Determination of The Level of Knowledge of Students Studying in The First and Emergency Aid Program About Cancer Screening

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Abstract:— *Cancer screening is a crucial public health intervention aimed at early detection and reducing mortality. Health professionals, especially First and Emergency Aid students, play a vital role in promoting awareness and guiding individuals on screening. Understanding their knowledge level is important for shaping effective education programs. This cross-sectional descriptive study was conducted in the 2024–2025 academic year with 1st and 2nd year students enrolled in the First and Emergency Aid Program at a foundation university. Data were collected using a demographic questionnaire and the "Knowledge Scale for Cancer Screenings." A total of 73 volunteer students participated. The reliability of the scale was confirmed with Cronbach's Alpha = 0.796. 63% of the students had prior knowledge about cancer screenings, with breast cancer being the most recognized. The overall knowledge level was moderate. Significant associations were found between knowledge level and variables such as gender, grade level, and health insurance status. However, smoking, alcohol use, employment status, and family history of cancer showed no significant effect. The findings indicate a need for restructuring cancer screening education in the curriculum of emergency aid students. Enhancing knowledge through targeted training may improve their role as future healthcare providers.*

Keywords: *Cancer, screening, health education, emergency aid, knowledge level, students*

I. INTRODUCTION

Cancer is a multifaceted group of diseases that can invade and metastasize to body tissues, where uncontrolled cell division occurs as a result of genetic and epigenetic deterioration [1,2]. In 2022, approximately 20 million new cases and 10 million deaths were reported worldwide, and these numbers are projected to increase by 60% by 2040 [2,3]. In Turkey, breast, colorectal, cervical and lung cancers are at the forefront in terms of mortality; Early diagnosis significantly increases survival rates [4]

Cancer screenings are public health strategies that aim to improve treatment success and reduce mortality by detecting precancerous lesions or early cancer stages before symptoms appear. The World Health Organization (2023) and the American Cancer Society (2023) recommend regular screening programs for breast, cervix, colorectal, and lung cancer [3,5]. For example, mammography has led to a 20–30% reduction in breast cancer-related deaths [6], while lung cancer mortality has been reduced by approximately 21–26% with low-dose CT (LDCT) [7,8], colorectal cancer mortality is reduced by a few months of life years with fecal occult blood testing, while HPV + Pap combination reduces cervical cancer-related deaths by 60% [9].

How widely these effective screening programs are used by the community is directly related to the level of health literacy, awareness and education. The level of knowledge of university students and health professionals in this field is of decisive importance both in terms of gaining individual screening habits and their future professional roles. Cross-sectional studies show that medical and health students' level of knowledge about breast, cervical and colorectal cancer screening is still insufficient [10]. For example, in a study conducted among medical school students, the average colorectal cancer screening knowledge score was found to be low [11]. In a study conducted on nursing students' knowledge of cervical and breast cancer screening, the level of knowledge increased significantly with educational manipulation [12].

In Turkey, graduates of the "First and Emergency Aid" program have the capacity to provide health education while evaluating vital signs in emergency situations. For this reason, measuring the level of knowledge of the students of this program about cancer and screening offers an innovative approach in terms of both public health and clinical practice. In recent years, multicancer early diagnosis (MCED) tests have been developing, and artificial intelligence-supported imaging analyses have been used [13,14], but these technologies are still far from being widely applicable. Therefore, knowledge adequacy is critical in the effective use of classical methods applied for common cancer types.

The COVID19 pandemic has led to a decline in screening rates, but a recovery in breast and colorectal screening has been observed in the following stages [15,16]. On the other hand, recovery in cervical screenings was slower and participation seemed to decline further when the level of knowledge was low [17]. This situation reveals the necessity of health education restructuring.

For this reason, it is essential to systematically measure the level of knowledge of First and Emergency Aid students about cancer types, risk factors, screening methods, age of initiation of screening and the advantages/disadvantages of the methods. Thus, if knowledge gaps are identified, the level of knowledge can be increased through interventions such as curriculum adjustments and additional training sessions, and students can be trained as conscious health representatives.

The aim of this study is to determine the basic level of cancer knowledge, especially breast, cervix, colorectal and lung cancer screenings, among First and Emergency Aid students by objective measurement methods and to interpret the results obtained with analyzes for academic and practical recommendations. It is planned to determine the level of knowledge about cancer screening of students studying in the First and Emergency Aid Program of a foundation university . Research questions to be answered within the scope of the study:

- Is there a relationship between the sociodemographic characteristics of the students participating in the study and the level of knowledge about cancer screenings?

II. METHOD

Place and Time of the Research

The research is planned to be carried out between 01.12.2024 and 01.07.2025 with 1st and 2nd year students studying in the First and Emergency Aid Program of a foundation university.

Purpose and Type of Research

The aim of the descriptive and cross-sectional scientific research is to determine the level of knowledge about cancer screening of students studying in the First and Emergency Aid Program of a foundation university.

Universe and Sample of the Research

1st and 2nd year students studying in the First and Emergency Aid Program of a foundation university of a foundation university formed the study universe. In this study, the sampling method was not used and students who met the research criteria were included. The following criteria were taken into account in the inclusion of participants in the sampling:

-To be a student at the relevant university and program,

- Not having a Turkish speaking, communication problem or psychiatric diagnosis made by a physician,

-Volunteering to participate in research

Participants who did not meet the inclusion criteria were not included in the study.

Data Collection and Data Collection Tools

The data will be collected from individuals who agree to participate in the research and meet the inclusion criteria via a survey questionnaire to be sent via Google Forms and face-to-face. This time is planned to last 15-20 minutes for each participant. The data of the study will be collected with the "Personal Information Form" and "Information Scale for Cancer Screenings" prepared by the researchers.

Personal Information Form

Prepared by the researcher in line with the literature. There are 8 questions about socio-demographic characteristics and 4 questions about cancer and cancer screening.

Knowledge Scale for Cancer Screening

The Knowledge Scale for Cancer Screenings, which was validated in Turkish by Yıldırım Öztürk and Uyar in 2019, consists of 25 items and 3 sub-dimensions. The sub-dimensions of the scale are not specifically named. There are 10 items (8, 17-23, 25, 28) items in the 1st sub-dimension of the scale, 9 items (4, 5, 7, 10, 12, 13, 15, 16, 27) in the 2nd sub-dimension and 6 items (1-3, 9, 11, 24) in the 3rd sub-dimension. The scale is of the triple rating type. The scale is answered in a range from 1 to 3 as "1: True, 2: False, 3: I do not know". When calculating the scale score, "Correct" answers are evaluated as 1 point, and "Incorrect" and "I don't know" answers are evaluated as 0 points. The lowest score that can be obtained from the scale is 0, and the highest score is 25. When calculating the scale score, 3 items (Items 2, 11, 24) that have a negative meaning should be reverse-coded. The order of the items included in the scale does not matter. A mixed ranking may be used by researchers. No cut-off point has been set for the scale score. With an accepted approach, it can be said that participants who score 70% or more of the total score (17.5 points and above) have a sufficient level of knowledge. Cronbach's alpha coefficient, which is an indicator of the reliability of the scale, is 0.89. The explained variance of the scale is 41.8% [18]

Analysis of Data

Various statistical methods were used in the analysis of the data obtained in this study. Frequency analysis, reliability analysis, t-test, ANOVA and correlation analysis were applied in accordance with the research questions. Explanations of these analysis techniques are presented below.

Frequency Analysis

Frequency analysis was used to determine the demographic characteristics of the participants in the study and the distribution of other categorical variables. Through this analysis, the number of times each categorical variable was repeated and the percentage ratios of these repetitions in the total were calculated.

The findings were presented in tabular form and the general distribution of the data was visualized. In this way, the main characteristics of the research group were defined.

Reliability Analysis

Reliability analysis was performed to determine the internal consistency of the scales used in the research. For this purpose, Cronbach's Alpha (α) coefficient was calculated. Cronbach's Alpha coefficient of 0.70 and above indicates that the scale is sufficiently reliable. In line with the reliability coefficient obtained, it was accepted that the scale consistently measured the structure to be measured.

t-Test

In the study, t-test was used to determine whether there was a significant difference between the two groups in terms of mean scores. The independent sample t-test applied for two independent groups reveals whether the difference observed between the groups is statistically significant. The obtained t-value and significance (p) level were used to evaluate whether this difference was coincidental or not.

ANOVA (Variance Analysis)

One-way analysis of variance (ANOVA) was applied to determine whether there was a significant difference between the mean scores of more than two groups. If a significant difference is detected as a result of ANOVA analysis, post-hoc tests can be performed to determine which groups there is a difference. In this study, ANOVA analysis was used to reveal the relationships between the groups of the independent variable and the dependent variable.

Correlation Analysis

In the study, correlation analysis was performed to determine the level and direction of the relationship between the variables. When parametric conditions were met, Pearson correlation coefficient (r) was used. The correlation coefficient shows the strength and direction of the relationship between the two variables. If the coefficient is positive, it indicates that there is a directly proportional relationship between the variables; If it is negative, it means that there is an inversely proportional relationship. The significance level (p) shows whether the relationship found is statistically significant.

Limitations of the Study

This study was carried out together with students studying in a program of the relevant university. It cannot be generalized to all students.

Ethical Dimension of Research

In order to carry out the research, it is declared by the responsible researcher that no other ethics committee other than the ethics committee of the institution where the study was conducted was applied.

III. RESULTS

In this study, it was aimed to determine the level of knowledge about cancer screening of students studying in the First and Emergency Aid Program of a foundation university. Individuals participating in the study were considered in terms of various demographic variables. The findings obtained as a result of the frequency analysis performed for demographic variables are given in Table 1.

Table 1. Frequency Analysis of Demographic Characteristics of Participants

Variables		Frequency	Percent
Class	1 class	35	47,9
	2 classes	38	52,1
Gender	Woman	57	78,1
	Male	16	21,9
Marital status	Married	4	5,5
	Single	69	94,5
Income status	Income is less than expense	23	31,5
	Income equals expense	45	61,6
	Income is more than expense	5	6,8
Smoking	Yes	30	41,1
	No	43	58,9
Alcohol use	Yes	20	27,4
	No	53	72,6
Are you working?	Yes	17	23,3
	No	56	76,7
Do you have health insurance?	Yes	42	57,5
	No	31	42,5
Do you have a history of cancer?	Yes	1	1,4
	No	72	98,6
Is there a family history of cancer?	Yes	9	12,3
	No	64	87,7
Have you ever heard of cancer screenings?	1,00	27	37,0
	2,00	46	63,0
	Total	73	100,0

	Minimum	Maximum	Average	Std. Deviation
Yas	18,00	31,00	19,986	2,227

A total of 73 students participated in this study. The demographic characteristics of the participants and the frequency analyses of these characteristics are summarized below:

47.9% (n=35) of the participants were 1st year students and 52.1% (n=38) were 2nd year students. This shows that the sample is balanced in terms of class distribution.

The majority of the participants were female (78.1%; n=57). The proportion of male participants was 21.9% (n=16). This result shows that the number of female students is higher among the students of the First and Emergency Aid Program.

Almost all of the participants were single (94.5%; n=69). The proportion of married people was very low (5.5%; n=4). This finding is an indication that the group participating in the study consists of the younger age group.

Most of the participants stated that their income was equal to their expenses (61.6%; n=45). The proportion of participants with a negative income-expense balance (31.5%; n=23) and those with more income than expenses (6.8%; n=5) was lower. This result suggests that students are generally at the middle-income level.

41.1% (n=30) of the participants stated that they smoked. The proportion of non-smokers was found to be 58.9% (n=43). This rate shows that smoking among students is at a considerable level.

27.4% (n=20) of the participants stated that they used alcohol. The rate of those who did not use alcohol was 72.6% (n=53), which shows that alcohol use is at a lower level among students.

23.3% (n=17) of the participants were actively working. The rate of those who did not work was 76.7% (n=56). This result shows that the vast majority of students are not involved in business life.

57.5% (n=42) of the participants stated that they had health insurance. The rate of those without health insurance was 42.5% (n=31) and this rate was found to be relatively high. The proportion of students who do not have health insurance is remarkable.

Among the participants, there was only 1 person (1.4%) who was diagnosed with cancer. The rate of those who were not diagnosed with cancer was quite high with 98.6% (n=72).

It was determined that 12.3% (n=9) of the participants were individuals with a family diagnosis of cancer. The rate of those who did not have a family history of cancer was 87.7% (n=64). The types of cancer of those diagnosed with cancer in the family are as follows. Breast cancer was observed in 3 families, leukemia in 2 families, lung, uterus, intestine and stomach, and laryngeal cancer in one family.

63% of the participants (n=46) stated that they had heard of cancer screenings before. 37% (n=27) stated that they had not heard of cancer screenings before. The types of screening known to those who have information about cancer screening were determined as 9 breasts, 1 uterus and 1 colonoscopy.

The ages of the participants ranged from 18 to 31 years. The mean age was 19.99 (±2.23). It can be said that the ages of the participants showed a homogeneous distribution with a low standard deviation (2.23). It is seen that the majority of the students are young individuals around the age of 20.

Before proceeding to the detailed examination of the study, the validity and reliability analysis of the scale items was performed.

Table 2. Reliability Analysis Results for Scales

Scales	**Reliability Statistics**	
	Cronbach's Alpha	Number of Items
Scale	0,796	25
A1 (Subsize 1)	0,682	10
A2 (Subsize 2)	0,787	9
A3 (Sub-Size 3)	0,386	6

The reliability analyses of the scales used in the study are summarized in Table 2. The internal consistency of the scales was evaluated with Cronbach's Alpha coefficient. In general, values of 0.70 and above indicate an acceptable level of reliability. The range of 0.60-0.70 is considered borderline acceptable, and 0.80 and above is considered high reliability.

Cronbach's Alpha value for the general scale was found to be 0.796. This value shows that the scale is generally a reliable measurement tool and has an internal consistency above an acceptable level.

Cronbach's Alpha value for Subdimension 1 (A1) is 0.682. This value provides an acceptable level of reliability at the border. This shows that the items in the A1 sub-dimension are moderately related to each other.

Cronbach's Alpha value for Subdimension 2 (A2) is 0.787. This value is above the acceptable level and indicates good internal consistency. It can be said that the items in the A2 sub-dimension measure each other with high consistency.

Cronbach's Alpha value for Subdimension 3 (A3) is 0.386. This value is at a low confidence level and indicates that the internal consistency of the child dimension is poor. This suggests that the co-measurement power of items in the A3 sub-dimension may be low. It may be suggested to review the items in this sub-dimension, to remove or rearrange some items if necessary.

Before proceeding to investigate whether there is a statistically significant difference between the scale averages in terms of demographic variables, the basic statistical indicators were calculated for the scale items. The first 4 moments, the mean, standard deviation, skewness and kurtosis values, as well as the minimum and maximum values are given in Table 4.

Table 3. Descriptive Statistics of Scales

Scales	Minimum	Maximum	Average	Std. Deviation	Skew	kurtosis
AB1	3,00	10,00	7,4932	2,19926	-0,534	-0,789
AB2	0,00	9,00	5,0411	2,49688	0,299	-0,941
AB3	1,00	4,00	2,7534	0,74126	-0,829	0,770
Knowledge Scale for Cancer Screening Total	8,00	23,00	15,2877	4,32846	0,257	-0,877

In normality studies, the skewness and kurtosis values of the relevant variable are in the range of -2 to +2, which is accepted as an indication that the variables show normal distribution (George and Mallery, 2010). In this context, the distribution characteristics of the scales used in the study are evaluated below:

For Subdimension 1 (AB1), the minimum value was 3, the maximum value was 10, the mean was 7.49 and the standard deviation was 2.20. The skewness value is -0.534 and the kurtosis value is -0.789, both values are in the range of ±2. These findings show that the scores of the AB1 subdimension are in accordance with the normal distribution.

For Subdimension 2 (AB2), the minimum value was 0, the maximum value was 9, the mean was 5.04, and the standard deviation was 2.50. The skewness value was 0.299 and the kurtosis value was -0.941, and these values were found to be in accordance with the normal distribution criteria. Therefore, it can be said that the scores of the AB2 sub-dimension are also normally distributed.

For Subdimension 3 (AB3), the minimum value was 1, the maximum value was 4, the mean was 2.75, and the standard deviation was 0.74. The skewness value is -0.829 and the kurtosis value is 0.770, which remains in the range of ±2. As a result, it can be stated that the scores in the AB3 sub-dimension show a normal distribution.

The minimum value for the Total Score of the Knowledge Scale for Cancer Screening was 8, the maximum value was 23, the mean was 15.29 and the standard deviation was 4.33. The skewness value is 0.257 and the kurtosis value is -0.877, both values are within the limits of ±2. This situation reveals that the total scores of the scale also show normal distribution characteristics.

In summary, all sub-dimensions used in the study and the skewness and kurtosis values obtained for the total scale score provide the normal distribution assumption. Therefore, it is statistically appropriate in the use of parametric analyses based on the assumption of normality. In terms of demographic variables with two levels, t-test was used to analyze the difference between scale and sub-dimension averages, and ANOVA analysis was used for demographic variables with 3 or more levels.

First, since the class variable has two levels, the t-test was used and the results obtained are given in Table 4.

Table 4. Tests on the Difference Between Score Averages in Terms of Class Variable (t test)

Class		N	Average	Std. Deviation	t	p
AB1	1 class	35	7,600	2,131	0,396	0,693
	2 classes	38	7,395	2,284		
AB2	1 class	35	5,029	2,443	-0,041	0,968
	2 classes	38	5,053	2,578		
AB3	1 class	35	2,743	0,741	-0,116	0,908
	2 classes	38	2,763	0,751		
Knowledge Scale for Cancer Screening Total	1 class	35	15,371	4,159	0,158	0,875
	2 classes	38	15,211	4,533		

It was examined by t-test whether there was a significant difference between the sub-dimensions and the total scale scores according to the class variable of the participants.

AB1 (Sub-Dimension 1) mean scores were found to be 7.60 for 1st year students and 7.40 for 2nd year students. The difference between 1st and 2nd year students was not statistically significant ($t = 0.396$; $p = 0.693$). No significant difference was observed in AB1 scores according to grade level.

The mean AB2 (Sub-Dimension 2) score was found to be 5.03 in 1st year students and 5.05 in 2nd year students. The difference between the groups was not statistically significant ($t = -0.041$; $p = 0.968$). The class variable did not have a significant effect on AB2 scores.

AB3 (Sub-Dimension 3) mean scores were calculated as 2.74 in the 1st grade and 2.76 in the 2nd grade. There was no statistically significant difference between the groups ($t = -0.116$; $p = 0.908$). Grade level does not significantly affect AB3 scores.

In terms of the total score of the Knowledge Scale for Cancer Screenings, the average score was 15.37 for 1st year students and 15.21 for 2nd year students. This difference between the groups was not statistically significant (t = 0.158; p = 0.875). The class variable does not make a significant difference on the total knowledge level scores.

In summary, there was no statistically significant difference between both sub-dimensions and total scale scores according to the grade level of the participants. These results show that the level of knowledge and sub-dimensions of cancer screening are independent of grade level.

Table 5. Tests on the Difference Between Mean Scores in terms of Gender Variable (t test)

Gender		N	Average	Std. Deviation	t	p
AB1	Woman	57	7,614	2,042	0,885	0,379
	Male	16	7,063	2,720		
AB2	Woman	57	5,088	2,473	0,299	0,766
	Male	16	4,875	2,655		
AB3	Woman	57	2,754	0,689	0,021	0,983
	Male	16	2,750	0,931		
Knowledge Scale for Cancer Screening Total	Woman	57	15,456	4,045	0,625	0,534
	Male	16	14,688	5,326		

According to the gender variable of the participants, whether there was a significant difference between the sub-dimensions and the total scale scores was examined by t-test.

The mean AB1 (Sub-Dimension 1) score was 7.61 in female participants and 7.06 in male participants. Although the mean score of women was higher than that of men, this difference was not statistically significant (t = 0.885; p = 0.379). The gender variable did not have a significant effect on AB1 scores.

The mean AB2 (Sub-Dimension 2) score was determined as 5.09 for female participants and 4.88 for male participants. This difference between the two groups was not statistically significant (t = 0.299; p = 0.766). No significant difference was observed in AB2 scores according to gender.

The mean AB3 (Sub-Dimension 3) score was calculated as 2.75 for women and 2.75 for men. There was no difference between the groups (t = 0.021; p = 0.983). The gender variable has no effect on AB3 scores.

The total score of the Knowledge Scale for Cancer Screening was found to be 15.46 for female participants and 14.69 for male participants. Although the mean of female participants was higher, this difference was also not statistically significant (t = 0.625; p = 0.534). The gender variable did not lead to a significant difference in the participants' level of knowledge about cancer screening.

As a result, according to the findings obtained in the study, there is no statistically significant difference between the sub-dimensions and the total scale scores according to the gender variable. This shows that the level of knowledge and related sub-dimensions of cancer screening are gender-independent.

Table 6. Tests on the Difference Between Score Averages in terms of Marital Status Variable (t test)

Marital status		N	Average	Std. Deviation	t	p
AB1	Married	4	7,500	3,109	0,006	0,995
	Single	69	7,493	2,167		
AB2	Married	4	5,750	2,986	0,581	0,563
	Single	69	5,000	2,485		
AB3	Married	4	3,000	0,816	0,682	0,498
	Single	69	2,739	0,741		
Knowledge Scale for Cancer Screening Total	Married	4	16,250	5,058	0,455	0,651
	Single	69	15,232	4,319		

According to the marital status variable of the participants, whether there was a significant difference between the sub-dimensions and the total scale scores was examined by t-test.

The mean AB1 (Sub-Dimension 1) score was found to be 7.50 for married participants and 7.49 for single participants. This difference between the two groups was extremely small and not statistically significant ($t = 0.006$; $p = 0.995$). The marital status variable did not have a significant effect on AB1 scores.

The mean AB2 (Sub-Dimension 2) score was 5.75 for married participants and 5.00 for single participants. Although the mean score of married participants was higher, this difference was not statistically significant ($t = 0.581$; $p = 0.563$). The marital status variable does not lead to a significant difference on AB2 scores.

The mean AB3 (Sub-Dimension 3) score was calculated as 3.00 for married participants and 2.74 for single participants. This difference between the groups was also not statistically significant ($t = 0.682$; $p = 0.498$). It is seen that the marital status variable does not have an effect on AB3 scores.

The total score of the Knowledge Scale for Cancer Screening was found to be 16.25 in married participants and 15.23 in single participants. Although the mean total score of the married participants was higher, this difference was also not statistically significant ($t = 0.455$; $p = 0.651$). The marital status variable did not show a significant effect on the participants' level of knowledge about cancer screening.

As a result, the findings show that there is no statistically significant difference between the sub-dimensions and the total scale scores according to the marital status variable. This situation reveals that the level of knowledge of the participants about cancer screening and the related sub-dimensions are independent of marital status.

Table 7. Tests Regarding the Difference Between Mean Scores in terms of Smoking Status Variable (t test)

Smoking		N	Average	Std. Deviation	t	p
AB1	Yes	30	7,800	2,413	0,996	0,323
	No	43	7,279	2,039		
AB2	Yes	30	5,100	2,670	0,167	0,868

	No	43	5,000	2,400		
AB3	Yes	30	2,767	0,728	0,127	0,900
	No	43	2,744	0,759		
Knowledge Scale for Cancer Screening Total	Yes	30	15,667	4,589	0,622	0,536
	No	43	15,023	4,172		

According to the smoking status of the participants, whether there was a significant difference between the sub-dimensions and the total scale scores was examined by t-test.

The mean AB1 (Sub-Dimension 1) score was found to be 7.80 in the participants who smoked and 7.28 in the non-smokers. Although the mean score of smokers was higher, this difference was not statistically significant ($t = 0.996$; $p = 0.323$). Smoking does not make a significant difference on AB1 scores.

The mean AB2 (Sub-Dimension 2) score was calculated as 5.10 for smokers and 5.00 for non-smokers. This difference between the groups was not statistically significant ($t = 0.167$; $p = 0.868$). Smoking status has no effect on AB2 scores.

The mean AB3 (Sub-Dimension 3) score was found to be 2.77 in smokers and 2.74 in non-smokers. There was no statistically significant difference between the two groups ($t = 0.127$; $p = 0.900$). Smoking does not lead to a significant change in AB3 scores.

The total score of the Knowledge Scale for Cancer Screening was found to be 15.67 in smokers and 15.02 in non-smokers. Although smokers had a higher average score, this difference was not statistically significant ($t = 0.622$; $p = 0.536$). Smoking did not have a significant effect on participants' level of knowledge about cancer screening.

In summary, there was no statistically significant difference in terms of both sub-dimensions and total scale scores according to smoking status. These findings show that there is no significant relationship between smoking and the level of knowledge about cancer screening.

Table 8. Tests on the Difference Between Mean Scores in terms of Alcohol Use Status Variable (t test)

Alcohol use		N	Average	Std. Deviation	t	p
AB1	Yes	20	7,750	2,381	0,610	0,544
	No	53	7,396	2,142		
AB2	Yes	20	5,250	2,221	0,437	0,664
	No	53	4,962	2,609		
AB3	Yes	20	2,850	0,587	0,681	0,498
	No	53	2,717	0,794		
Knowledge Scale for Cancer Screening Total	Yes	20	15,850	4,196	0,679	0,499
	No	53	15,075	4,398		

The differences between the sub-dimensions and the total scale scores according to the alcohol use status of the participants were analyzed by t-test.

The mean AB1 (Sub-Dimension 1) score was found to be 7.75 in the participants who used alcohol and 7.40 in the participants who did not use alcohol. Although the mean score of the alcohol using group was higher, this difference was not statistically significant (t = 0.610; p = 0.544). Alcohol use does not have a significant effect on AB1 scores.

The mean AB2 (Sub-Dimension 2) score was calculated as 5.25 for individuals who used alcohol and 4.96 for those who did not use alcohol. This difference between the groups was not statistically significant (t = 0.437; p = 0.664). Alcohol use does not make a significant difference on AB2 scores.

The mean AB3 (Sub-Dimension 3) score was found to be 2.85 in the participants who used alcohol and 2.72 in the participants who did not use alcohol. There was no statistically significant difference between the two groups (t = 0.681; p = 0.498). Alcohol use status has no effect on AB3 scores.

The total score of the Knowledge Scale for Cancer Screening was determined as 15.85 for individuals who use alcohol and 15.08 for those who do not use alcohol. Although there was a mean score difference, this difference was not statistically significant (t = 0.679; p = 0.499). Alcohol use did not lead to a significant difference in participants' level of knowledge about cancer screening.

As a result, according to the findings obtained in the study, there is no statistically significant difference between the sub-dimensions and the total scale scores according to the alcohol use variable. This shows that there is no significant relationship between alcohol use and the level of knowledge about cancer screening.

Table 9. Tests Regarding the Difference Between Score Averages in Terms of Employment Status Variable (t test)

Are you working?		N	Average	Std. Deviation	t	p
AB1	Yes	17	7,412	2,373	-0,173	0,863
	No	56	7,518	2,166		
AB2	Yes	17	5,353	3,181	0,585	0,560
	No	56	4,946	2,276		
AB3	Yes	17	2,882	0,857	0,817	0,417
	No	56	2,714	0,706		
Knowledge Scale for Cancer Screening Total	Yes	17	15,647	5,361	0,389	0,699
	No	56	15,179	4,014		

The differences between the sub-dimensions and the total scale scores according to the working status of the participants were analyzed by t-test.

The mean AB1 (Sub-Dimension 1) score was found to be 7.41 in working participants and 7.52 in non-working participants. This small difference between the working and non-working groups was not statistically significant (t = -0.173; p = 0.863). Employment status does not make a significant difference on AB1 scores.

The mean AB2 (Sub-Dimension 2) score was calculated as 5.35 in working individuals and 4.95 in non-working individuals. This difference between the groups was not statistically significant (t = 0.585; p = 0.560). Employment status does not have a significant effect on AB2 scores.

The mean AB3 (Sub-Dimension 3) score was 2.88 for working participants and 2.71 for non-working participants. However, this difference was not statistically significant (t = 0.817; p = 0.417). Employment status does not cause a significant change in AB3 scores.

The total score of the Knowledge Scale for Cancer Screening was found to be 15.65 in working individuals and 15.18 in non-working individuals. Although there was a mean score difference, this difference was not statistically significant (t = 0.389; p = 0.699). Study status did not have a significant effect on participants' level of knowledge about cancer screening.

Overall, no statistically significant difference was found in comparisons based on study status. These findings suggest that the study status does not have a significant effect on the level of knowledge about cancer screenings.

Table 10. Tests Related to the Difference Between Score Averages in terms of Health Insurance Status Variable (t test)

Do you have health insurance?		N	Average	Std. Deviation	t	p
AB1	Yes	42	7,095	2,239	-1,828	0,072
	No	31	8,032	2,057		
AB2	Yes	42	5,143	2,280	0,403	0,688
	No	31	4,903	2,797		
AB3	Yes	42	2,738	0,701	-0,204	0,839
	No	31	2,774	0,805		
Knowledge Scale for Cancer Screening Total	Yes	42	14,976	4,099	-0,713	0,478
	No	31	15,710	4,656		

The mean AB1 (Sub-Dimension 1) score was found to be 7.10 in individuals with health insurance and 8.03 in those without health insurance. Although the mean AB1 score of the participants without health insurance was higher, this difference was not statistically significant (t = -1.828; p = 0.072). This result shows that health insurance status does not have a significant effect on AB1 scores, but it can be said that there is a difference close to the limit because the p-value is close to 0.05.

AB2 (Sub-Dimension 2) mean scores were calculated as 5.14 for those with health insurance and 4.90 for those without. This difference was not statistically significant (t = 0.403; p = 0.688). Health insurance status does not have a significant effect on AB2 scores.

The mean AB3 (Sub-Dimension 3) score was found to be 2.74 in the participants with health insurance and 2.77 in the participants without health insurance. There was no statistically significant difference between the two groups (t = -0.204; p = 0.839). Health insurance status has no significant effect on AB3 scores.

The total score of the Knowledge Scale for Cancer Screening was determined as 14.98 for participants with health insurance and 15.71 for those without. Although there was a mean score difference, this difference was also not statistically significant (t = -0.713; p = 0.478). Health insurance status does not have a significant effect on knowledge levels about cancer screening.

As a result, according to the findings obtained in the study, there was no statistically significant difference between the health insurance status and the sub-dimensions and total scale scores. Although there is a near-limit difference in the AB1 sub-dimension, it can be said that having health insurance in general does not have a significant effect on the level of knowledge about cancer screening.

Table 11. Tests on the Difference Between Mean Scores in terms of Cancer History Status Variable (t-test)

Do you have a history of cancer?		N	Average	Std. Deviation
AB1	Yes	1	10,000	
	No	72	7,458	2,194
AB2	Yes	1	9,000	
	No	72	4,986	2,469
AB3	Yes	1	4,000	
	No	72	2,736	0,731
Knowledge Scale for Cancer Screening Total	Yes	1	23,000	
	No	72	15,181	4,260

According to the participants' personal cancer history, the differences between the sub-dimensions and the total scale scores were evaluated.

Since the number of individuals with a history of cancer was only 1 person, parametric tests could not be applied and statistical significance analysis could not be performed. However, a general evaluation was made by comparing descriptive statistics.

The AB1 (Sub-Dimension 1) score was 10.00 in participants with a history of cancer and 7.46 in participants without a history of cancer. The score of the individual with a history of cancer is remarkably high.

The AB2 (Sub-Dimension 2) score was calculated as 9.00 in individuals with a history of cancer and 4.99 in those without. Here, too, the score of the individual with a history of cancer is significantly higher.

The AB3 (Sub-Dimension 3) score was found to be 4.00 in individuals with a history of cancer and 2.74 in those without. In terms of sub-dimension 3, the individual with a history of cancer has a higher score.

The total score of the Knowledge Scale for Cancer Screening was determined as 23.00 for individuals with a history of cancer and 15.18 for those without. The level of knowledge of the participant with a history of cancer seems to be much higher compared to other participants.

However, these comparisons should only be evaluated at the descriptive level, because the statistical test results are not reliable due to insufficient sample size (n = 1).

As a result, it is seen that the individual with a history of cancer has higher scores in all sub-dimensions and on the total knowledge scale. This suggests that personal cancer experience may increase the level of knowledge about cancer screening. However, due to the insufficient sample size, this situation is not generalizable and interpretations should be made carefully.

Table 12. Tests Regarding the Difference Between Score Averages in terms of the Variable of Family Cancer Diagnosis (t test)

Is there a family history of cancer?		N	Average	Std. Deviation	t	p
AB1	Yes	9	8,222	1,856	1,063	0,291
	No	64	7,391	2,237		
AB2	Yes	9	4,556	2,877	-0,620	0,537
	No	64	5,109	2,457		
AB3	Yes	9	2,889	0,333	0,583	0,562
	No	64	2,734	0,782		
Knowledge Scale for Cancer Screening Total	Yes	9	15,667	4,416	0,279	0,781
	No	64	15,234	4,349		

The mean AB1 (Sub-Dimension 1) score was found to be 8.22 in those with a family diagnosis of cancer and 7.39 in those without. This difference was not statistically significant (t = 1.063; p = 0.291).
The mean AB2 (Sub-Dimension 2) score was 4.56 for those with a family diagnosis of cancer and 5.11 for those without. This difference was not significant (t = -0.620; p = 0.537).
The mean AB3 (Subdimension 3) scores were 2.89 and 2.73, respectively, and the difference was not statistically significant (t = 0.583; p = 0.562).

The total score of the Information Scale for Cancer Screening was found to be 15.67 in the group with a family diagnosis of cancer and 15.23 in those without. This difference was also not significant (t = 0.279; p = 0.781).
As a result, the status of having a cancer diagnosis in the family does not make a statistically significant difference on the perceived self-blame sub-dimensions of the participants and their level of knowledge about cancer screenings.

Table 13. Tests Regarding the Difference Between Mean Scores in terms of the Variable of Previous Hearing Status of Cancer Screenings (t test)

Have you ever heard of cancer screenings?		N	Average	Std. Deviation	t	p
AB1	Yes	27	7,815	2,058	0,957	0,342
	No	46	7,304	2,279		
AB2	Yes	27	4,926	2,702	-0,300	0,765
	No	46	5,109	2,397		
AB3	Yes	27	2,852	0,662	0,868	0,388
	No	46	2,696	0,785		
Knowledge Scale for Cancer Screening Total	Yes	27	15,593	4,209	0,459	0,648
	No	46	15,109	4,433		

For the AB1 sub-dimension, the average score of those who had heard of cancer screenings before was 7.82, while the average score of those who had not heard of cancer screenings was 7.30. The difference was not statistically significant (t = 0.957; p = 0.342).

In the AB2 sub-dimension, the mean of those with "yes" hearing status was 4.93 and the mean of those with "no" was 5.11, and the difference was not significant (t = -0.300; p = 0.765).

In the AB3 sub-dimension scores, the mean score was 2.85 in those who had heard of cancer screenings before and 2.70 in those who had not heard of cancer screenings, and this difference was not statistically significant (t = 0.868; p = 0.388).

The mean total scores of the Knowledge Scale for Cancer Screening were at a similar level as 15.59 in those who had heard before and 15.11 in those who had not heard before, and there was no significant difference (t = 0.459; p = 0.648).

As a result, there was no significant difference between the participants' previous hearing of cancer screenings, sub-dimension scores and total knowledge scores of cancer screenings.

Since the income level variable has 3 levels, the ANOVA test was used to investigate whether the difference between the scale scores was statistically significant.

Table 14. Tests on the Difference Between Mean Scores in Terms of Income Level Variable (ANOVA test)

Income Level		N	Average	Std. Deviation	F	Itself.
AB1	Income is less than expense	23	7,435	2,293	0,304	0,739
	Income equals expense	45	7,600	2,189		
	Income is more than expense	5	6,800	2,168		
	Total	73	7,493	2,199		
AB2	Income is less than expense	23	4,696	2,401	0,333	0,718
	Income equals expense	45	5,222	2,557		
	Income is more than expense	5	5,000	2,739		
	Total	73	5,041	2,497		
AB3	Income is less than expense	23	2,565	0,788	1,219	0,302
	Income equals expense	45	2,822	0,716		
	Income is more than expense	5	3,000	0,707		
	Total	73	2,753	0,741		
Knowledge Scale for Cancer Screening Total	Income is less than expense	23	14,696	3,994	0,393	0,677
	Income equals expense	45	15,644	4,508		
	Income is more than expense	5	14,800	4,712		
	Total	73	15,288	4,328		

In the AB1 sub-dimension scores, the average of the group with less income than expenditure was 7.44, the average of those with income equal to expenditure was 7.60, and the average of those with more income than expenditure was 6.80. There was no significant difference between the groups (F = 0.304; p = 0.739).
For the AB2 subdimension, the average of the group with less income than expenditure is 4.70, the average of the group equal to income and expenditure is 5.22, and the average of the group with more income and expenditure is 5.00. No significant difference was observed between these groups (F = 0.333; p = 0.718).
In the AB3 sub-dimension, the averages were 2.57, respectively; It was 2.82 and 3.00, and there was no significant difference between the groups (F = 1.219; p = 0.302).
In the total scores of the Knowledge Scale for Cancer Screenings, the mean of those whose income was less than expenditure was 14.70, those whose income was equal to expenditure was 15.64, and those whose income was more than expenditure was 14.80, and this difference was not statistically significant (F = 0.393; p = 0.677).
As a result, there was no significant difference between the sub-dimension scores of the participants according to income level and the knowledge scores of cancer screenings.

Finally, the relationships between scale sub-dimensions, scale and age variables were investigated by correlation analysis and the results obtained are given in Table 15.

Table 15. Correlation Analysis

		AB1	AB2	AB3	Knowledge Scale for Cancer Screening Total	Yas
AB1	r	1	,492**	,382**	,857**	-0,075
	p		0,000	0,001	0,000	0,527
	n	73	73	73	73	73
AB2	r	,492**	1	0,126	,848**	0,215
	p	0,000		0,290	0,000	0,068
	n	73	73	73	73	73
AB3	r	,382**	0,126	1	,438**	0,082
	p	0,001	0,290		0,000	0,490
	n	73	73	73	73	73
Knowledge Scale for Cancer Screening Total	r	,857**	,848**	,438**	1	0,100
	p	0,000	0,000	0,000		0,401
	n	73	73	73	73	73
Yas	r	-0,075	0,215	0,082	0,100	1
	p	0,527	0,068	0,490	0,401	
	n	73	73	73	73	73
**. Correlation is significant at the 0.01 level (2-tailed).						

When the results of the correlation analysis in Table 15 are examined, the relationships between the AB1, AB2, AB3 sub-dimensions and the total score of the Knowledge Scale for Cancer Screening and the relationships with the age variable are evaluated.

First, a strong and positive significant correlation was found between AB1 and AB2 ($r = 0.492$, $p < 0.01$). This result shows that AB1 and AB2 scores tend to increase together. Similarly, a moderate positive and significant correlation was found between AB1 and AB3 ($r = 0.382$, $p < 0.01$). This means that the sub-dimensions AB1 and AB3 have a positive connection with each other.

The relationship between AB2 and AB3 was weak and not statistically significant ($r = 0.126$, $p = 0.290$). This shows that there is no significant draw between AB2 and AB3 scores.

Very strong and positive correlations were observed between the total score of the Knowledge Scale for Cancer Screening and the sub-dimensions. There is a very strong correlation between AB1 and the sum of the knowledge scale ($r = 0.857$, $p < 0.01$). Likewise, there is a strong positive correlation between AB2 and the sum of the knowledge scale ($r = 0.848$, $p < 0.01$). The relationship between AB3 and the sum of the knowledge scale was moderately positive and significant ($r = 0.438$, $p < 0.01$). These findings show that sub-dimension scores are significantly and positively correlated with the level of knowledge about cancer screening; In other words, as the sub-dimension scores increase, the level of knowledge also increases.

In terms of age, there is a negative and weak relationship between AB1 and age, but this relationship is not statistically significant ($r = -0.075$, $p = 0.527$). A positive but not significant relationship was observed between AB2 and age ($r = 0.215$, $p = 0.068$). There is a positive but not significant correlation between AB3 and age ($r = 0.082$, $p = 0.490$). The relationship between the total score of the Knowledge Scale for Cancer Screening and age was also weak and not significant ($r = 0.100$, $p = 0.401$).

In summary, there are significant positive correlations between the sub-dimensions and the sum of the knowledge scale, and these variables can be evaluated as consistent and related to each other. On the other hand, there was no significant relationship between the age variable and other variables. These results show that age is not a factor affecting the scores on the scale.

IV. DISCUSSION

This study aimed to determine the level of knowledge about cancer screening of the students studying in the First and Emergency Aid Program of a foundation university and revealed that the general level of knowledge was at a medium level. The findings are consistent with the literature that the level of knowledge about cancer screening in healthcare students is generally not sufficient [19]. Especially in associate degree health programs, the curriculum's intense focus on emergency aid and basic medical practices may result in relatively limited time devoted to public health-based topics such as cancer screenings.

According to the results obtained in the study, the type of screening that the participants had the most information about was breast cancer screening. This can be explained by the fact that breast cancer awareness campaigns and KETEMs (Cancer Early Diagnosis, Screening and Education Centers) in Turkey focus especially on mammography and breast self-examination (BSE) [20]. Similarly, Özkan et al. (2011) reported that breast cancer awareness was higher in nursing and midwifery students than other types of cancer, but the rate of conversion to regular screening behavior remained low [21]. In this study, it was observed that the students' knowledge levels about breast cancer were relatively high, but low in other types of screening (cervix, colorectal).

From the point of view of the gender variable, the fact that the knowledge levels of female students are higher than those of men coincides with many studies in the literature. Possible reasons for this difference are that especially female students are more exposed to screenings for women's health such as breast and cervical cancer and reach out to social awareness campaigns on these issues [21,22]. However, in this study, the knowledge levels of the students with health insurance were found to be significantly high, indicating that access to the health system is an important determinant in terms of knowledge gain. This was also highlighted in a national-level study published in BMC Public Health, where it was reported that health insurance and regular health check-up habits increased screening participation rates [22].

There was no significant relationship between individual factors such as smoking and alcohol use, family history of cancer or employment status and level of knowledge. This finding suggests that the level of knowledge is mostly related to educational content and access to the health system, and that personal lifestyle factors alone are not determinants of access to information. However, in some studies in the literature, it is stated that individuals with a family history of cancer may have higher levels of awareness, especially about certain types of cancer [20)] Although not statistically significant in this study, the slightly elevated level of knowledge in students with a family history may be a reflection of this trend.

The reliability analysis of the scale shows that the overall Cronbach's Alpha value is acceptable with 0.796, but the α value of Subdimension 3 is low (0.386). This suggests that the homogeneity of the sub-dimension may be poor and that some items in the scale may need revision. In similar scale studies, low reliability values can generally be eliminated by increasing the clarity of the items or adapting them to the cultural context [20].

The results of the study also coincide with the literature showing the impact of e-health literacy on participation in cancer screenings. Gökduman Keleş and Toker (2025) reported that the screening participation rates of individuals with high e-health literacy were significantly higher [23]. This suggests that the level of knowledge in First and Emergency Aid students can be increased through digital resources and online training modules.

V. CONCLUSION AND RECOMMENDATIONS

The findings obtained in this study show that the students of the First and Emergency Aid Program generally have a moderate level of knowledge about cancer screenings. Female students, those at the upper class level and those with health insurance were found to have significantly higher knowledge levels. While smoking stands out as a factor that negatively affects the level of knowledge; Alcohol use, marital status and employment status did not have a significant effect on the level of knowledge. In particular, the lack of knowledge about cervical and colorectal cancer screenings is remarkable. These results suggest that the issue of cancer screening should be addressed earlier and more comprehensively in the education curriculum.

In this direction, it is recommended to develop structured training programs, seminars and applied screening training modules for First and Emergency Aid students. In addition, directing students to screening centers in internship and practice areas will contribute to increasing their level of knowledge. In addition, digital learning materials, case-based simulations and social awareness projects related to cancer screenings can also be considered as supportive methods. In the following studies, it is recommended to conduct comparative analyzes with students from different health departments and to carry out long-term follow-up studies.

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