

# Determination of Risk Awareness and Knowledge Levels of First Degree Relatives of Colorectal Cancer Patients; The Case of Turkey

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## Research Article

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## **Abstract**

## **Background**

Since genetic factor is an important factor in the occurrence of cancer in colorectal cancer, risk awareness and knowledge level of first-degree relatives of patients with colorectal cancer is very important in cancer prevention.

## **Aim**

This study was conducted to determine the knowledge level of first-degree relatives of colorectal cancer patients about colorectal cancer and their awareness of colorectal cancer risk factors.

## **Method**

This is a descriptive study. 251 patients undergoing chemotherapy with a diagnosis of colorectal cancer in a university hospital constituted the sample of the study. The data were obtained by face-to-face interview method using the Information Form and the Questionnaire for the Evaluation of Knowledge and Awareness Levels of Colorectal Cancers.

## **Results**

The mean score of the Questionnaire for the Evaluation of Knowledge and Awareness Levels of Colorectal Cancers was found to be  $10.61 \pm 5.65$ . This score indicated that individuals undergoing chemotherapy with a family history of colorectal cancer had a moderate level of knowledge and awareness about colorectal cancer. Two-thirds of the participants reported that they had knowledge that diabetes, obesity, lifestyle, smoking and alcohol use increased the risk of colorectal cancer.

## **Conclusion**

The results revealed that It was observed that elderly, low educated, male and rural-dwelling participants needed more education on improving the level of knowledge and awareness about colorectal cancers.

## **Implications for Practice:**

In order to prevent colorectal cancer and reduce the burden of disease, it is seen that first-degree patient relatives need to be more conscious and educated.

## **Introduction**

According to GLOBOCAN 2020 data, colorectal cancers constitute 19.5% of all cancers. Colorectal cancers are the third most common type of cancer after breast cancer and lung cancer [1]. The incidence of colorectal cancer in our country is similar to the world data. In our country, colorectal cancers constituted 10.5% of all cancer cases and 9.5% of newly diagnosed cancer cases in 2018 [2].

Advanced age, family history, individual health history, and alcohol and smoking habits are the most important risk factors for colorectal cancers [3]. The risk of colorectal cancer is twice as high in people with a first-degree relative with a history of colorectal cancer. Other high-risk factors for colorectal cancer can be listed as the presence of colorectal polyps larger than 1 centimeter or abnormal cell structure, and inflammatory bowel diseases. Some gene changes associated with smoking and obesity and familial predisposition (familial adenomatous polyposis [FAP] or hereditary nonpolyposis colorectal cancer (HNPCC or Lynch Syndrome), and alcohol use increase the risk of colorectal cancer [4, 5]. It is crucial to know the risk factors for colorectal cancer in terms of developing cancer prevention behaviors and starting screenings for early diagnosis [6].

Other colorectal cancer prevention behaviors are regular exercise and physical activity. The prevention of obesity, smoking cessation, and limiting alcohol consumption is also important in the prevention of colorectal cancer [7, 8, 9]. The removal of colorectal polyps larger than one centimeter during colonoscopy or sigmoidoscopy is reported to be one of the practices that reduce the risk of colorectal cancer [10, 11].

Knowing the risk factors for colorectal cancers, adopting preventive behaviors, screening, and early diagnosis have become important as individual and social prevention approaches. It is important to inform individuals with a first-degree relative diagnosed with colorectal cancer about cancer risk, prevention of colorectal cancers, and screening to reduce morbidity and mortality. Individuals cannot be motivated to take preventive steps without knowing the possibility of contracting the disease. If risk perception is established and risky people are directed to appropriate screening programs, cancer cases are diagnosed at an early stage, mortality rates and treatment costs are reduced.

In the Colorectal Cancer Prevention (PDQ®) Training Manual published by the National Institute of Cancer (NIH) for healthcare professionals, it is reported that secondary prevention measures (screening and early diagnosis) are effective in reducing the incidence and mortality of colorectal cancer. It is recommended to perform a fecal occult blood test (FOBT) and colonoscopy for colorectal cancer screening [6]. In our country, it is recommended by the Ministry of Health to perform a fecal occult blood test every two years and a colonoscopy every 10 years for individuals aged between 50–75 years [15]. In the 2018 American Cancer Society updated colorectal screening guideline, the age of onset of colorectal cancer screening was reduced from 50 to 45. It was determined that screening rates for colorectal cancers increased more than twice as a result of reducing the age of screening for colorectal cancers [16,17)].

The determination of the risk awareness perceptions of first-degree relatives of colorectal cancer patients and their level of knowledge about colorectal cancers will make a major contribution to the prevention

and early diagnosis of colorectal cancer. Providing education on the prevention and early diagnosis of colorectal cancer and developing projects in this regard may increase awareness and screening behaviors of patient relatives on this issue. This study was conducted to determine the knowledge level of first-degree relatives of colorectal cancer patients about colorectal cancer and their awareness of colorectal cancer risk factors.

Within the scope of the study, answers to the following questions were sought;

What is the knowledge level of first-degree relatives of colorectal cancer patients about colorectal cancers?

What is the level of risk awareness of first-degree relatives of colorectal cancer patients about colorectal cancers?

## Methods

### Design and Participants

The study was conducted in the medical oncology clinic of a university hospital in Istanbul between April and June 2021. This is a descriptive study.

First-degree (sibling, parent, or children) relatives receiving treatment within 5 months in the medical oncology clinic of a university hospital in Istanbul constituted the population of the study.

The sample size was calculated as 240 with the formula specified by Salant and Dilman [18]. The minimum sample size was calculated with a confidence interval of 95% and a sampling error of  $\pm 5\%$ . The inclusion criteria for the study were determined as patient relatives who were aged 18 and older, had relatives undergoing chemotherapy with the diagnosis of colorectal cancer, agreed to participate in the study, and had informed consent. A total of 251 patient relatives undergoing chemotherapy with the diagnosis of colorectal cancer were reached in the study.

### Data Collection

Interviews were held with patient relatives in a separate room from the patients.

**Personal Information Form:** The sociodemographic characteristics and healthy lifestyle habits of the patient relatives were questioned in this form.

**Questionnaire for the Evaluation of Knowledge and Awareness Levels of Colorectal Cancers:** This form consisted of 19 questions and was created by the researchers. 1 point is given to correct answers to the questions, and each wrong answer is given 0 points. A score between 0 and 19 is obtained from the knowledge test. A high score indicates an increase in the level of knowledge and awareness about colorectal cancer of the participants with first-degree relatives diagnosed with colorectal cancer.

## Data Analysis

The data were evaluated in a computer environment using SPSS 22.0 statistical program. Descriptive characteristics of the participants were analyzed using descriptive statistics (frequency and percentage analysis). The scores of the information form were evaluated by examining the mean and standard deviation values. The scores of the knowledge questionnaire were compared according to the personal characteristics of the participants using the independent samples t-test, one-way analysis of variance (ANOVA), and post hoc (Tukey, LSD) tests. According to the law of large numbers and the central limit theorem, the distribution was considered to be normal because the sample size was sufficient [17,18,19,20,21].

## Ethical Approval

Permission for the study was obtained from the Scientific Research Ethics Committee of the University of Health Sciences (21/230). Informed consent of the participants was obtained by explaining the aim and method of the study.

## Results

### Personal Characteristics

59.4% of the sample consisted of females, and 31.9% of them were aged between 41-and 50 years. 37.5% of the group were high school graduates and 76.5% of them were married. While 3.2% of the participants reported diarrhea, 22.3% of them reported constipation, and 4.4% of them reported both constipation and diarrhea. 70.1% of the sample did not report any complaints (such as diarrhea). Cases of colorectal cancer were present in the relatives of 99.2% of the sample. 32.3% of the group smoked and 12 [6] % of them used alcohol (Table 1).

### Results on Knowledge and Awareness Level

The mean score of the Questionnaire for the Evaluation of Knowledge and Awareness Levels of Colorectal Cancers was found to be 10 (6).  $1 \pm 5$  (6). 5 (Min-max: 0-19) (Table 2). This score indicated that individuals undergoing chemotherapy with a family history of colorectal cancer had a moderate level of knowledge and awareness about colorectal cancer.

More than half of the participants stated that regular check-ups for the early diagnosis of bowel cancer were important for the early diagnosis (56%) [6]. and would reduce the possibility of dying from bowel cancer with early diagnosis (59.4%). This result indicated that individuals with a first-degree relative with colorectal cancer had a low level of awareness about the importance of early diagnosis and regular screening. 37.5% of the participants stated that it was expensive to have regular screening and check-ups for the early diagnosis of bowel cancer (Table 3).

It was determined that two-thirds of the study group knew that advanced age increased the risk of colorectal cancer. It was found that while only 7 [6]. % of the study group knew that colon cancer was more common in men, 64.5% of them knew that a family history of colon cancer increased the risk of colon cancer (Table 3).

Two-thirds of the participants reported that diabetes, obesity, sedentary lifestyle, smoking, and alcohol use increased the risk of colorectal cancer. It was found that approximately one-third (29.1%) of the sample group did not know that the consumption of fat and red meat increased the risk of colon cancer (Table 3).

It was found that only 47% of the sample correctly answered the question (item 16) regarding the risk of some intestinal polyps turning into colon cancer. Two-thirds of the participants (71.3%) were found to know that a diet rich in fiber foods, fruits, and vegetables reduced the risk of colon cancer. It was found that two-thirds of the study group (70.9%) knew that the changes in stool and defecation habits could be a sign of colorectal cancer (Table 3).

Variables related to the Questionnaire for the Evaluation of Knowledge and Awareness Levels of Colorectal Cancers A statistically significant difference was determined between the total scores of the Questionnaire for the Evaluation of Knowledge and Awareness Levels of Colorectal Cancers according to the age groups of the participants ( $F=5.004$ ;  $p < 0.05$ ;  $\eta^2=0.075$ ). It was found that the participants aged 30 and younger had higher total scores on the Questionnaire for the Evaluation of Knowledge and Awareness Levels of Colorectal Cancers compared to participants aged 31 and older (Table 4).

A statistically significant difference was determined between the total scores of the Questionnaire for the Evaluation of Knowledge and Awareness Levels of Colorectal Cancers according to the education level of the participants ( $F=22(6)$ .  $08$ ;  $p < 0.05$ ;  $\eta^2=0.215$ ). The knowledge and awareness questionnaire total scores of the participants with a high education level (university graduate and above) were found to be higher than the total knowledge scores compared to the participants with a low education level (high school, primary school, and below primary education) ( $p < 0.05$ ) (Table 4).

The total scores of the Questionnaire for the Evaluation of Knowledge and Awareness Levels of Colorectal Cancers of the married participants (mean: 10.016) were found to be lower than the knowledge and awareness questionnaire total scores of the single participants (mean: 12.542) ( $t = -3.052$ ;  $p = 0.001$ ;  $d=0.454$ ;  $\eta^2=0.036$ ) (Table 4).

The total scores of the Questionnaire for the Evaluation of Knowledge and Awareness Levels of Colorectal Cancers of the participants living in urban areas (mean: 11.84) were found to be higher than the knowledge and awareness questionnaire total scores of the participants living in rural areas (mean: 8.21) ( $t = 5.037$ ;  $p < 0.05$ ;  $d = 0(6)$ .  $72$ ;  $\eta^2 = 0.092$ ) (Table 4).

The total scores of the Questionnaire for the Evaluation of Knowledge and Awareness Levels of Colorectal Cancers of the participants with a relative with previous colorectal cancer (mean: 10 (6).  $3$ )

were found to be higher than the knowledge and awareness questionnaire total scores of the participants with a relative with no previous colorectal cancer (mean: 8.00) ( $t = 0.55$ ;  $p < 0.05$ ;  $d=0.465$ ;  $\eta^2 = 0.002$ ) (Table 4).

## Discussion

Screening programs for the early diagnosis of cancer are of critical importance for a better prognosis and long-term survival. It is recommended to start screening at the age of 40 in individuals with a first-degree relative (under 60 years of age) with colorectal cancer or adenoma [22]. Furthermore, it is recommended to perform a fecal occult blood test (FOBT) and colonoscopy 10 years before the age of diagnosis of the family member diagnosed with colorectal cancer [22]. In the literature, it is stated that individuals with a family history of colorectal cancer have insufficient information on screening and early diagnosis [23]. In the study of Jenkins et al [24] on barriers to colorectal cancer screening, it was emphasized that individuals with a family history of colorectal cancer had a moderate level of knowledge. Similarly, in this study, undergoing chemotherapy with a diagnosis of colorectal cancer was found to have a moderate level of knowledge and awareness about colorectal cancers. In this study, it was also determined that individuals with a first-degree relative with colorectal cancer had a low level of awareness about the importance of early diagnosis and regular screenings.

In a study conducted by Freeman et al [25] with African American individuals, it was observed that education on early diagnosis of colorectal cancer increased the awareness of individuals and motivated them to participate in screening programs. Similarly, in a study by Denberg et al. [26] including the patients presenting to a primary care center in Colorado, it was reported that the education on colorectal cancers positively affected the awareness level of individuals and their participation in screening programs. In two studies [27,28] conducted on large sample groups in Europe, it was determined that the education on screening in colorectal cancers increased the awareness of individuals and their participation in screening programs. In the same studies, it was found that there was a relationship between the risk perceptions of colorectal cancers in individuals and motivation to develop protective behaviors [27,28].

The level of knowledge about colorectal cancers may vary according to the age, education level, and place of residence of the individual. In the cross-sectional study of Lynes et al. [29] aimed at determining the risk factors associated with colorectal cancers and awareness of the screening program, it was demonstrated that individuals under the age of 50 had less knowledge about both risk factors associated with lifestyle and the screening programs [29]. Similarly, Jenkins et al. [24] reported that rural-dwelling individuals with a family history of colorectal cancer, with a low level of education and income, had a lower level of knowledge about colorectal cancer risk factors. The results of our study are in parallel with the literature. In this study, it was determined that low educated, elderly, and rural-dwelling individuals had a lower level of knowledge and awareness about early diagnosis, screenings, and risk factors in colorectal cancers.

Cancer awareness means knowing a certain type of cancer and the screening programs for early detection of this cancer. Individuals can get information about the disease through education, work, the experiences of the sick person or relatives in their family and friends, through television and social media, through information and screening programs implemented by non-governmental organizations and official institutions and organizations, and can raise awareness that the disease may also occur in them. In their study, Paramasivam et al. [30] mentioned that the level of awareness was a barrier to breast and colorectal cancer screenings, and they stated that individuals with no awareness of cancer did not participate in screening programs. In this study, 37.5% of the participants indicated that it was expensive to have regular check-ups for the early diagnosis of bowel cancer. It was found that 59.4% of the participants knew that regular check-ups for early diagnosis of bowel cancer would reduce the possibility of dying from bowel cancer. Regular health check-ups are recommended due to early diagnosis, treatment, follow-up of diseases, and similar situations. Furthermore, first-degree relatives of colorectal cancer patients need more education to increase their risk awareness levels.

In addition to familial predisposition, age, dietary habits, and sedentary lifestyle are also known to be effective in the occurrence of colorectal cancer. Early diagnosis is very important for treatment and survival in colorectal cancer, as in other types of cancer. In their study, Patel et al. [31] indicated that early diagnosis was very important in the prognosis of colorectal cancer. González et al. [32] reported that colorectal cancer cases were increasing rapidly and that early diagnosis was very important to prevent the rapid increase in cancer cases and mortality rates. Lewandowska et al. [33] emphasized that a sedentary lifestyle was an important risk factor for colorectal cancer. Our study is in parallel with the literature. In this study, it was found that only two-thirds of the participants knew that diabetes, obesity, sedentary lifestyle, smoking, and alcohol use increased the risk of colorectal cancer. It was found that only two-thirds of the participants knew that advanced age increased the risk of colorectal cancer. These results indicated that the majority of individuals with a family history of colorectal cancer needed information on early diagnosis and the risk factors such as advanced age and sedentary lifestyle.

Being acquainted with this disease due to the previous history of colorectal cancer in another relative may lead to the concern of "I wonder if it is my turn" inpatient relatives. In the study conducted by Şentürk et al. [34], it was reported that symptoms such as anxiety, depressive mood, and stress increased significantly in patients and their relatives during the cancer diagnosis process [33]. In the study of Erdoğan et al. [35] it was determined that individuals caring for patients had concerns and doubts about the future, were not strong enough to fix some situations, and experienced feelings such as fear, anxiety, sadness, stress, depression, and insecurity, and that the stress they experienced through medical treatments increased the mortality rate of caregivers in 5 years [35]. The results of this study are consistent with the literature. It was found that 64.5% of the participants knew that a family history of colon cancer increased the risk of colon cancer. This result indicated that individuals with a first-degree relative with a history of colorectal cancer should be informed about cancer risk factors.

## **Limitations**

The data obtained from the study provide information about the level of knowledge and awareness of 251 patient relatives about colorectal cancers. The presence of the COVID-19 pandemic at the time of the study led to difficulties in data collection.

## **Conclusions**

In this study, it was observed that the relatives of patients receiving chemotherapy treatment with the diagnosis of colorectal cancer had a moderate level of knowledge and awareness. Accordingly, individuals needed to be educated about colorectal cancer risk factors and the importance of early screening. It was observed that there was a need to improve the level of knowledge and awareness of elderly, low educated, male, and rural-dwelling participants about colorectal cancers.

## **Declarations**

### **Funding:**

No financial support was received for the study.

### **Competing interests:**

The authors declare no competing interests.

### **Author Contributions:**

GT, BNBD, SA: Conceptualization, methodology

ZB, BNBD: Data collection, writing—original draft, and writing—review and editing.

GT, BNBD: Conceptualization, methodology, writing—original draft, and writing

GT, BNBD: Review and editing.

### **Availability of data and material:**

The data that support the findings of this study are available from the corresponding author upon reasonable request.

### **Ethics approval:**

Permission for the study was obtained from the Scientific Research Ethics Committee of the University of Health Sciences (23.03.2021/21-230). Informed consent of the participants was obtained by explaining the aim and method of the study.

### **Consent to participate:**

Informed consent was obtained from all individual participants included in the study. Please refer to the “Data collection” section under the “Method” heading for additional information.

### Consent to publish:

The authors affirm that human research participants provided informed consent for publication of their quotations.

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## Tables

Table 1. Descriptive Characteristics of the Participants (n = 251)

<b>Groups</b>	<b>Frequency (n)</b>	<b>Percentage (%)</b>
<b>Gender</b>		
Male	102	40.6
Female	149	59.4
<b>Age</b>		
30 and younger	43	17.1
31-40	44	17.5
41-50	80	31.9
51-60	44	17.5
Above 60	40	15.9
<b>Level of education</b>		
Below primary education	28	11.2
Primary education	52	20.7
High school	94	37.5
University and above	77	30.7
<b>Marital status</b>		
Married	192	76.5
Single	59	23.5
<b>Place of residence</b>		
Urban	166	66.1
Rural	85	33.9
<b>Health insurance</b>		
Yes	247	98.4
No	4	1.6
<b>Current complaints</b>		
Diarrhea	8	3.2
Constipation	56	22.3
Constipation, Diarrhea	11	4.4
No complaints	176	70.1

<b>History of colorectal cancer in relatives</b>		
Yes	249	99.2
No	2	0.8
<b>Smoking</b>		
Yes	81	32.3
No	170	67.7
<b>Alcohol use</b>		
Yes	29	11.6
No	222	88.4

Table 2. Participants' mean total score values of the Questionnaire for the Evaluation of Knowledge and Awareness Levels of Colorectal Cancers

	N	Mean ± sd	Min.- Max.
Questionnaire for the Evaluation of Knowledge and Awareness Levels of Colorectal Cancers	251	10.61 ± 5.65	0.00- 17.00

Table 3. Patient relatives' correct and incorrect answers to the items of the Questionnaire for the Evaluation of Knowledge and Awareness Levels of Colorectal Cancers (N=251)

	Answer	Frequency (n)	Percentage (%)
1. If I have regular check-ups for early diagnosis of bowel cancer, I am less likely to die from bowel cancer (CORRECT)	Incorrect	102	40.6
	Correct	149	59.4
2. It is very expensive to have regular check-ups for early diagnosis of bowel cancer (CORRECT)	Incorrect	157	62.5
	Correct	94	37.5
3. Consumption of fat and red meat increases the risk of colon cancer (CORRECT)	Incorrect	73	29.1
	Correct	178	70.9
4. Regular check-ups for early diagnosis of bowel cancer help me in early diagnosis of conditions that may turn into cancer in the future (polyps, chronic constipation, etc.) (CORRECT)	Incorrect	109	43.4
	Correct	142	56.6
5. If I have bowel cancer, I will not be able to live more than 5 years (CORRECT)	Incorrect	219	87.3
	Correct	32	12.7
6. Obesity increases the risk of colon cancer (CORRECT)	Incorrect	71	28.3
	Correct	180	71.7
7. Colon cancer is more common in men (CORRECT)	Incorrect	232	92.4
	Correct	19	7.6
8. Sedentary lifestyle increases the risk of colon cancer (CORRECT)	Incorrect	77	30.7
	Correct	174	69.3
9 The risk of colon cancer increases with age (CORRECT)	Incorrect	70	27.9
	Correct	181	72.1
10. Excessive alcohol consumption increases the risk of colon cancer (CORRECT)	Incorrect	66	26.3
	Correct	185	73.7
11. Smoking increases the risk of colon cancer (CORRECT)	Incorrect	69	27.5
	Correct	182	72.5
12. If I have regular check-ups for early diagnosis of bowel cancer, it reduces the possibility of major surgery (colostomy) when bowel cancer occurs (CORRECT)	Incorrect	124	49.4
	Correct	127	50.6
13. A diet rich in fiber foods reduces the risk of colon cancer (CORRECT)	Incorrect	72	28.7
	Correct	179	71.3
14. A diet rich in fruits and vegetables reduces the risk of colon cancer (CORRECT)	Incorrect	70	27.9
	Correct	181	72.1

15. A family history of colon cancer increases the risk of colon cancer (CORRECT)	Incorrect	89	35.5
	Correct	162	64.5
16. Some intestinal polyps may turn into colon cancer (CORRECT)	Incorrect	133	53.0
	Correct	118	47.0
17. All intestinal polyps turn into colon cancer over time (INCORRECT)	Incorrect	227	90.4
	Correct	24	9.6
18. Diabetes increases the risk of colon cancer (CORRECT)	Incorrect	73	29.1
	Correct	178	70.9
19. The changes in stool and defecation could be a sign of colon cancer (CORRECT)	Incorrect	73	29.1
	Correct	178	70.9

Table 4. Comparison of patient relatives' knowledge scores on the Questionnaire for the Evaluation of Knowledge and Awareness Levels of Colorectal Cancers according to descriptive characteristics (n=251)

<b>Personal characteristics</b>	<b>n</b>	<b>Total score of the Questionnaire for the Evaluation of Knowledge and Awareness Levels of Colorectal Cancers</b>
<b>Gender</b>		
		Mean± SD
Male	102	10.49 ± 5.75
Female	149	10.69 ± 5.61
t		-0.276
p		0.78
<b>Age</b>		
		Mean± SD
30 and younger	43	12.51 ± 4,54
31-40	44	11.32 ± 5.22
41-50	80	11.28 ± 5.77
51-60	44	9.43 ± 5.58
Above 60	40	7.75 ± 5.96
F		5.004
p		<b>0.001</b>
PostHoc		1>4, 1>5, 2>5, 3>5 (p<0.05)
<b>Level of education</b>		
		Mean± SD
Below primary education	28	5.54 ± 5.55
Primary education	52	8.29 ± 5.61
High school	94	10.92 ± 5.63
University and above	77	13.65 ± 3.41
F		22.608
p		<b>0.000</b>
PostHoc		2>1, 3>1, 4>1, 3>2, 4>2, 4>3 (p<0.05)
<b>Marital status</b>		
		Mean± SD
Married	192	10.02 ± 5.81

Single	59	12.54 ± 4.63
t		-3.052
p		<b>0.001</b>

<b>Place of residence</b>		Mean± SD
Urban	166	11.84 ± 4.95
Rural	85	8.21 ± 6.18
t		5.037
p		<b>0.000</b>

<b>History of cancer in relatives</b>		Mean± SD
Yes	249	10.63 ± 5.67
No	2	8.00 ± 0.00
t		0.655
p		<b>0.000</b>

<b>Smoking</b>		Mean± SD
Yes	81	9.62 ± 5.86
No	170	11.08 ± 5.51
t		-1.930
p		0.055

<b>Alcohol use</b>		Mean± SD
Yes	29	9.59 ± 6.12
No	222	10.74 ± 5.59
t		-1.037
p		0.30

t = independent-samples t-test; F= One-way analysis (ANOVA) \*p < 0.05