^2=0.159$, $F=5.146$, $p<0.01$). Education level, thinking of having sufficient knowledge on fighting against cancer and perceived cancer risk explained 16% of the total variance in the participants' levels of health improvement and protection behaviors.

Table 1. The Sociodemographic Characteristics of the Participants

Characteristics		%
Age (year) (M±SD)	43.36±14.10	
Gender		
Male	61	35.9
Female	109	64.1
Marital status		
Married	132	77.6
Single	38	22.4
Education status		
Illiterate	18	10.6
Primary education	57	33.5
Secondary education	58	34.1
High education	37	21.8
Working status		
Yes	48	28.2
No	122	71.8
Economic status		
Good	47	27.6
Medium	98	57.6
Bad	25	14.7
Smoking habit		
Smoker	53	31.2
Never smoker	94	55.3
Left	23	13.5
Alcohol habit		
Drinks	7	4.1

Never drank	151	88.8
Left	12	7.1
Presence of chronic disease diagnosed by a doctor		
Yes	49	28.8
Hypertension	21	42.9
Asthma	8	16.3
Diabetes Mellitus	6	12.2
Cardiovascular	5	10.5
Other	9	18.4
(Hypothyroidism,		
No	121	71.2
The degree of proximity to		
Mother	6	3.5
Father	2	1.2
Brother	25	14.7
Child	39	22.9
Spouse	54	31.8
Relative	44	25.9
General health status		
Good	93	54.7
Medium	49	28.8
Bad	28	16.5

Table 2. Distribution of the Thoughts of the Participants on Cancer Risk
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Statements	n	%
What do you think is the most significant factor causing cancer?		
Stress	70	41.2
Incorrect nutrition	31	18.2
Smoking	22	12.9
Environmental factors (like radiation, sunlight)	22	12.9
Genetic predisposition	19	11.2
Presence of another disease	3	1.8
Alcohol consumption	2	1.2
Obesity	1	0.6
Do you think risk factors that may cause cancer can be taken under control in the fight against cancer?		
Yes	79	46.5
No	63	37.1
I don’t know	28	16.5
Do you think you have sufficient knowledge on fighting against cancer?		
Yes	17	10.0
Partly	55	32.4
No	98	57.6

Do you want to receive information from healthcare professionals on cancer?		
Yes	140	82.4
No	30	17.6
Have you been informed by healthcare professionals on getting screened for cancer?		
Yes	47	27.6
No	123	72.4
Have you participated in any cancer screening program due to having an individual around you diagnosed with cancer? (check-up, mammography, etc.)		
Yes	57	33.5
No	113	66.5
If you have not participated in a screening program, are you thinking of getting screened for cancer soon?		
Yes	70	62.3
No	43	37.7
How much does thinking about cancer disturb you?		
Does not disturb at all	41	24.1
Disturbs moderately	41	24.1
Disturbs very much	88	51.8
On what level do you think is your risk of getting cancer in the future?		
No risk at all	29	17.1
Very low	16	9.4
Low	10	5.9
Moderate	58	34.1
High	40	23.5
Very high	17	10.0
How is your probability of getting any cancer in the future in comparison to other people?		
My probability is the same as most people	90	52.9
My probability is higher than most people	54	31.8
My probability is lower than most people	26	15.3

Table 3. Distribution of the Health Improvement and Protection Behaviors Scale Total and Dimension Mean Scores of the Participants

The Health Improvement and Protection Behaviors Scale	Possible min–max scores	Received min–max scores	M±SD
General	24-120	51-118	84.92±12.82
Physical	10-50	20-48	35.17±6.23
Psychosocial	6-30	8-30	20.14±4.55
Protection	8-40	17-40	29.61±5.51

Table 4. Comparison of the Cancer RiskPerceived by the Participants and Their Mean Health Improvement and Protection Behaviors Scale scores

Perceived cancer risk level	The Health Improvement and Protection Behaviors Scale			
	General	Physical	Psychosocial	Protection
	M±SD	M±SD	M±SD	M±SD
No risk at all	89.72±11.78	38.06±5.78	20.68±5.03	30.96±5.06

Very low	88.50±12.03	36.93±6.07	21.25±3.56	30.31±5.86
Low	83.30±11.74	35.70±4.37	19.40±4.45	28.20±4.73
Moderate	82.67±13.28	33.91±6.05	19.79±4.99	28.96±6.00
High	85.65±13.98	35.30±6.91	20.20±4.36	30.15±5.64
Very high	80.29±8.80	32.23±5.17	19.64±3.69	28.41±4.00
Test, p	KW=12.138; p=0.046*	KW=14.431; p=0.013*	KW=1.919; p=0.860	KW=5.866; p=0.332

Table 5. Multiple Regression Analysis Predictors of Health Improvement and Protection Behaviors

Variables	*B*	*SE*	*ß*	*t*	p value
Age	0.111	0.081	0.122	1.369	0.173
Gender	3.087	2.164	0.116	1.427	0.156
Education status	4.129	1.380	0.301	2.991	0.003*
Thinking that you have enough knowledge	-3.639	1.514	-0.191	-2.404	0.017*
Participating in cancer screening program	0.154	2.085	0.006	0.074	0.941
Perceived cancer risk level	-1.710	0.590	-0.211	-2.898	0.004*
*R=0.399, R2=0.159, F=5.146, p= 0.000***					

*p<0.05; **p<0.01

Discussion

It is known that having cancer in the family is a strong factor affecting the risk perceptions of individuals and increases the individual perception of cancer risk (Caman, Bilir, & Ozcebe 2014; Kim et al., 2008; Haug et al., 2018). In our study, approximately half of the participants stated that they thought their probability of getting cancer was the same as most people, and only 10% said they perceived a high level of risk. Similarly**,** Oztas et al (2018) determined that only 10% of the relatives of colorectal cancer patients assessed themselves as high-risk. In another study, it was found that one-fourth of women who had a history of breast cancer in their family stated their cancer risk levels as high (van Dooren et al., 2004). On the other hand, it is seen in some studies that the ratio of individuals perceiving high risk levels was high and varied in the range of 42.9-59% (Caman et al., 2014; Gimeno García et al., 2011; Cameron, Rose, & Carey, 2014; Akhtar et al., 2007). It is thought that the finding in this study that the participants did not state their risk perceptions high might have multiple reasons. The first one of these might be that the participants wished their cancer risk was low. Another reason was that risk perception is affected by psychosocial factors and factors like the current health status and anxiety levels. Additionally, the finding that more than half of the sample did not have knowledge on cancer indicated that they were not aware of the risk.

Having a history of cancer in the family may be associated with cancer-preventing and health-improving behaviors (Haug et al., 2018; Bousman & Madlensky, 2010; Bostean, Crespi, & McCarthy, 2013; Townsend et al., 2013). In this study, the health improvement and protection behaviors of the individuals with a family history of cancer were found to be on a medium level. Haug et al (2018) found in their study that individuals with a family history of cancer had higher motivation levels to change an unhealthy lifestyle than those without, but they continued their risky behaviors. Furthermore, another study determined that 81% of individuals with a history of lung cancer in their families thought of quitting a changeable risk such as smoking, but this rate was significantly lower in comparison to those without such a history (Bousman & Madlensky, 2010). Lemon, Zapka, & Clemow (2004) reported that 42% of women who had relatives with breast cancer increased their

physical activity levels and fruit and vegetable consumption and reduced their fat, alcohol and tobacco consumption within the six months following the diagnosis of their relatives. Making a permanent change in health behaviors is not easy in practice. While individuals with a family history of cancer turn towards healthy lifestyle behaviors in the initial period of the diagnosis due to the concern they feel, as time passes, their rates of returning to their old routine are high (Haug et al., 2018; Lemon, Zapka, & Clemow, 2004). In this study, the time that passed after the diagnosis of the participants' cancer patient relatives was not known. In the time that passed since, the health improvement and protection behaviors of the individuals may have decreased due to factors like acceptance and underestimation, or the sole risk of having a family history of cancer might not have been enough for motivation. If family members receive education and counselling services from healthcare professionals, this may make it easier to have motivation and adopt desired health behaviors.

In this study, it was determined that the individuals who assessed their cancer risk perceptions to be very high generally had low levels of health improvement and protection behaviors. Howell et al (2013) reported that 81% of the relatives of patients diagnosed with colorectal cancer were willing to participate in a healthy lifestyle program, and there was a positive and significant correlation between concerns of getting cancer and tendencies towards joining these programs. Nevertheless, it has been stated in the literature that the relationship between the high risk perceptions of individuals and their protective health behaviors might not always be strong or in the positive direction (Shiloh & Ilan, 2005; Caman et al., 2014; Boven et al., 2004; Santos, Lourenço, & Rossi, 2011). Caman et al (2014) found that individual protection behaviors did not significantly change depending on family history of cancer and cancer risk perceived by the individual. Bowen et al (2004) determined that there was no significant relationship between perceived cancer risk and participation in screening programs, physical activity or fruit and vegetable consumption. Kasparian et al (2010) reported that high-risk individuals who had a history of malignant melanoma in their families participated in skin cancer screenings less frequently. Santos, Lourenço, & Rossi (2011) determined that family history of colorectal cancer changed the risk perceptions of individuals, but it did not affect the frequency of getting a colonoscopy. In their study on women with a family history of breast cancer, Drossaert et al (1996) emphasized that, although the women had higher perceived risk, there was no significant difference between those with a family history and those without in terms of behaviors related to early diagnosis. In this study, while it was an unwanted situation that the health improvement and protection behaviors of individuals with high perceptions of risk were on low levels, it is seen that these individuals need education on this issue.

In this study, the education levels of the participants, their thinking that they had sufficient knowledge on the fight against cancer and their perceived cancer risk levels were identified as factors that were significantly effective on their health improvement and protection behaviors. Guzel & Bayraktar (2019) reported that having received information on cancer and high education levels positively affected awareness and practices related to the early diagnosis of breast cancer. Caman et al (2014) determined that there was an increase in the frequency of self-examination of breasts in individuals who visited a Cancer Early Diagnosis, Screening and Education Center and received education. On the other hand, another study ascertained that the low health literacy levels of the relatives of individuals with colorectal cancer and their lack of information on screening tests did not affect their risk-related screening rates (Griffith et al., 2008). Primarily increasing the level of education supports gaining consciousness and awareness, and this way, provides a positive contribution to health behaviors. The finding of this study is important in terms of emphasizing that, first of all, education needs to be provided in developing health improvement and protection behaviors in individuals with a high risk of cancer.

Limitations: The most important limitation of the study was that, in the examination of the relationships, variables that could affect these relationships were not sufficiently examined. For example, the time that passed after the cancer diagnosis in the family, the concern levels of the

individuals, their control perceptions or their personality characteristics were not questioned. Another limitation was that the data were collected with the method of self-reporting. Especially in terms of fighting against cancer, trusting the individual interpretations of persons for sufficient information constitutes a significant limitation.

Conclusions: In this study, it was determined that the risk perceptions and health improvement and protection behaviors of the individuals who had cancer patients in their family were not on a desired level, and the health improvement and protection behavior levels of the individuals who stated their risk levels to be high were found to be low. Moreover, it was found that education level, thinking that one has sufficient knowledge on fighting against cancer and perceived cancer risk level were significant predictors of health improvement and protection behaviors. Accordingly, it is recommended to provide individuals with a family history of cancer with education and information on cancer risk, the importance of genetic predisposition, behaviors protecting against cancer and improving health and cancer screening right after the patient is diagnosed with cancer. Furthermore, it is recommended for primary healthcare and public health centers to assess family members regarding health improvement and protection behaviors at least once a year. In addition to this, for the purpose of raising awareness in the society, especially in those with a genetic risk, organizing education and health programs on the media that will emphasize the importance of health improvement and protection behaviors in protection from cancer with healthcare professionals who are experts in their field may increase the awareness levels.

References

Akhtar S, Sinha S, McKenzie S, Sagar PM, Finan PJ, Burke D. (2017). Awareness of risk factors amongst first degree relative patients with colorectal cancer. Colorectal Dis. 10(9):887-90. .

Audrain J, Schwartz M, Herrera J, Goldman P, Bush A. (2001). Physical activity in firstdegree relatives of breast cancer patients. J Behav Med. 24(6):587–603.

Bostan N, Orsal O, Karadag E. (2016). Developing Promotive And Protective Health Behaviors Scale: Methodological study. J Nurs Sci. 8(2):102-11.

Bostean G, Crespi CM, McCarthy WJ. (2013). Associations among family history of cancer, cancer screening and lifestyle behaviors: a population-based study. Cancer Causes Control. 24(8):1491–503. .

Bousman CA, Madlensky L. (2010). Family history of lung cancer and contemplation of smoking cessation. Prev. Chronic Dis 7(2):A29

Bowen DJ, Alfano CM, McGregor BA, Andersen MR. (2004). The relationship between perceived risk, affect, and health behaviors. Cancer Detection and Prevention.;28(6):409–17.

Cameron E, Rose S, Carey M. (2014). Assessment of family history of colorectal cancer in primary care:Perceptions of first degree relatives of people with colorectal cancer. Patient Educ Couns.;94(3):427-31.

Condit CM. (2001). What is 'public opinion' about genetics? Nature Reviews Genetics.;2(10):811-5.

Czene K, Lichtenstein P, Hemminki K. (2002). Environmental and heritable causes of cancer among 9.6 million individuals in the Swedish Family-Cancer Database. Int J Cancer.99(2):260–6.

Caman OK, Bilir N, Ozcebe H. (2014). Are family history of cancer and perceived cancer risk associated with cancer preventive behaviors? Fırat Medical Journal,19(2):95-100.

Drossaert CC, Boer H, Seydel ER. (1996). Perceived risk, anxiety, mammogram uptake, and breast self-examination of women with a family history of breast cancer: the role of knowing to be at increased risk. Cancer Detect Prev. 20(1):76-85.

Gimeno García AZ, Quintero E, Nicolás Pérez D, Hernández M, JiménezSosa(2011). A. Colorectal cancer screening in first-degree relatives of colorectal cancer: participation, knowledge, and barriers against screening. Eur J Gastroenterol Hepatol .3(12):1165-71.

Griffith KA, McGuire DB, Royak-Schaler R, Plowden KO, Steinberger EK. (2008). Influence of family history and preventive health behaviors on colorectal cancer screening in African Americans. Cancer. 113(2):276-85. .

Gooding HC, Organista K, Burack J, Biesecker BB. (2006). Genetic susceptibility testing from a stress and coping perspective. Social Science & Medicine..62(8):1880-90.

Gursu RU, Kesmezacar O, Karacetin D, Mermut O, Okten B, Guner SI. (2012). Istanbul Research and Training Hospital Oncology Division: 18-month results of a newly formed unit. Istanbul Med J.13(1):13-8.

Guzel N, Bayraktar N. (2019). Determination of women's awareness and practices on early diagnosis of breast cancer. Journal of Hacettepe University Faculty of Nursing.6(2):101-10.

Haug U, Riede O, Cholmakow-Bodechtel C, Olsson L. (2018). First-degree relatives of cancer patients: a

target group for primary prevention? A cross-sectional study. British Journal of Cancer. 2018;118:1255–61.

Howell LA, BrockmanTA, Sinicrope PS, Patten CA, Decker PA, Ehlers SL. (2013).. Receptivity and preferences in cancer risk reduction lifestyle programs: a survey of colorectal cancer family members. J Behav Health. 2(4):279–90.K

Kasparian NA, McLoone JK, Meiser B, Butow PN, Simpson JM, Mann GJ. (2010). Skin cancer screening behaviours among individuals with a strong family history of malignant melanoma. Brit J Cancer. 103(10):1502-9.

Katapodi MC, Lee KA, Facione NC, Dodd MJ. (2004). Predictors of perceived breast cancer risk and the relation between perceived risk and breast cancer screening: A meta-analytic review. Preventive Medicine. 38:388-402.

Kim SE, Pérez-Stable EJ, Wong S, Gregorich S, Sawaya G.F, Judith ME, et al. (2008). Association between cancer risk perception and screening behavior among diverse women. Arch Intern Med. 168(7):728–34.

Kiviniemi MT, Jandorf L, Erwin DO. (2014). Disgusted, embarrassed, annoyed: Affective associations Relate to uptake of colonoscopy screening. Annals of Behavioral Medicine. 48(1):112-9.

Lemon SC, Zapka JG, Clemow, L. (2004). Health behavior change among women with recent familial diagnosis of breast cancer. Prev Med. 39(2):253–62.

Murff HJ, Spigel DR, Syngal S. (2004). Does this patient have a family history of cancer? An evidence-based analysis of the accuracy of family cancer history. JAMA.292(12):1480-9.

Oztas B, Iyigün E, Tastan S, Can MF, Oztas M. (2018). Determination of cancer risk perceptions and health beliefs of firstdegree relatives of patients who were operated with colorectal cancer diagnosis. Turk J Colorectal Dis. 28:80-87.

Pérez-Losada J, Castellanos-Martín A, Mao JH. (2011). Cancer evolution and individual susceptibility. Integr Biol. 3:316–28.

Pharoah PD, Day NE, Duffy S, Easton DF, Ponder BA. (1997). Family history and the risk of breast cancer: A systematic review and" meta-analysis. Int J Cancer. 71:800-9.

Santos EM, Lourenço MT, Rossi BM. (2011). Risk perception among Brazilian individuals with high risk for colorectal cancer and colonoscopy. Hered Cancer Clin Pract. 9(1):4.

Shiloh S, Ilan S. (2005). To test or not to test? Moderators of the relationship between risk perceptions and interest in predictive genetic testing. Journal of Behavioral Medicine. 28(5):467-79.

Townsend JS, Steele CB, Richardson LC, Stewart SL. (2013). Health behaviors and cancer screening among Californians with a family history of cancer. Genet Med.15(3):212–21. .

WHO report on cancer: setting priorities, investing wisely and providing care for all. Geneva: World Health Organization; 2020. Licence: CC BY-NC-SA 3.0 IGO. Available to: https://creativecommons.org/licenses/by-nc-sa/3.0/igo

van Dooren S, Rijnsburger AJ, Seynaeve C, Duivenvoorden HJ, Essink-Bot ML, Tilanus-Linthorst MMA, et al. (2004). Psychological distress in women at increased risk for breast cancer: the role of risk perception. European Journal of Cancer. 40(14):2056–63.