

## Research Article

# Health literacy levels affect breast cancer knowledge and screening attitudes of women in Turkey: A descriptive study

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### Abstract

**Objective:** The mortality rate for breast cancer for people under the age of 50 is decreasing, and health literacy is increasingly understood as important for cancer awareness and screening behavior. The aim of this study was to address the relationship between health literacy levels and breast cancer knowledge and screening attitudes of women. **Method:** The study was cross-sectional, and conducted in two primary healthcare centers in Turkey. The Rapid Estimate of Adult Literacy Measurement (REALM) and Adult Health Literacy Scale (AHLS) were used for health literacy level assessment. **Results:** The mean age of the participants was 49.62±8.43 years. The mean score of the women for REALM was 61.59±4.97 and the mean AHLS score of women was 19.55±2.64 (min-max=0-23). The women who had inadequate health literacy levels had the lowest Breast cancer knowledge score (BCKS) (6.00±2.82). Of the women, 38.2% (n=191) reported that they received breast cancer information from TV, whereas 31.7% (n=102) received information from their doctors. **Conclusion:** Low health literacy levels seem to be an important barrier for breast cancer knowledge, affecting screening attitudes and the source of knowledge among women.

**Key words:** Breast cancer, health literacy, screening, primary care

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# Sağlık okuryazarlığı düzeyi kadınların meme kanseri bilgisi ve tarama davranışını etkiliyor: Türkiye’den bir kesitsel çalışma

## Özet

**Amaç:** Meme kanserine bağlı 50 yaş ve altı ölüm hızı azalmakta ve sağlık okuryazarlığı kanser farkındalığı ve tarama davranışı açısından önem kazanmaktadır. Çalışmanın amacı, kadınların sağlık okuryazarlığı seviyesi ve meme kanseri bilgi ve tarama davranışı arasındaki ilişkiyi göstermektir. **Yöntem:** Çalışma kesitsel bir çalışma olup, Türkiye’de iki birinci basamak sağlık merkezinde uygulanmıştır. Sağlık okuryazarlığı seviyesi değerlendirmesi için; REALM ve AHLS ölçekleri kullanılmıştır. **Bulgular:** Kadınların ortalama yaşı 49±8.42’ydi. Kadınların REALM ortalama skoru 61±4.97 (min-max=0-65) olup, ortalama AHLS skoru 19±2.64 (min-max=0-23) olarak değerlendirildi. Yetersiz sağlık okuryazarlığı seviyesine sahip kadınlar en düşük meme kanseri bilgi skoruna sahipti (6±2.82, min-maks=0-15). Kadınların %38,2’si (n=191) meme kanseri bilgisini televizyondan edindiğini belirtirken, %31,7’si (n=102) doktorundan edindiğini bildirdi. **Sonuç:** Düşük sağlık okuryazarlığı düzeyi kadınların meme kanseri tarama davranışı ile bilgi kaynaklarını etkileyerek meme kanseri bilgisinde önemli bir bariyer olarak görünüyor.

**Anahtar kelimeler:** Meme kanseri, sağlık okuryazarlığı, sağlığın geliştirilmesi, birinci basamak

## Introduction

Breast cancer is the second most common cancer in the world and the most frequent cancer among women.<sup>1</sup> It is the second most common cause of cancer death among women in developed regions and leading cause of cancer death among women in less developed regions.<sup>1</sup> In Turkey, it is the most common cancer in women and one out of four women who are diagnosed with cancer has breast cancer.<sup>2</sup> The age standardized incidence of breast cancer was 43.0/100,000 according to the latest report of the Turkish Cancer Institute, released in 2014.<sup>2</sup>

Early detection is crucial for the attainment of better outcomes and thus survival of breast cancer patients, and

population-based screening is beneficial for early diagnosis and usually cost-effective when applied to high-risk population groups.<sup>3</sup> Clinical Breast Examination (CBE) and Self Breast Examination (SBE) are reported as having no effect on mortality, but they still have great importance for nations where Mammographies (MMG) are not common and where there are low breast cancer knowledge and low health literacy levels.<sup>4,5</sup> Centers for Disease Control and Prevention (CDC) recommends every woman aged between 40-74 years old get an MMG once every two years for breast cancer screening. An MMG between the ages of 40 to 74 years results in a 15-20% decrease in mortality from breast cancer.<sup>5</sup>

In Turkey, the national screening program recommends women to perform SBE

every month and to get CBE once a year after 20 years old. It also recommends that women get MMG once every two years after 40 years old in addition to SBE and CBE.<sup>6</sup>

Low health literacy (HL) is one of the biggest barriers for women in following screening recommendations as it limits individuals' ability to obtain, process and understand cancer screening methods and symptoms. Therefore, it highly impacts cancer diagnosis and treatment options.<sup>7</sup> As new treatment options are developed and cancer care becomes more complex, patient's involvement in decision making during diagnosis and treatment increases and thus the importance of HL is amplified.<sup>8</sup>

It is known that individuals with low HL benefit less from cancer knowledge materials. Moreover, people with low HL levels have less cancer screening attitudes because they have difficulty making the right decision about their health.<sup>7,9,10</sup> Therefore, HL seems to be an important issue for improving breast cancer knowledge and screening attitude of individuals.<sup>8,11</sup> However, as far as is known, there is only one study conducted in Turkey about HL levels and mammography awareness of women who attended a university hospital.<sup>12</sup> Therefore, further research was needed to probe this relationship for a disease that has a high prevalence in the population, has risk factors that are well-known and that can be preventable with screenings. The present study intended to help professionals to optimize the screening behavior of women by showing the association between HL levels and breast cancer knowledge, as well as its association with screening attitudes of women and sources of information on screening.

In this study, it is aimed to address the association of HL with breast cancer knowledge and breast cancer screening attitudes of women.

## **Material and Method**

### **Study design and setting**

This descriptive study was carried out between March 1 and May 1, 2015 in two primary healthcare centers in Izmir, Turkey. In total, the number of primary healthcare centers in Izmir was determined to be 361. An online announcement was made and the centers included in the study were selected randomly where the responsible physicians reported their willingness to participate in the study. As a result, one center was selected from a rural area and the other one was selected from an urban area. The urban center was located in one of the popular districts in the city center and the rural center was located 40 kilometers away from the city center and the distance to the nearest hospital was 15 kilometers.

In line with the target population of breast cancer screening guidelines, women aged 40-years-old and above, who attended the healthcare centers for any reason were included in the study. All women were able to read and write. The women who did not accept to participate in the study comprised less than 1% of the study population. The main reason for rejection was the limited time of the women. The ethical approval of the study was obtained from Dokuz Eylul University, Non-invasive Researches Ethical Committee in February 12, 2015 (Protocol no: 1924-GOA; Decision no: 2015/04-23).

### **Data collection**

Some characteristics like age, education and socioeconomic status of women were recorded by a sociodemographic questionnaire.

In order to measure breast cancer knowledge of women, 15 statements were prepared based on the GAIL Score (Breast cancer risk assessment tool) . The score was derived based on the GAIL model that was developed in 1989 in order to predict the risk of development of breast cancer of women<sup>13</sup>. In the questionnaire, the women, who responded correctly, were scored one point and others, who had a wrong or "I do not

know” responses were scored zero point. Accordingly, the breast cancer knowledge score of women ranged between 0 and 15.

For the evaluation of women’s screening attitudes, the national screening guideline was followed and SBE, CBE and MMG were asked to the participants. In addition, their sources of breast cancer knowledge and suggested educational materials were questioned.

In order to measure the health literacy level of women, REALM and AHLS scales were applied by the researchers. REALM was developed by Davis et al. in 1993 and validated in Turkish by Ozdemir et al. in 2010.<sup>14,15</sup> In REALM, 66 medical terms were asked to the participants for them to read respectively and loudly. The participants, who could read the terms easily and properly, received one point for each correctly pronounced term. The participants, who could not read properly or waited for more than 5 seconds for a term received zero points. In the end, the total score defined the health literacy level of the participants.

REALM basically measures the reading ability of the participants among different aspects of health literacy like written or numerical. If a participant scored less than 18 points, her literacy level was considered as below the third grade (as in level of educational attainment), meaning that she could not read and understand even the basic materials. If a participant scored between 19 and 44 points, her literacy level corresponded to 4th-6th grades, meaning that she could read basic materials, but not the complicated ones. If the score of a participant was between 45 and 60 points, her literacy level corresponded to 7th-8th grades, meaning that she could handle lots of materials. Lastly, score of 61 points and above meant that the participant’s literacy was at the high school level and she could handle all materials. In other words, scores were classified in three groups: “61 and above”, “between 45-60” and “below 45”, which were defined as “adequate health

literacy”, “limited health literacy” and “inadequate health literacy”, respectively.

In addition to the REALM, AHLS, which was originally developed in Turkish by Sezer et al. in 2014, was applied.<sup>16</sup> AHLS consists of 23 questions in total and 22 of them are related to health information and drug addiction and one of them is related to human body parts. Of the questions, 13 are yes/no questions, four are fill-in-the-blank questions, four of them are multiple choice questions and two of them are matching questions. The participants who responded “yes” to yes/no questions and who correctly answered the fill-in-the-blank questions got one point. For the multiple-choice questions and matching questions, participants who answered more than two questions correctly got one point. AHLS measures not only reading, but also writing, numeracy and general comprehension of health information. Health literacy level of the participants increase as they score higher in the questionnaire and no cut-off point was defined.

The data was collected by the researchers with face-to-face interviews. In order to prevent the bias due to data collection by different researchers, one researcher applied sociodemographic questionnaire and GAIL score, the other one applied REALM and AHLS to all the participants.

#### Statistical analysis

The statistical analysis was done by using the SPSS 15.0 software. For the continuous variables, mean and standard deviation and for the categorical variables, frequency and percentages were used as descriptive statistics. The normality of the distribution was checked with the Shapiro-Wilk test. In order to analyze associations between dependent and independent variables, chi-square analysis was performed. In order to compare the means of two groups (urban and rural), t-test was used, whereas the ANOVA test was applied for more than two groups. In order to analyze the correlation between two

numerical variables, Pearson correlation analysis was used. A p value of less than 0.05 was taken as statistically significant.

## Results

In total, 500 women, who attended one of the urban or rural primary health care centers for any reason were included in the study. The mean age of the women was  $49.62 \pm 8.42$  years old and 35.4% (n=77) of them were aged between 40-44 years. Of the women, 51.2% were graduates of primary school, 74.4% (n=372) had middle socioeconomic status, and 61% (n=305) were housewives. The mean REALM score of the women was  $61.59 \pm 4.97$  and the mean AHLS score was  $19.55 \pm 2.64$  (min-max=0-23). According to the REALM scores, 68.2% (n=341) had an adequate health literacy level, 31.0% (n=155) had a limited health literacy level and 0.8% (n=4) had inadequate health literacy levels.

In Table 1, the associations between health literacy scores and sociodemographic characteristics of the women were shown. As educational level or economic status increased, the health literacy scores of women also increased in both REALM and AHLS ( $p < 0.001$  and  $p < 0.001$ ). The BCKS of the women also increased as the education level or economic status increased, and the association was found significant in both ( $p < 0.001$  and  $p = 0.018$ , respectively). Employed women got the highest scores in both health literacy scales compared to the women who were housewives or retired ( $p < 0.001$ ). In contrast, retired women got the highest score for BCKS compared to the employed women and housewives ( $p < 0.001$ ). The women living in the urban region got higher scores than the women in the rural region in both health literacy scales and the BCKS. The associations were statistically significant for all of them ( $p < 0.001$ ,  $p = 0.011$ , and  $p < 0.001$ , respectively). Appendix 1, the statements and the answers of the women prepared for determination of women's breast cancer knowledge were shown. The mean breast cancer knowledge score of the women

was  $7.47 \pm 3.17$ . The best-known statements were about the relationships of breastfeeding and alcohol consumption with breast cancer and the impact of family history on breast cancer.

The association between women's health literacy and BCKS scores, and breast cancer screening attitudes were summarized in Table 2. The women, who performed SBE regularly got the highest scores in both health literacy scales and the BCKS and the association was statistically significant ( $p < 0.001$ ). The women, who had CBE regularly got the highest score in BCKS ( $p < 0.001$ ); the association was statistically significant for REALM ( $p = 0.009$ ) but not for AHLS ( $p = 0.065$ ). Finally, the women, who had an MMG once in two years got higher REALM scores compared to the women, who never had an MMG, who had irregular MMGs or who had an MMG once in a year ( $p < 0.001$ ). Although there was no statistically significant association between MMG attitudes and AHLS of the women ( $p = 0.185$ ), there was a significant association with BCK scores ( $p = 0.004$ ).

When the BCKS of the women with different REALM scores were analyzed, it was found that the women who had inadequate health literacy levels had the lowest BCKS ( $6.00 \pm 2.82$ ). The women who had limited health literacy levels had a score of  $6.58 \pm 3.38$ , and the women who had adequate health literacy levels had the highest score  $7.9 \pm 2.80$ . The difference between the groups was statistically significant ( $p < 0.001$ ).

In addition, participants were questioned about their current source of information for breast cancer. Of the women, 38.2% (n=191) reported that they received information from TV, 29.0% (n=145) from a doctor, 17.2% (n=86) from neighbors or friends and 11.4% (n=57) from brochures in medical centers. We also asked them their preferred methods for future educational activities. Of the women, 60.0% (n=300) preferred educational meetings, 16.0% (n=80) preferred online education, 14.0% (n=70) preferred brochures and flyers, 6.6% (n=33)

preferred online videos and 1.8% (n=9) preferred audio records (Table 3). The women, who had low health literacy were more likely to get information from television and neighbors, whereas women with high health literacy level were more likely to get information from television and from their doctors.

## **Discussion**

Our findings showed that health literacy level was associated with breast cancer knowledge and breast cancer screening attitudes of the women. As the health literacy level of women increased, breast cancer knowledge scores also increased and women with high health literacy level showed appropriate breast cancer screening behaviors compared to the ones with low health literacy levels.

### **Comparison with existing literature**

In this study, health literacy levels of the women was associated with different socio demographics. In the REALM scale, the women who were employed or retired or had high economic status or high educational attainment had better health literacy as also shown by previous studies.<sup>15</sup> Additionally, health literacy levels of women measured by AHLS and BCKS also showed similar associations between employment, economic and educational status.

In our study, women who were between 40-44 and 50-54 years old had the highest scores in both scales and health literacy scores of women didn't increase as their age increased. In previous studies, different results were found regarding age and health literacy. For example, it was found by Jovic et al. that as age increased, the health literacy also increased among Serbian participants. and it was found by Beren et al. that as the age increased, the health literacy decreased among German participants.<sup>17,18</sup> In both studies, participants were composed of men and women. However, the participants were only women in our study. That shows there may be other factors that affect health

literacy level of participants like gender in addition to age.

Similar to other studies, we found that health literacy levels of women were important for their cancer knowledge, which includes understanding of risk factors and symptoms. The women who had higher scores in REALM also got higher scores in BCKS, but we could not find the same association with the AHLS. Similar to previous studies regarding the associations of health literacy scores and breast cancer screening attitudes of women, we found that people who had higher scores in REALM had regular SBE and CBE. Although we found similar relationship with SBE and AHLS, we could not find a statistically significant relationship between CBE and MMG and AHLS. This might be the result of the measurement characteristics of the scales that measure different aspects of health literacy.<sup>7,19,20</sup> REALM is a list of medical words so anyone who is familiar with medical terms can easily get a high score in REALM. It takes 4-6 minutes to apply and participants read the terms by themselves. In AHLS, there are some parts that participants have to give at least two correct answers, otherwise they cannot get any scores in those parts. This results in a decrease in points even if the participants give one correct answer. AHLS takes around 8-10 minutes to apply and it measures health literacy level in various ways.

According to the REALM results, the highest scores belonged to the women who had regular MMGs compared to the ones with no or irregular MMGs. Although we found a similar relationship between AHLS scores and regular MMG screening attitudes, the relationship was not statistically significant.

Another finding of our study was that more than half of the women never had MMG in their lifetimes.<sup>7,11,21,22</sup>

**Table 1.** Association of health literacy scores and sociodemographics of participating women (Izmir, 2015)

	Number (n)	REALM			AHLS			BCKS		
		Mean (REALM)	SD	p value	Mean (AHLS)	SD	p value	Mean (BCKS)	SD	p value
<b>Age groups (yrs)</b>										
40-44	177	62.04	4.93	<b>0.010</b>	20.01	2.78	<b>&lt;0.001</b>	6.67	3.21	<b>&lt;0.001</b>
45-49	118	61.97	4.41		19.57	2.56		7.86	2.93	
50-54	66	62.41	3.94		19.81	2.66		7.68	3.29	
55-59	52	60.29	5.62		19.61	1.93		8.76	3.10	
≥60	87	60.32	5.76		18.35	2.50		7.66	2.97	
<b>Educational status</b>										
Primary school*	256	58.93	5.44	<b>&lt;0.001</b>	19.00	2.63	<b>&lt;0.001</b>	7.08	3.06	<b>0.018</b>
High school	116	63.74	2.38		19.65	2.31		7.86	3.06	
University	128	64.96	1.63		20.57	2.64		7.91	3.39	
<b>Economic status</b>										
Low	99	57.67	6.44	<b>&lt;0.001</b>	18.42	2.50	<b>&lt;0.001</b>	6.45	3.40	<b>&lt;0.001</b>
Middle	372	62.46	4.09		19.73	2.53		7.61	3.08	
High	29	63.86	2.10		21.17	3.14		9.17	2.40	
<b>Labor status</b>										
Housewife	305	60.28	5.32	<b>&lt;0.001</b>	19.09	2.58	<b>&lt;0.001</b>	6.98	3.08	<b>&lt;0.001</b>
Working	119	63.86	3.78		20.90	2.51		7.71	3.29	
Retired	76	63.32	3.02		19.27	2.35		9.09	2.74	
<b>Primary Healthcare Center (PHC)</b>										
Rural PHC	260	58.96	5.48	<b>&lt;0.001</b>	19.26	2.65	<b>0.011</b>	7.11	3.14	<b>&lt;0.001</b>
Urban PHC	240	64.44	1.88		19.86	2.59		7.87	3.16	

\*The women who had education for eight years or below.

**Table 2.** Association of health literacy scores and breast cancer screening attitudes of participating women (Izmir, 2015)

	Number (n)	REALM			AHLS			BCKS		
		Mean	SD	p value	Mean	SD	p value	Mean	SD	p value
<b>SBE</b>										
Never	172	59.11	6.08	<b>&lt;0.001</b>	18.88	2.72	<b>&lt;0.001</b>	6.01	3.22	<b>&lt;0.001</b>
Regularly	91	63.77	3.29		20.14	2.76		8.05	2.92	
Irregularly	237	62.55	3.76		19.81	2.44		8.31	2.83	
<b>CBE</b>										
Never	277	60.40	5.63	<b>0.009</b>	19.31	2.76	0.065	6.70	3.23	<b>&lt;0.001</b>
Regularly	60	64.13	2.45		19.43	2.02		8.03	3.57	
Irregularly	163	62.67	3.75		20.01	2.59		8.59	2.46	
<b>MMG</b>										
Never	261	61.07	5.70	<b>&lt;0.001</b>	19.41	2.92	0.185	6.96	3.33	<b>0.004</b>
Once in a year	32	63.97	2.59		19.31	2.20		7.93	3.52	
Once in two years	21	64.05	2.01		20.14	2.30		6.95	3.33	
Irregularly	186	61.64	4.17		19.73	2.30		8.17	2.69	

\*SBE: Self breast examination, CBE: Clinical breast examination, MMG: Mammography



**Table 3.** Current sources of cancer information and preferred methods for future education among women (Izmir, 2015)

	REALM Scores						Total	
	61-66		45-60		<45			
	Number (n)	%	Number (n)	%	Number (n)	%	Number (n)	%
<b>Current sources of information</b>								
Television	113	33.1	78	50.3	-	-	191	38.2
Doctor	108	31.7	37	23.9	-	-	145	29.0
Neighbor	53	15.5	29	18.7	4	100.0	86	17.2
Flyer	48	14.1	9	5.8	-	-	57	11.4
Others	19	5.6	2	1.3	-	-	21	4.2
<b>Preferred methods for future education</b>								
Educational meeting	170	49.9	126	81.3	4	100	300	60.0
Online education (websites)	75	22.0	5	3.2	-	-	80	16.0
Brochures and flyers	56	16.4	14	9.0	-	-	70	14.0
Online video	25	7.3	8	5.2	-	-	33	6.6
Others	8	2.3	-	-	-	-	8	1.6
Audio records	7	2.1	2	1.3	-	-	9	1.8
<b>Total</b>	<b>341</b>	<b>100.0</b>	<b>155</b>	<b>100.0</b>	<b>4</b>	<b>100.0</b>	<b>500</b>	<b>100.0</b>

We found that most of the patients got breast cancer knowledge from televisions and some of them got it from their neighbors and friends. Less than 30.0% of them received information from their doctors. Similar results were found in previous studies. It shows that healthcare providers also have some barriers in reaching out to women to inform them about breast cancer.<sup>23-25</sup> Keeping this in mind, special approaches should be taken. These approaches could include home visits for housewives and retired women or mobile health services for rural areas with appropriate briefing methods. Moreover, women with both adequate and inadequate health literacy levels indicated television as the primary source of information. For this reason, keeping the power of media in mind, projects can be done to promote breast cancer screening on television, radio, internet, etc. for target populations considering their health literacy levels and preferences. Also, taking into account the preferences of women with high health literacy, online interventions should be considered for this group.

Health literacy level of women should be identified and breast cancer information should be planned according to their health literacy level and preferred education methods. Additionally, education is also needed for healthcare providers to approach women with low health literacy properly and to increase their health literacy with comprehensive and continuous consultations.

The main strength of this study was the use of two different HL scales to measure the HL level of the women. This helped us to address the different components of HL. Additionally, questioning the source of information and preferred sources of the women showed other factors which might play a role in HL level of the women.

One of the limitations of this study was the sample size. As the study was performed only in two PHCs, the results cannot be generalized to the whole population.

Additionally, as the study was designed as a cross-sectional study, it fails to show the causal relationship between HL and cancer screening knowledge and behavior of the women.

Our study results revealed that women with inadequate health literacy levels had knowledge gaps leading to difficulties in assessment of risk factors and symptoms of breast cancer that also affected their screening attitudes. In addition, according to the women's health literacy levels, their current sources of information for breast cancer and preferred methods for future educational interventions differed distinctly. This can be one of the reasons why healthcare providers have difficulties in reaching out to women and providing necessary and accurate cancer information. For cancer-related education, all educators have to take into consideration the health literacy levels of women and their preferred education methods. This seems like the only way to have improvements in both breast cancer knowledge and screening attitudes of the women.

## **References**

1. Fact Sheets by Cancer. [http://globocan.iarc.fr/Pages/fact\\_sheets\\_cancer.aspx](http://globocan.iarc.fr/Pages/fact_sheets_cancer.aspx). Accessed October 8, 2016.
2. Şencan İ, Keskinç B. Türkiye Kanser İstatistikleri. TC Sağlık Bakanligil Türkiye Halk Sağlığı Kurumu. 2015.
3. Fact Sheets by Cancer—Breast Cancer: Estimated Incidence, Mortality and Prevalence Worldwide in 2012. International Agency for Research on Cancer, and World Health Organization (WHO); 2012.
4. Brennan ME. The role of clinical breast examination in cancer screening for women at average risk: A mini review. *Maturitas*. 2016;92:61-63. doi:10.1016/j.maturitas.2016.07.011

5. Nelson HD, Tyne K, Naik A, et al. Screening for breast cancer: an update for the U.S. Preventive Services Task Force. *Ann Intern Med.* 2009;151(10):727-737, W237-242. doi:10.7326/0003-4819-151-10-200911170-00009
6. Ozmen V, Fidaner C, Aksaz E, et al. The report of breast cancer early detection and screening sub-committee, national cancer advisory board, the ministry of health of Turkey. *J Breast Health.* 2009;5:125-134.
7. Davis TC, Arnold C, Berkel HJ, Nandy I, Jackson RH, Glass J. Knowledge and attitude on screening mammography among low-literate, low-income women. *Cancer.* 1996;78(9):1912-1920.
8. Davis TC, Williams MV, Marin E, Parker RM, Glass J. Health Literacy and Cancer Communication. *CA Cancer J Clin.* 2002;52(3):134-149. doi:10.3322/canjclin.52.3.134
9. Cox N, Bowmer C, Ring A. Health Literacy and the Provision of Information to Women with Breast Cancer. *Clin Oncol.* 2011;23(3):223-227. doi:10.1016/j.clon.2010.11.010
10. Doak LG, Doak CC, Meade CD. Strategies to improve cancer education materials. *Oncol Nurs Forum.* 1996;23(8):1305-1312.
11. Sentell T, Braun KL, Davis J, Davis T. Health literacy and meeting breast and cervical cancer screening guidelines among Asians and whites in California. *SpringerPlus.* 2015;4(1):432. doi:10.1186/s40064-015-1225-y
12. Yilmazel G. Health Literacy, Mammogram Awareness and Screening Among Tertiary Hospital Women Patients. *J Cancer Educ Off J Am Assoc Cancer Educ.* May 2016. doi:10.1007/s13187-016-1053-y
13. Gail MH, Brinton LA, Byar DP, et al. Projecting individualized probabilities of developing breast cancer for white females who are being examined annually. *JNCI J Natl Cancer Inst.* 1989;81(24):1879-1886.
14. Davis TC, Long SW, Jackson RH, et al. Rapid estimate of adult literacy in medicine: a shortened screening instrument. *Fam Med.* 1993;25(6):391-395.
15. Ozdemir H, Alper Z, Uncu Y, Bilgel N. Health literacy among adults: a study from Turkey. *Health Educ Res.* 2010;25(3):464-477. doi:10.1093/her/cyp068
16. Sezer A, Kadioğlu H. YETİŞKİN SAĞLIK OKURYAZARLIĞI ÖLÇEĞİ'NİN GELİŞTİRİLMESİ. *J Anatolia Nurs Health Sci.* 2014;17(3). doi:10.17049/ahsbd.51846
17. Jovic-Vranes A, Bjegovic-Mikanovic V, Marinkovic J, Kocev N. Health literacy in a population of primary health-care patients in Belgrade, Serbia. *Int J Public Health.* 2011;56(2):201-207. doi:10.1007/s00038-010-0181-0
18. Berens E-M, Vogt D, Messer M, Hurrelmann K, Schaeffer D. Health literacy among different age groups in Germany: results of a cross-sectional survey. *BMC Public Health.* 2016;16(1):1151.
19. DeWalt DA, Berkman ND, Sheridan S, Lohr KN, Pignone MP. Literacy and health outcomes. *J Gen Intern Med.* 2004;19(12):1228-1239.
20. Kindig DA, Panzer AM, Nielsen-Bohlman L. *Health Literacy: A Prescription to End Confusion.* National Academies Press; 2004.
21. Pagán JA, Brown CJ, Asch DA, Armstrong K, Bastida E, Guerra C. Health literacy and breast cancer screening among Mexican American women in South Texas. *J Cancer Educ.* 2012;27(1):132-137.
22. Komenaka IK, Nodora JN, Hsu C-H, et al. Association of health literacy with adherence to screening mammography guidelines. *Obstet Gynecol.* 2015;125(4):852-859.
23. Aslan A, Temiz M, Yiğit Y, Can R, Canbolant E, Yiğit F. Hemsirelik Yüksek Okulu öğrencilerinin meme kanseri hakkında bilgi,

tutum ve davranışları. TSK Koruyucu Hekim Bül. 2007;6(3):193-198.

24. Guvenc I, Guvenc G, Tastan S, Akyuz A. Identifying women's knowledge about risk factors of breast cancer and reasons for having mammography. Asian Pac J Cancer Prev. 2012;13(8):4191-4197.

25. Kartal M, Ozcakar N, Hatipoglu S, Tan MN, Guldal AD. The Importance of Family History in Breast Cancer Patients in Primary Care Setting: a Cross-sectional Study. J Cancer Educ. 2017:1-8.