



## Evaluation of Health Beliefs in Relation to Attitudes to Colorectal Cancer Screening

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### ABSTRACT

**Introduction:** Colorectal Cancer (CRC) screening is one of the few methods for decreasing its incidence and invasive cancer morbidity and mortality. In Turkey, the screening participation rate is below the desired outcomes. To explain insufficient participation of some individuals at screening programs, a "Health Belief Model" (HBM) scale was developed in 1950. In this study we aimed to investigate attitudes toward prevention from CRC by the HBM scale.

**Materials and methods:** A questionnaire composed of 14 sociodemographic questions and 33 Health Belief Model (HBM) scale questions were applied on the patients of family medicine clinic. The data was analyzed using SPSS 21.0 statistical package program.

**Results:** 62.8% of the participants were women, 50.2% were university graduates. The mean points of 40-49 age group in confidence and 18-29 age group in barrier subscales were significantly higher than the other groups. The mean points of men in seriousness and singles in barrier subscales were significantly higher. Both in the barrier and motivation subscales, mean points of high school graduates were significantly highest.

**Conclusion:** Despite the high education level of participants, the percentage of participants who agreed with the statements about CRC screening tests remained under 70%. Population based educational and awareness projects should be implemented especially for young people, women, singles, undereducated and low socio-economic communities, related to the benefits and applicability of the CRC screening tests to eliminate the barrier perceptions for prevention from colorectal cancer. Health care workers regardless of occupation and the work step should accustom the idea of CRC screening especially among young people. They should talk about screening program at every meeting.

**Keywords:** Colorectal cancer; Health belief model; Colorectal cancer; Sociodemographic

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## INTRODUCTION

According to the most recent reports of WHO, Colorectal Cancer (CRC) is the 2<sup>nd</sup> most common cause of mortality from cancer globally with 862 000 deaths. In Turkey, CRC is the 3<sup>rd</sup> most common cancer type after lung and prostate in men, breast and thyroid in woman. Early diagnosis is a crucial public health strategy in all settings especially in high risk populations and effective screening methods are available for CRC. CRC screening is one of the few methods for decreasing CRC incidence and invasive cancer morbidity and mortality, with a proven efficiency [1].

Considering the infrastructure and facilities in Turkey, every individual from the age of 50 are invited for Fecal Occult Blood (FOB) test every 2 years and colonoscopy every 10 years. Realizable target is public screening between 50-70 years of age. So, each individual older than 50 is invited to participate in colorectal cancer screening *via* his/her own family physician. For the CRC screening programs to reach desired outcomes the participation rate should be at least 70% but in Turkey it is around 20%-30%. Increasing public awareness to obtain consciousness and behavioral changes carries a very important role for this purpose [2]. In an effort to explain insufficient participation of some individuals at prevention and screening programs while other people adopt preventive health behaviors, Hochbaum, Kegeles, Leventhal and Rosenstock developed the HBM scale in 1950. They identified that age, gender, socioeconomic status and ethnicity have an effect on preventive health behaviors; however even if the health services are provided for free, people with lower socioeconomic status use this service less often. This observation suggests that other factors are also effective on preventive health behaviors, mainly individuals' values, beliefs and attitudes. If we can identify the beliefs and attitudes that are viewed as a problem, we can personalize the health education and treatments for the individual accordingly [3].

Champion adapted HBM scale for breast cancer in 1984 and emphasized that it can also be used for other cancers by revision of some items. Later, Jacobs revised the scale for colon cancer. The purpose of HBM is to foresee the determinants of preventive health behaviors. It is the benefit perception that defines if an individual is open to apply the health behavior to her/his life [4]. Informing individuals on the effect of application and maintenance of positive health behaviors to the quality and duration of life are effective measures to increase awareness. And it is important to inform the individuals during youth. By this way, we can increase the possibility of an individual to have control over her/his own health. In this study we aimed to evaluate the health beliefs of people before the age of screening in relation to attitudes to colorectal cancer screening [5].

## MATERIAL AND METHODS

This study was conducted on volunteers 18 years and older, admitted to the primary care clinics for any reason, in Ankara

university İbn-i Sîne Hospital. The study was approved with a reference number of 14/223, by the ethics committee of Ankara University (Ankara, Turkey) for non-clinical research. The sample size was calculated as to be 200 and we enrolled 215 volunteer responsive participants [6].

### Data Collection

All data were collected by the same research assistant from July 2016 through October 2016. The researcher proffered an informed consent form to everyone above age 18 who applied to the family physician polyclinic, and she carried out the study on volunteers [7]. She first introduced the questionnaire with 14 questions on information about CRC and sociodemographic characteristics. And then the researcher carried out the Turkish language version of "Health Belief Model Scale".

### Health Belief Model Scale

The HBM scale for protection from colorectal cancer is a scale was composed of 33 items. The validity and reliability study of Turkish language version of HBM scale for protection from CRC was carried out by Özsoy and used in this study with permission. The scale has 5 subscales [8].

- Perceived confidence and benefits
- Perceived susceptibility
- Perceived barriers
- Health motivation
- Perceived seriousness

In the HBM, which is a Likert style tool, "I strongly disagree" is 1 point, "I disagree" is 2 points, "I somewhat agree" is 3 points, "I agree" is 4 points, "I strongly agree" is designated 5 points. The minimum (min) and maximum (max) points are 11-55 for benefits, 6-30 for susceptibility, 6-30 for barriers, 5-25 for motivation, 5-25 for seriousness [9].

### Analysis

The data was analyzed using the SPSS 21.0 statistics package program. Descriptive statistics were defined as percent, mean, median and standard deviation. The conformity of variables to normal distribution was tested by Kolmogorov-Smirnov and Shapiro-Wilks tests [10]. *Chi-Square* test was used for categorical variables between groups, students'-t-test was used for constant variables with two independent groups which are concordant with normal distribution and Mann-Whitney U test was used for constant variables with two independent groups which are not concordant with normal distribution. Statistical significance was considered when type 1 error value was below 5%.

## RESULTS

Average age of participants were  $35.4 \pm 12.7$  and 62.8% of them were women. 54.4% were married and about half of them were university graduates (50.2%). Some sociodemographic characteristics of participants are given in

**Table 1.**

**Table 1:** Some sociodemographic characteristics of participants.

Characteristic		n	%
Gender	Woman	135	62.8
	Man	80	37.2
Marital status	Married	117	54.4
	Single	98	45.6
Education level	Illiterate	1	0.5
	Literate	1	0.5
	Primary school	8	3.7
	Secondary school	14	6.5
	High school	83	38.6
Employment	University	108	50.2
	Working	121	56.3
	Student	56	26
	Retired	19	8.8
	Housewife	15	7
Health coverage	Unemployed	4	1.9
	Yes	206	95.8
	No	9	4.2
Total		215	

According to the family health histories, 5.6% of participants had a first degree relative with colon cancer [11]. 67.9% of the participants agreed with the phrase “FOB test should be done every two years after 50 years old, as colon cancer screening”,

while only 58.1% agreed with “colonoscopy should be done every ten years starting at age 50, as colon cancer screening” (Table 2).

**Table 2:** Colon cancer history in relatives of participants and some characteristics of screenings.

Characteristics	N (%)	
Colon cancer history in first degree relative	Yes	12 (5.6)
	No	203 (94.4)
FOBT should be done every two years after 50 years old as colon cancer screening	I agree idea	146 (67.9)
	I have no idea idea	56 (26) (26)
	I disagree	13 (6)
Colonoscopy should be done every ten years starting at age 50 as colon cancer screening	I agree	125 (58.1)
	I have no idea	68 (31.6)
	I disagree	22 (10.2)
Total	215	

Distribution of mean points from each phrase of the subscales of HBM scale is shown in **Table 3**. According to these results, the statements that received the highest score in perceived confidence and benefits subscale are;  $1.89 \pm 0.9$  points for “If necessary, I trust myself to have regular controls for early

diagnosis of colon cancer” and  $1.89 \pm 0.9$  for “I search for new information for being healthy”.

**Table 3:** Mean points of each statement of HBM scale for protection from colon cancer.

	Statements	Mean	Sd
Confidence-benefit	I would like to determine my health problems early	1.19	0.48
	It is very important for me to stay healthy	1.25	0.55
	If necessary, I trust myself to have regular controls for early diagnosis of colon cancer	1.89	0.95
	Regular controls for early detection of colon cancer provides an opportunity to catch the cancer at an early stage	1.38	0.65
	I search for new information for being healthy.	1.89	0.9
	I can continue regular controls if I have colon cancer	1.43	0.76
	I know the importance of things to do to stay healthy	1.59	0.74
	I can notice the normal and abnormal changes in my bowel habits	1.73	1.03
	My risk of dying from colon cancer will decrease if I have regular controls for early diagnosis of colon cancer	1.77	1.6
	My risk of having a big and unshapely operation (colostomy) if I have colon cancer will decrease if I have regular controls for early diagnosis of colon cancer	1.66	0.73
	I can catch colon cancer early if I have regular controls	1.59	2.12
Susceptibility	I will most likely have colon cancer in the future	3.93	0.9
	I can feel that I will have colon cancer in the future	4.1	0.81
	I have risk of having colon cancer in the next 10 years	4.01	0.87
	I have a high risk to have colon cancer	4.13	0.78
	My risk of having colon cancer is higher than everybody	4.3	0.7
	My relationship with my spouse will be disrupted if I have colon cancer	3.87	1.07

Barrier	I get uncomfortable to talk about colon cancer	3.55	1.19
	I wouldn't worry about colon cancer if I had regular controls for early diagnosis of colon cancer	2.44	1.12
	Having regular controls for early diagnosis of colon cancer is embarrassing for me	3.74	1.08
	Having regular controls for early diagnosis of colon cancer makes me worry about colon cancer	3.57	1.04
	Having regular controls for early diagnosis of colon cancer takes a lot of time	3.46	1.02
	It is not pleasant to have regular controls for early diagnosis of colon cancer	3.78	1.03
Health motivation	I have a balanced diet	2.62	0.98
	I do exercise at least three times per week	3.2	1.13
	Having regular controls for early diagnosis of colon cancer will help me for early diagnosis of formations that can turn into cancer in the future (polyps, chronic constipation, etc)	1.8	0.89
	I have regular controls even if I am not sick	2.86	1.1
	It is very costly to have regular controls for early diagnosis of colon cancer	3.6	0.91
Seriousness	The thought of having colon cancer scares me	2.55	1.2
	I would feel better if I had regular controls (check-up) for early diagnosis of colon cancer	2.32	1.09
	My heart beats faster when I think I may have colon cancer	2.82	1.17
	My whole life will change if I have colon cancer	2.6	1.12
	I can't live more than 5 years if I have colon cancer	3.42	1.1

At the susceptibility subgroup, highest points were  $4.30 \pm 0.7$  for "My risk of having colon cancer is higher than everybody" and  $4.13 \pm 0.8$  for "I have a high risk to have colon cancer". In barrier subgroup;  $3.78 \pm 1.0$  points for "It is not pleasant to have regular controls for early diagnosis of colon cancer" and  $3.74 \pm 1.1$  points for "Having regular controls for early diagnosis of colon cancer is embarrassing for me" were the highest scores [12]. Health motivation subgroup had the highest points for "It is very costly to have regular controls for

early diagnosis of colon cancer" with  $3.60 \pm 0.9$  points and "I do exercise at least three times per week" with  $3.20 \pm 1.1$  points. In seriousness subgroup;  $3.42 \pm 1.1$  for "I can't live more than 5 years if I have colon cancer" received the highest points. The mean, median, min and max values of each subscale of HBM are shown in [Table 4](#).

**Table 4:** Distribution of points in HBM subscales for prevention of colon cancer.

Subscale	Mean	SD	Median	Min	Max
Confidence/Benefits	17.4	5.9	17	11	52
Susceptibility	24.3	3.9	24	6	30
Barriers	20.5	4.1	21	8	30
Health motivation	14.1	2.7	14	6	25
Seriousness	13.7	3.4	14	5	25

Sociodemographic features and mean points of each subscale were compared and shown in **Table 5**. Comparison between age groups showed a significant difference only in confidence and barrier subscales; in confidence subscale, 40-49 age group ( $19.08 \pm 7.4$ ) and in barrier subscale, 18-29 age group ( $22.02 \pm 3.7$ ) have the highest points ( $p=0.04$  and  $p<0.001$  respectively). No statistical significance was found in other subscales for age. According to sex; men's mean points were significantly higher than women in seriousness subscale ( $14.51 \pm 3.9$ ,  $p=0.01$ ). No statistical significance was found in other subscales for sex [13]. When marital status of participants were compared, single participants' mean points were higher in barrier subscale than married ones ( $p=0.001$ )

and other subscales had no significant difference. According to education; the mean points of high school graduates were significantly highest among all groups, in barrier ( $21.06 \pm 4.4$ ,  $p=0.02$ ) and motivation subscales ( $14.65 \pm 2.5$ ,  $p=0.03$ ). When the work status between groups were compared, no significant difference was found in confidence, susceptibility, motivation and seriousness subscales but in barrier subscale, students received the highest points ( $22.41 \pm 3.5$ ,  $p=0.001$ ). Having health coverage or not didn't cause a significant difference in subgroups ( $p>0.05$ ).

**Table 5:** Distribution of subscales' points (Mean  $\pm$  SD) according to the sociodemographic characteristics.

	Confidence	Susceptibility	Barrier	Motivation	Seriousness
<b>Age</b>					
18-29	16.42 $\pm$ 5.17	23.93 $\pm$ 3.96	22.02 $\pm$ 3.72	14.32 $\pm$ 2.63	13.82 $\pm$ 3.44
30-39	16.81 $\pm$ 4.19	25.46 $\pm$ 3.54	19.63 $\pm$ 4.28	14.28 $\pm$ 2.63	12.83 $\pm$ 3.66
40-49	19.08 $\pm$ 7.36	24.53 $\pm$ 3.92	19.60 $\pm$ 4.37	13.93 $\pm$ 3.05	14.28 $\pm$ 3.17
50+	18.69 $\pm$ 7.53	23.66 $\pm$ 4.57	19.39 $\pm$ 3.05	13.42 $\pm$ 2.78	14.03 $\pm$ 3.28
<b>Gender</b>					
Man	18.02 $\pm$ 6.14	24.11 $\pm$ 3.99	19.88 $\pm$ 4.45	13.92 $\pm$ 3.05	14.51 $\pm$ 3.87
Woman	17.05 $\pm$ 5.87	24.51 $\pm$ 3.99	20.97 $\pm$ 3.78	14.20 $\pm$ 2.56	13.26 $\pm$ 3.06
<b>Marital status</b>					
Single	16.58 $\pm$ 4.86	24.07 $\pm$ 4.03	21.53 $\pm$ 3.84	14.32 $\pm$ 2.89	13.92 $\pm$ 3.53
Married	18.11 $\pm$ 6.71	24.61 $\pm$ 3.95	19.76 $\pm$ 4.09	13.90 $\pm$ 2.62	13.56 $\pm$ 3.35
<b>Education</b>					
Secondary school/ Lower	18.87 $\pm$ 6.93	23.66 $\pm$ 4.37	18.45 $\pm$ 3.72	13.25 $\pm$ 3.02	12.91 $\pm$ 3.36
High school	17.67 $\pm$ 6.70	24.07 $\pm$ 4.47	21.06 $\pm$ 4.42	14.65 $\pm$ 2.52	13.98 $\pm$ 3.53
University	16.89 $\pm$ 5.10	24.75 $\pm$ 3.48	20.65 $\pm$ 3.73	13.86 $\pm$ 2.79	13.71 $\pm$ 3.36
<b>Work status</b>					
Working	18.0 $\pm$ 6.74	24.76 $\pm$ 3.89	19.97 $\pm$ 4.34	14.06 $\pm$ 2.93	13.83 $\pm$ 3.59
Student	15.64 $\pm$ 4.61	23.26 $\pm$ 4.46	22.41 $\pm$ 3.54	14.21 $\pm$ 2.36	13.73 $\pm$ 3.34

Retired	18.52 ± 5.07	24.94 ± 4.03	19.21 ± 2.57	13.05 ± 2.69	13.52 ± 3.61
Housewife	18.26 ± 4.16	24.06 ± 2.54	20.06 ± 3.31	15.13 ± 2.64	13.06 ± 2.40
Unemployed	16.25 ± 4.57	26.00 ± 1.41	18.0 ± 2.94	14.50 ± 1.91	14.0 ± 3.16

We didn't see any statistically significant difference in subscales, compared by history of colon cancer in first degree relatives ( $p > 0.05$ ). When we analyzed the participants' agreement with "FOB test should be done every two years after 50 years old, as colon cancer screening" statement, the mean points of those who don't agree were significantly higher at the confidence subscale ( $22.84 \pm 9.11$ ,  $p < 0.001$ ). Other subscales had no significant difference [14]. In the barrier subscale, mean points of those who don't have an idea about the statement "Colonoscopy should be done every ten years starting at age 50, as colon cancer screening" were significantly lower than others ( $p = 0.03$ ). Other subscales had no significant difference ( $p > 0.05$ ).

## DISCUSSION

HBM is based on the idea that there is a correlation between the beliefs and behaviors of individuals and it is frequently used to explain preventive health behavior. It is viewed as an effective guide that explains and measures behaviors to protect and improve health and also what motivates or prevents patients for the compliance with therapy in various health problems. This study was conducted in a reference hospital in the capital city of Turkey, for the purpose of evaluating people's health beliefs about prevention from CRC. The participants' average age was around 35, most of them were woman, high school or higher graduate and almost all of them had health coverage. In previous studies, the selected age groups were mostly above 50, which is the age that screenings for early diagnosis begin. Our study makes a difference by including participants as young as 18 years old, giving time for intervention at an early age [15].

Confidence-benefit perception refers to the belief/expectation of the individual that the risk of the disease occurring will decrease as a result of certain behavior, which is the "perceived benefit". It is the perception of benefit that determines if the person is open to implement the health behavior to her/his life. The mean points of participants from confidence-benefit perception subscale is  $17.4 \pm 5.9$ . This is closer to the lower end of min-max points, which shows that the benefit perception for prevention of CRC is low. The 40-49 age group has significantly higher points in the benefit subscale. In a similar study by Baysal and Turkoglu with participants 50 years and older, the average score of the benefit subscale of HBM was  $42.38 \pm 9.02$  points which is much higher than our study. In another study by Nar, on 400 individuals whose first degree relatives had CRC diagnosis, confidence-benefit average points was  $48.9 \pm 5.1$ , which is higher than both our and Turkoglu studies. This may be due to the fact that they had first degree relatives with CRC diagnosis. In both studies carried out in Turkey, confidence-

benefit, health motivation and seriousness perception average scores were higher, susceptibility and barrier points were lower than ours. This difference may be due to the younger age of our participants and the fact that study group of Nar was composed of first degree relatives of patients with CRC. Susceptibility perception includes acceptance of the diagnosis by the patient and the possibility of the disease happening. The possibility of an individual to show the behavior for risk reduction increases as the perception of susceptibility increase.

Our participants' mean point, 24.3, is closer to the maximum (min-max: 6-30). This is higher than the mean points in both Baysal and Nar's studies. This difference may be due to the younger age of our participants. Barrier perception is related to the factors that prevent or complicate the exhibition of a preventive health behavior. Individuals evaluate the positive or negative results of such behavior for themselves. According to study results, barrier perception is the most critical factor for exhibition of the behavior and the difference between the barrier and benefit perceptions is seen as the most important variable complicating the exhibition of preventive health behaviors. Also, the perception of susceptibility, seriousness and benefits should have a reducing effect on the perception of barriers for the realization of the behavior. In our study, the groups that have the highest points are 18-29 age group and singles group in barrier subscale. The mean of our study group in barrier subscale is  $20.5 \pm 4.1$  (min-max: 6-30). This value was found as  $15.6 \pm 4.3$  in Baysal's and  $15.2 \pm 3.8$  in Nar's studies.

Health motivation covers the individual's self-belief, determination and will-power for exhibition of the behaviors to reach the expected outcome, so it plays an important role to initiate the behavioral change and maintaining it. The most important factor that effects the individual's perception of self-efficacy is the real performance. Perception of self-efficacy increases if the individual can repeatedly exhibit some behaviors, and decreases if exhibition fails repeatedly. In motivation subscale, the mean of our participants' points is  $14.1 \pm 2.7$  (min and max points are 5-25). It was more than 15 in both Baysal's and Nar's study.

The notion that expresses the personal beliefs about the severity of the disease is "seriousness perception". Although this perception mostly depends on the medical knowledge or experience, it may also arise from beliefs about the difficulties that the disease will create for the person or the general effects on the person's life. Joseph J Y Sung et al. showed that seriousness and barrier perceptions have significant effect on an individual to participate at screening tests for cancer. In this subscale men have significantly higher mean points than women ( $14.51 \pm 3.87$ ). Min-max points are 5-25 and our mean

is  $13.7 \pm 3.4$ . This is below both Baysal's ( $16.5 \pm 4.0$ ) and Nar's studies ( $16.5 \pm 4.3$ ).

When we look at the statistically significant differences according to the demographical features, there is significant difference among age groups in confidence-benefit subscale. 40-49 age group has the highest points. There is no significant variable in susceptibility. In barrier subscale, 18-29 age group, high school graduates, students and singles received the highest points statistically significant. This may be an area to work on for social projects, to reduce the barrier perception of young people, students and singles. In motivation subscale, high school graduates have the highest points significantly. In seriousness, men have higher points than women.

According to our results, being over 40 years old increases confidence perception. Being below 30 years old, being female, being single, being high school and higher graduate increases barrier perception, being male increases seriousness perception, being unemployed decreases barrier perception. Having health coverage didn't cause a significant difference in subgroups ( $p > 0.05$ ). But this may be due to the low number of samples.

## CONCLUSION

Our study points out to the fact that attitudes about preventive health measures are not mainly influenced by an individual's health coverage, but mainly affected by age, gender, education level and marital status. These personal characteristics should be taken into consideration while offering screening programs and preventive health measures to individuals for protection from colorectal cancer. Although a well-organized screening program is mediated through Ministry of Health for CRC in the primary health care in Turkey, the habit of complying is insufficient. Many people struggle against screening decision making. This study shows that the benefit perception for prevention of CRC is lowest among young people. This means that the person is not open to implement the health behavior to her/his life. Meanwhile barrier subscale have high points among the young ones, single ones, high school graduates and students.

Even, it seems that health coverage statute doesn't influence preventive health measures. So increasing primary prevention and early detection about CRC is connected with the attitude and raising awareness of the young people. Health care workers regardless of occupation and the work step should accustom the idea of CRC screening especially among young people. They should talk about screening program at every meeting regardless of the personal complaint. So it may be easier to adopt the idea of screening procedure kindly when they reach the screening age. Health care providers should work harder to remove the obstacles in the minds beginning from the youth.

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