ORIGINAL ARTICLE

The relationship between women's level of knowledge about cancer screenings and health literacy

Mehmet Ucar[1], Ebru Gul[2]

[1]Muş Alparslan University, Varto Vocational School, Department of Medical Services and Techniques, Muş, Türkiye
[2]İnönü University, Faculty of Nursing, Department of Public Health Nursing, Malatya, Türkiye

Abstract

This research aimed to investigate the relationship between women's level of knowledge about cancer screenings and health literacy. The research involved a descriptive study design and included 418 women, aged between 18 and 65, who registered at two different Family Health Centers in a provincial center in eastern Türkiye. The research utilized three separate forms to collect the study data: the "Descriptive Features Form," the "Knowledge Scale for Cancer Screenings," and the "Health Literacy Scale-Short Form." The research found the average age of the participants to be 41.88±12.91. In addition, a low level positive relationship was found between the knowledge scale and its sub-dimensions regarding cancer screenings and the health literacy scale (respectively, p<0.05, p<0.001). The research identified a slightly positive relationship between women's knowledge about cancer screenings and health literacy. It also concluded that some sociodemographic characteristics were effective factors in women's cancer screening knowledge and health literacy.

Keywords: Knowledge, women; cancer, cancer screenings, health literacy

Introduction

Cancer is considerably one of the most significant public health problems that threaten human health globally [1]. Among diseases with known reasons, cancer ranks second after cardiovascular diseases [1,2]. In addition to causing psychological and social issues for patients and their relatives, the lack of sufficient treatment success in a significant group of patients leads to a perception that cancer is a feared disease [2,3]. However, early diagnosis methods and cancer screenings may avoid one-third of cancer-related deaths; in other words, they avert approximately 3-3.5 million deaths. As the most crucial component of this fight, cancer screenings should be implemented efficiently across society, with the primary goal being to screen for the disease in at least 70% of the target population. Such an outcome will be achievable with intensive awareness studies and conscious follow-ups [3,4]. The wide array of information sources makes it difficult to access accurate information since technological advancements and information dissemination may also lead to confusion. Accessing necessary and reliable information from credible sources is essential to averting cancer disease [4,5]. There is a significant relationship between health literacy and individuals' ability to express their motivation and competence, prevent diseases, improve their health, make decisions about receiving health services, set goals for such issues, access health-related information, and assess the reliability and accuracy of the information they use. Individuals expect more from health services in line with the developing and modern health system [6]. However, health system also anticipates that individuals should take responsibility for their health, acquire adequate information, and make decisions that affect both their own and other people's health. Health literacy skills play a significant role in individuals' ability to achieve all these roles [7,8].

There is an insufficient number of studies establishing the relationship between women's cancer screenings and their health literacy in our nation. Hence, this study aimed to identify the relationship between women's level of knowledge about cancer screening and health literacy in a city center in eastern Türkiye. Despite the abundance of research on the topic of health literacy and cancer relationships in the literature, no studies have specifically assessed the relationship between women's health literacy and their awareness of cancer screenings. Therefore, this

Corresponding Author: Mehmet Ucar, 1Muş Alparslan University, Varto Vocational School, Department of Medical Services and Techniques, Muş, Türkiye
Email: m.ucar@alparslan.edu.tr

research will anticipatingly contribute to the literature and inspire more research on this topic.

In light of the issues mentioned above, this study focused on the following research questions:

1. What is the knowledge level of women about cancer screenings?

2. What is the health literacy level of women?

3. Is there any correlation between women's knowledge about cancer screenings and health literacy?

Material and Methods

Location, Time and Sample Selection of the Study

The researchers conducted the study between 15 November 2023 and 15 March 2024 and included 418 women, aged between 18 and 65, who registered at two Family Health Centers (FHCs) in a provincial center in eastern Türkiye.

This research was conducted in descriptive design. The research population consisted of 3520 women registered at two different and randomly selected FHCs in a province in eastern Türkiye. Considering the power analysis and 95% confidence interval, the study sample consisted of 347 women. The researchers initially included 418 women to avoid any data loss in the study. The post hoc power analysis conducted in line with the results acquired from the participants at the end of the study calculated the study power as 99% at a 95% confidence level with a medium effect size [9]. The researchers also used the STROBE guidelines while reporting this research article [10]. The data of the study were collected using the "Descriptive Characteristics Form", "Knowledge Scale for Cancer Screenings" and "Health Literacy Scale-Short Form".

Descriptive Features Form; This form developed by the researchers consists of 9 questions and is presented in Table 1.

Knowledge Scale for Cancer Screenings; As initially developed by Yıldırım and Uyar in 2023 [11] this scale consists of 25 items and three sub-dimensions. There are no specific sub-dimension names in the scale. The first, second, and third sub-dimensions included 10 (8, 17 to 23, 25, and 28), nine (4, 5, 7, 10, 12, 13, 15, 16, and 27), and six items (1, 2, 3, 9, 11, and 24), respectively. The scale had a three-point Likert-type, and 1, 2, and 3 indicated 'True,' 'False,' and 'I do not know,' respectively. While scoring the scale, researchers scored the 'True' response as '1 point,' whereas they scored 'False' and 'I do not know' responses as '0 points.' The study also used three reverse-coded items (items 2, 11, and 24), and the total scale score ranged from 0 to 25. The scale score had no predefined cut-off point. With an accepted approach, it is possible to state that participants who scored 70% and above of the total score (17.5 points or more) have sufficient knowledge. The scale's Cronbach's alpha coefficient, which measures reliability, was 0.89 [11], and this study calculated Cronbach's alpha value as 0.72.

Health Literacy Scale-Short Form; As developed by Karahan-Yılmaz and Eskici in 2021 [12], this scale uses a formula (Index = (Average-1) x 50/3) to evaluate the scale scores. The formula calculates the average by dividing the total scale score by the number of items on the scale.

The index value calculated by the formula varies between 0-50, with a higher score indicating better health literacy. The scale includes 4-point Likert-type response options ranging from 1 (very difficult) to 4 (very easy) and consists of 12 items. The Cronbach's alpha coefficient of the 12-item scale was 0.85 [12]. This study also calculated the Cronbach's alpha value as 0.75.

Research inclusion criteria

- Being registered in the specified FHCs,
- Having an age between 18 and 65,
- Having no communication problems,
- Voluntariness.

Research exclusion criteria

- Having some difficulties that prevent evaluation or communication,
- Being diagnosed with a systemic or psychiatric disease.

Data Collection

Researchers used a face-to-face survey form to collect research data. They collected these data according to the principles of data confidentiality and received informed consent from each participant. Before beginning the data collection process, researchers specifically requested that participants approve this form. Participants completed each survey form in 20-25 minutes.

Data Analysis

In this study, research data were analyzed in computer environment. It also evaluated the data using numbers, percentages, minimum and maximum values, the mean, and standard deviation and calculated kurtosis-skewness value to determine a normal data distribution. The calculated kurtosis-skewness value indicated that the data was normally distributed (+2.0/-2.0) [13]. The Cronbach-α result also verified the reliability of the analysis methods. The study additionally used independent samples t-test, One-way ANOVA, Kruskal-Wallis, and correlation analyses to analyze the data. It also considered the significance level as $p<0.05$.

Ethical Dimension

Muş Alparslan University's Scientific Research and Publication Ethics Committee granted the researchers the necessary approvals (date and number: 08.11.2023/ 116366) to carry out the research. Researchers also obtained the required institutional permission from the directorate to which the FHCs (date and number: 24.01.2024/ E-35465298-619-235019524) were affiliated and received permission to use the scales from the authors through e-mail. Researchers initially briefed the participants about the research objectives, methodology, and the required time to complete the forms and received their consent. They also ensured that participating in the study was entirely voluntary and would not result in any harm. The Helsinki Declaration of Human Rights was adhered to throughout the study, aiming to focus on protecting individual rights. Researchers included the participants in the study after providing them with relevant information about the study and receiving their informed consent.

Results

Table 1 displays the distribution of the descriptive features of the participant women. Accordingly, the study found that 53.3% of the participants were married, 28.7% had primary school education, 62% were unemployed, 47.1% were housewives, and their average age was 41.88. Approximately 52.2% of the women perceived their family income level as low. The study also revealed that 61.7% of the women rated their health status as moderate, 58.4% had no chronic disease, and 77.0% had no cancer in their close family members.

Table 2 shows the average score distribution of the knowledge scale, sub-dimensions, and health literacy about cancer screenings. The participant women for cancer screenings were 12.13±4.45 (ranged from 0 to 23). Correspondingly, their health literacy scores were 28.78±8.50 (ranged from 0 to 50).

Table 1. Distribution of women according to their descriptive characteristics (N=418)

Descriptive features		N	%
Marital status	**Married**	223	53.3
	Single	195	46.7
Education level	**Illiterate**	71	17.0
	Literate	72	17.2
	Primary school	120	28.7
	High school	104	24.9
	Associate-licensure-graduate	51	12.2
Employment status	**Yes**	159	38.0
	No	259	62.0
Profession	**Housewife**	197	47.1
	Worker	46	11.0
	Academic-teacher	10	2.4
	Tradesmen	26	6.2
	Retired	3	0.7
	Officer	47	11.2
	Other	89	21.3
Family income level as perceived by the individual	**Low**	218	52.2
	Middle	165	39.5
	High	35	8.4
Health assessment status	**Bad**	87	20.8
	Middle	258	61.7
	Good	73	17.5
Chronic disease status	**No**	244	58.4
	Heart disease	23	5.5
	Respiratory diseases (asthma, COPD, etc.)	10	2.4
	Depression	27	6.5
	Thyroid diseases	28	6.7
	Diabetes	42	10.0
	Hypertension	44	10.5
Cancer in close family members	**No one**	322	77.0
	Mother-father-sibling	17	4.1
	Uncle-aunt etc.	54	12.9
	Wife	11	2.6
	Child (daughter-son)	14	3.3
	Minimum	**Maximum**	**Mean±SD**
Age	18	65	41.88±12.91

Mean: arithmetic mean, SD: standard deviation

Table 2. Distribution of the mean scores of the knowledge scale, sub-dimensions and health literacy scale for cancer screening

Measures	Min	Max	Mean±SD
Total scale of knowledge on cancer screening	**.00**	**23.00**	**12.13±4.45**
1st Sub-dimension	.00	10.00	4.94±2.56
2nd Sub-dimension	.00	9.00	4.14±1.82
3rd Sub-dimension	.00	6.00	3.03±1.21
Health literacy total scale	**.00**	**50.00**	**28.78±8.50**

Maksimum Mean: Arithmetic Mean; SD: standard deviation, Min: minimum; Max: maximum

Table 3 compares the participants' descriptive features and the mean scores of the knowledge and health literacy scales about cancer screenings. Accordingly, the study identified a poorly negative relationship between women's age and the Knowledge Scale for Cancer Screenings (r=-0.105, p<0.05). There was a statistically significant difference between the average score of the Knowledge Scale for Cancer Screenings (p<0.05) and women's variables, including marital status, education level, employment status, and occupation. However, there was no significant difference between the average score of the Knowledge Scale for Cancer Screenings (p<0.05) and variables such as income level, perceived health status, chronic disease status, and cancer screening among close family members. Considering the health literacy scale and participants' descriptive variables, the study identified a slightly negative relationship between women's age and the health literacy scale (r=-0.098, p<0.05). The study found a statistically significant difference between the Health Literacy Scale average score (p<0.05) and women's descriptive variables, including marital status, education level, and occupation. However, it identified no statistically significant difference with other variables (p>0.05).

Table 3. Comparison of women's descriptive characteristics and mean scores of knowledge about cancer screening and health literacy

		Number (%)	Knowledge Scale on cancer screenings Mean±SD	Test and p value	Health Literacy Scale Mean±SD	Test and p value
Marital status	**Married**	223 (53.3)	11.70±4.42	t=-2.109 **p=.036**	27.82±8.33	t=-2.493 **p=.013**
	Single	195 (46.7)	12.62±4.43		29.88±8.57	
Education level	**Illiterate**	71 (17.0)	11.23±3.65	F=4.098 **p=.003**	27.64±8.22	F=5.758 **p=.000**
	Literate	72 (17.2)	11.43±4.14		27.60±7.56	
	Primary school	120 (28.7)	11.74±4.41		28.81±8.57	
	High school	104 (24.9)	12.81±4.33		27.85±8.34	
	Associate licensure-graduate	51 (12.2)	13.88±5.54		33.85±8.72	
Employment status	**Yes**	159 (38.0)	12.88±4.45	t=2.716 **p=.007**	28.52±9.07	t=-.481 p=.631
	No	259 (62.0)	11.67±4.39		28.94±8.14	
Profession	**Housewife**	197 (47.1)	11.40±3.99	KW=20.697 **p=.002**	27.7±7.75	KW=15.087 **p=.020**
	Worker	46 (11.0)	12.08±5.26		27.98±8.43	
	Academic-teacher	10 (2.4)	16.30±6.09		33.05±13.38	
	Tradesmen	26 (6.2)	12.46±4.05		30.07±8.36	
	Retired	3 (0.7)	11.66±4.04		33.79±13.70	
	Officer	47 (11.2)	13.04±4.47		28.28±9.65	
	Other	89 (21.3)	12.74±4.56		30.72±8.40	
Income level	**Low**	218 (52.2)	12.21±4.19	F=.829 p=.437	29.16±8.49	F=.712 p=.491
	Middle	165 (39.5)	11.86±4.72		28.57±8.34	
	High	35 (8.4)	12.88±4.67		27.42±9.30	
Perceiving health	**Bad**	87 (20.8)	11.80±4.62	F=2.624 p=.074	29.05±9.27	F=2.604 p=.075
	Middle	258 (61.7)	11.93±4.26		28.15±8.34	
	Good	73 (17.5)	13.20±4.77		30.68±7.86	
Chronic disease	**No**	244 (58.4)	12.21±4.42	KW=10.199 p=.117	29.02±8.25	KW=5.309 p=.505
	Heart disease	23 (5.5)	13.08±5.25		31.03±±7.56	
	Respiratory diseases	10 (2.4)	10.30±3.56		28.33±10.25	
	Depression	27 (6.5)	11.59±5.16		25.72±9.23	
	Thyroid diseases	28 (6.7)	11.14±4.44		26.88±8.21	
	Diabetes	42 (10.0)	11.30±4.06		29.23±9.51	
	Hypertension	44 (10.5)	13.31±3.99		29.04±8.52	
Cancer in close family	**No one**	322 (77.0)	12.27±4.37	KW=6.367 p=.173	29.17±8.58	KW=6.168 p=.187
	Mother-father-sibling	17 (4.1)	13.64±4.93		27.36±5.72	
	Uncle-aunt	54 (12.9)	11.37±5.14		28.44±8.73	
	Wife	11 (2.6)	11.54±3.44		24.74±8.55	
	Child	14 (3.3)	10.50±2.71		25.89±7.77	
Age		418	41.88±12.91	r=-.105* **p=.032**		r=-.098* **p=.045**

t: independent samples t-test, F: oneway Anova test, KW: Kruskal Wallis test, r: Sperman Correlation

Table 4 displays the relationship between the knowledge scale for cancer screening, its sub-dimensions, and the health literacy scale. Accordingly, the study identified a slightly positive relationship between the women's knowledge scale for cancer screenings and the health literacy scale (r=0.273, p=0.000). There was also a slightly positive relationship between the sub-dimensions of both scales (respectively, p<0.05, p<0.001).

Table 4. The relationship between the knowledge scale for cancer screenings, its sub-dimensions and the health literacy scale

Measures	p	Knowledge Scale for Cancer Screenings	1st sub-dimension	2nd sub-dimension	3rd sub-dimension	Health Literacy Scale
Knowledge Scale for Cancer Screenings	r	1	.878**	.776**	.648**	.273**
	p		.000	.000	.000	**.000**
1st sub-dimension	r	.878**	1	.471**	.405**	.273**
	p	.000		.000	.000	**.000**
2nd sub-dimension	r	.776**	.471**	1	.348**	.194**
	p	.000	.000		.000	**.000**
3rd sub-dimension	r	.648**	.405**	.348**	1	.133**
	p	.000	.000	.000		**.006**
Health Literacy Scale	r	.273**	.273**	.194**	.133**	1
	p	.000	**.000**	**.000**	**.006**	
r: Sperman Correlation						

Discussion

Cancer is the second leading cause of death worldwide and in Türkiye [1,2,14,15]. In Türkiye, breast and cervical cancer screening programs and colorectal cancer screening are carried out in women, but cancer screening is voluntary and individuals should apply to health institutions [16,17]. The current study was conducted to examine the relationship between women's knowledge about cancer screening and health literacy and significant findings were found. In this section, the findings obtained from this study are discussed in line with the literature.

This research found the average score of the women's Knowledge Scale for Cancer Screenings as 12.13±4.45 (Table 2). A previous study in Türkiye also reported the average score of the participants on the Knowledge Scale for Cancer Screenings as 16.16±5.89 [11]. This difference between these two studies may originate from the participants' descriptive features, such as age, gender, and education level. Another study identified the average score of the women's Attitude Scale for Cancer Screenings as 65.19 ± 8.45 [17]. In his thesis, Kıylıoğlu reported the average score of the women's Cancer Information Overload Scale and the average score of the Attitude Scale for Cancer Screenings as 17.06±4.92 and 101.93±11.56, respectively [18]. The findings of the study are similar to the literature.

The current research found women's average score on the Health Literacy Scale to be 28.78±8.50 (Table 2). A previous study in Türkiye indicated that 23.4% of women had satisfactory or excellent levels of health literacy [19]. Another study reported the participant women's average health literacy score as 10.74±3.37

[20]. As studying women participants between the ages of 18 and 49, Şahin et al. also identified their average health literacy score as 34.38 [21]. However, the current study and these mentioned studies used different scales to evaluate the health literacy of the participants. Therefore, drawing any conclusion from these findings using similarities and differences may be erroneous. Nonetheless, earlier studies reported that women had lower levels of health literacy than men.

This research identified a slightly negative relationship between women's age and the Knowledge Scale for Cancer Screenings (Table 3). A previous study reported that age did not affect the score on the Knowledge Scale for Cancer Screenings [11]. Hence, the findings of both studies differed. Such a discrepancy may arise from the inclusion of both male and female participants in the studies. The current research, however, only focused on women participants to collect research data. Another study, on the other hand, reportedly identified a significant relationship between women's age and whether they had a self-breast examination, clinical breast examination, mammography, smear test, or fecal occult blood test [22].

The current research identified a statistically significant difference between the average score on the Knowledge Scale for Cancer Screenings and women's descriptive features, including marital status, education level, employment status, and occupation (Table 3). A study in Türkiye reported that participants' knowledge of cancer screenings was unaffected by their marital status or educational levels [11]. Hence, the findings of this research and the given study are different. A study conducted by Başak identified no difference between the marital status and employment status of

women who were knowledgeable about breast cancer screenings compared to those who were not [23]. The findings of this research and the given study also differ. Another study reported that as the education level of the participants increased, the rate of knowledge about colonoscopy and fecal occult blood tests used in colorectal cancer screening increased significantly [24]. Indeed, as the education level increased, awareness about cancer and screening tests among women might have risen, leading to the acquisition of knowledge about cancer screenings and increasing the rate of taking the tests. The same study also discovered no discernible difference between professions (occupations) and knowledge of colorectal cancer screening methods [24]. As a result, the findings of this research and the given study are dissimilar. This variation may originate from using different scales to measure knowledge about a specific cancer disease and screening methods in the mentioned study.

This research found no statistically significant difference for the women's descriptive variables, including income level, perceived health status, chronic disease status, and having cancer among close family members (Table 3). A prior study reported that income level, chronic disease, and having cancer in a first-degree relative did not affect the score on the Knowledge Scale for Cancer Screenings [11]. Hence, the findings of this research and the given study displayed comparable conclusions. Özsoyler et al. also reported that the knowledge frequency about cancer screening was statistically and significantly higher among individuals with a family history of cancer than in those without [25]. Nonetheless, the findings of this research and the given study differed in this regard. One possible explanation for this difference could be the degree of individuals to their relatives with cancer.

This research identified a slightly negative relationship between women's age and the Health Literacy Scale (Table 3). A prior study in Taiwan reported that older women had significantly lower health literacy than younger women [26]. According to a different earlier study, women who were 40 years of age or older had a substantially high risk of unsatisfactory and poor (limited) health literacy [19]. Another study also found that low health literacy was associated with older age [27]. As a result, the current research results are consistent with the findings of the given studies.

The current research revealed a statistically significant difference between the average score of women on the Health Literacy Scale and certain descriptive features, including marital status, education level, and profession. However, there was no significant difference between the same scale and some variables, such as employment status, income level, perceived health status, and having chronic disease or cancer among close family members (Table 3). An earlier study on women in Türkiye reported that individuals with primary school education were substantially more likely to display a higher risk of having unsatisfactory and poor (limited) health literacy levels. Yet, the same study also indicated

that women employed, whose monthly income was higher than their expenses, and who had a chronic disease were significantly more likely to retain higher health literacy [19]. Another study by Maricic et al. revealed that women in good health and employed were more likely to have a satisfactory level of health literacy [28]. Based on these conclusions, the current research displays similarities and differences from the referenced studies. Beyond the similarities, it is reasonable to state that the differences among these studies could stem from the diverse cultural and ethnic backgrounds of the participants and the different scales used to measure their health literacy.

Finally, this research identified a slightly positive relationship between the Knowledge Scale for Cancer Screenings and the Health Literacy Scale ($r=0.273$, $p=0.000$) (Table 4). A study in Iran revealed that women with high health literacy scores performed more breast self-examination than those without less health literacy [29]. Another study reported a positive correlation between women's gynecological cancer awareness and health literacy [30]. In his study, Tayhan found a moderately positive relationship between knowledge about prostate cancer screening and health literacy [31]. Another study reported that as participants' health literacy levels increased, their knowledge about Pap smears and cervical cancer increased [32]. According to a Taiwanese study, most individuals with inadequate or poor general health literacy displayed either no or irregular screening behavior for cervical, breast, and colorectal cancers [33]. As a result, the findings of this research and the given literature are comparable. The level of health literacy, an effective concept in health behaviors, appears to be a critical factor affecting women's level of knowledge about cancer and screening. Increasing the knowledge level of women with adequate or high health literacy may yield positive outcomes in both knowledge and attitudes toward cancer screening.

Limitations and Generalizability

The fact that the study exclusively contains data from participant responses is one of its limitations. Additionally, conducting the research in a single province in eastern Türkiye might have led to collecting data from individuals with similar characteristics. A further limitation of the study is the random data collection. As a result, it is reasonable to generalize the study findings solely to the population involved in the research.

Conclusion

This research identified a slightly positive relationship between women's knowledge about cancer screenings and their health literacy. Additionally, it revealed that certain socio-demographic traits of women significantly affected their cancer screening knowledge and health literacy.

In line with these findings, this research recommends performing further studies involving different societies or communities to

assess knowledge and health literacy about cancer screenings. In addition to advancing women's health literacy levels, it will also be ideal to provide them with training to extend their knowledge about cancer screenings and help them practice screening behaviors. Furthermore, community health workers and public health nurses should address women's lack of knowledge about cancer by providing the necessary support and enabling them to apply screening practices. Innovations and strategies are needed to facilitate effective and confidential detection of low health literacy in FHCs and to develop preventive health actions appropriate for women with low health literacy. Mass media should be used effectively to communicate how cancer screening affects early detection and survival rates. It is recommended that all women who apply to the FHC for any reason should be informed about cancer screenings.

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