

## RESEARCH COMMUNICATION

# The Effects of Educational Level on Breast Cancer Awareness: A Cross-Sectional Study in Turkey

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### Abstract

Breast self-examination (BSE) is important for early diagnosis of breast cancer (BC). However, the majority of Turkish women do not perform regular BSE. We aimed to evaluate the effects of education level on the attitudes and behaviors of women towards BSE. A descriptive cross-sectional study was conducted on 413 women (20–59 years), divided into university graduates (Group I, n = 224) and high school or lower graduates (Group II, n = 189). They completed a 22-item scale assessing the knowledge level, attitudes and behaviors regarding BSE, and the Turkish version of the Champion's Revised Health Belief Model. A significantly higher number of women in Group II did not believe in early diagnosis of BC. A significantly higher number of Group I had conducted BSE at least once, and their BSE frequency was also significantly high. Moreover, a significantly lower number of Group I women considered themselves to not be at risk for BC and the scores for "perceived susceptibility" and "perceived barriers" were significantly higher. Logistic regression analysis identified the university graduate group to have a higher likelihood of performing BSE, by 1.8 times. Higher educational levels were positively associated with BSE performance. Overall, the results suggest that Turkish women, regardless of their education level, need better education on BSE. Consideration of the education level in women will help clinicians develop more effective educational programs, resulting in more regular practice and better use of BSE.

**Keywords:** Breast cancer - breast self examination - educational level - Champion's Revised Health Belief Model

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### Introduction

Despite advances in oncology, extensive use of early diagnostic methods, and increased awareness, breast cancer (BC) continues to be associated with high morbidity and mortality rates (Perry et al., 2008). BC is the most common cancer affecting women worldwide (31%), and the second leading cause of cancer deaths (15%) in women. According to the Turkish Ministry of Health, the incidence of BC among women in 2006 was 32.6 per 100,000 (Fidaner et al., 2001; Gursoy et al., 2009; Ozmen et al., 2009).

BC risk factors have been comprehensively reviewed previously (Veronesi et al., 2005; Lee et al., 2008; Thomsen et al., 2008). A number of risk factors for the development of BC are identified, which most often include age, menarche, parity, menopausal status, age at first live birth, family history, use of exogenous hormones, alcohol consumption, breast feeding, genetic mutations, and benign breast disease.

The lack of definitive preventive methods for BC has made early diagnosis the most important protective factor. Early diagnosis decreases mortality and increases quality of life (Bever et al., 2009). Breast self-examination (BSE) is one of the important components of early diagnosis

(Budden, 1995; Manasciewicz, 2003) and creates BC awareness and inculcates health self-responsibility in women (Bever, 2004; Karayurt et al., 2008). The American Cancer Society and the European Commission recommend annual mammograms and clinical breast examinations (CBEs) for healthy women over 40, and BSE once a month for all women over 20 years of age (Dodd, 1992; Leitch et al., 1997; Perry et al., 2008; Smith et al., 2010; Veronesi et al., 2005).

In developing countries with a lower number of women who are university graduates (UGs), education and beliefs have vital importance in the early diagnosis of BC. Studies have shown that the majority of Turkish women do not perform regular BSE (Karayurt and Dramalı, 2007; Ceber et al., 2010). The reasons for the low rate of BSE among Turkish women include the fear of finding that they have BC, inadequate knowledge regarding how to perform BSE, and lack of awareness about what to do if a lump is found. Studies have reported that these barriers can be eliminated by BSE education (Ozanne et al., 2006).

Beliefs have a strong influence on life style. The health belief model (HBM) is used as a theoretical framework to increase BSE performance. The HBM, which was first developed by Hochbaum in 1950, explains the relationship between people's beliefs and behaviors. The HBM also

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defines factors that motivate subjects to undertake actions consistent with healthy living (Champion and Menon, 1997). Champion's Revised Health Belief Model Scale (CR-HBM) is an HBM used worldwide that has been translated into many languages and tested for confidence and efficiency. CR-HBM evaluates the various sub-dimensions of behavioral approaches in women to early diagnosis of BC (Champion and Scott, 1997; Champion, 2003).

The first goal of the present study was to evaluate the effects of education on the BC risk factors in women, their attitudes toward BSE, and their behavior with regard to performing BSE; and to evaluate the results of the Turkish version of the Champion's Revised Health Belief Model Scale (TCR-HBM). The second goal was to create awareness for BC and BSE in the study population.

## Materials and Methods

### *Study Design and Sample Population*

This descriptive cross-sectional study was conducted between January 2009 and December 2009. The study population (n = 413) consisted of 2 groups: the first group comprised UG women working at Namik Kemal University (Group I, n = 224). The second group comprised women with a high school (HS) education or lower (Group II, n = 189,) who were admitted to the general surgery outpatient clinic of the university hospital without any breast problems, or women who brought their children to the hospital's pediatric outpatient clinic. Inclusion criteria were age between 20 and 59 years and consent to participation in the study. Women who had previously received a BC diagnosis were excluded.

### *Ethics*

The Deanship of Namik Kemal University, Faculty of Medicine, and the director of the University Hospital were informed in writing. The study was approved by the local ethics committee of Tekirdağ State Hospital. All the women participating in the study were informed in detail about the study and their written consent was obtained. Women who participated in the study were neither paid nor exposed to incentives such as priority for hospital admissions.

### *Data Collection*

The participants were asked to complete the following 2 questionnaires under supervision: (1) a knowledge, attitude, and behavior questionnaire on BSE, and (2) TCR-HBM.

Knowledge, Attitudes, and Behaviors Questionnaire on BSE

The first questionnaire consisted of 22 items (Tables 1–4) prepared by our researchers, in order to gather information about the level of knowledge, attitudes, and behaviors of the participants regarding BSE. Additionally, personal information was collected to assess the BC risk status of the participants. In order to prepare the questionnaire for optimal practical use in the study, preliminary questionnaires were administered to 10 subjects and the results evaluated prior to development

of the final study questionnaire.

### *TCR-HBM*

The second questionnaire used in the study is a Turkish adaptation of the CR-HBM (TCR-HBM) (Champion, 1990, 1993, 2003), which was validated by Karayurt and Dramalı (2007). The 42 Likert-type questions are subdivided into 6 classes: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, perceived confidence, and health motivation. Perceived susceptibility indicates a woman's perception of the likelihood of contracting BC risk. Perceived severity indicates a woman's assessment of the seriousness of BC. Perceived confidence is the woman's judgement about her ability to perform BSE. Perceived barriers defines a woman's estimation of the level of challenge posed by social, personal, environmental, and economic obstacles to performing BSE. Perceived benefits is an explanatory response about a woman's assessment of the positive consequences of performing BSE regularly. Of the 42 questions contained in the scale, 3 are related to perceived susceptibility to BC (items 1–3), 7 to perceived severity of BC (items 4–10), 4 to the perceived benefits of performing BSE (items 11–14), 11 to the perceived barriers of performing BSE (items 15–25), 10 to perceived confidence (items 26–35), and 7 to health motivation (items 36–42). The scale consists of a 5-point Likert format by which participants can answer according to following scale: strongly disagree (1), disagree (2), neutral (3), agree (4), and strongly agree (5). In the present study, each subscale was evaluated individually, and the scores were not summed to obtain an overall score. As a result, 6 different scores were obtained for each individual. Cronbach's  $\alpha$  internal coefficient was calculated to analyze the confidence of the scale with  $\alpha$  values between 0.73 and 0.83 for the subscales.

### *Statistical Methods*

Data collected from the 2 questionnaires were analyzed using the Statistical Package for the Social Sciences (version 18.0; SPSS Inc., Chicago, IL, USA). Chi-square ( $\chi^2$ ) tests for metric variables were performed to compare the groups. Cronbach's  $\alpha$  coefficient was computed for internal consistency of the scale. A logistic regression test was used to analyze the subscales. All the statistical analyses were evaluated within a 95% two-sided confidence interval (CI).

## Results

The demographic characteristics of each subject group are presented in Table 1. The 2 groups had the same age distribution. In contrast, the percentage of married women was lower among the more educated women (group I) (Table 1). Of all the risk factors commonly documented for BC, the 2 groups only differed in terms of their age at first child birth and diagnosis of benign breast disease (Table 2). More than 80% of the women with a low level of education started their family before the age of 30, compared to less than half of the UGs. On the other hand, educated women were more frequently diagnosed with

**Table 1. Demographic Characteristics of the Study Population (n = 413)**

| Characteristics | Group I*<br>224 (54.2%) | Group II*<br>189 (45.8%) | p**    |
|-----------------|-------------------------|--------------------------|--------|
| Age 20–29       | 56 (25)                 | 50 (26.5)                | NS     |
| Age 30–39       | 95 (42.4)               | 76 (40.2)                |        |
| Age 40–59       | 73 (32.6)               | 63 (33.3)                |        |
| Married         | 153 (68.3)              | 169 (89.4)               | <0.001 |

\* Group I: University graduate, Group II: High school or lower graduate. \*\*p: chi-square test, p values in bold denote statistical significance, NS: Not significant.

**Table 2. Risk Status of the Participants for Breast Cancer (n = 413)**

| Risk Factor                             | Group I*<br>224 (54.2%) | Group II*<br>189 (45.8%) | p**    |
|---|-------------------------|--------------------------|--------|
| Age at menarche < 12 years              | 55 (24.6)               | 57 (30.2)                | NS     |
| Nulliparous                             | 76 (33.9)               | 26 (13.8)                | <0.001 |
| Age at the first child birth ≤ 29 years | 106 (47.3)              | 152 (80.4)               | <0.001 |
| Age at the first child birth ≥ 30 years | 42 (18.8)               | 11 (5.8)                 | <0.001 |
| Breastfeeding                           | 143 (63.8)              | 148 (78.3)               | NS     |
| Postmenopausal                          | 22 (9.8)                | 21 (11.1)                | NS     |
| Hormone replacement therapy             | 65 (29)                 | 54 (28.6)                | NS     |
| Family history of BC: Yes               | 15 (6.7)                | 9 (4.8)                  | NS     |
| Family history of BC: No                | 206 (92)                | 170 (90)                 | NS     |
| Family history of BC: Unknown           | 3 (1.3)                 | 10 (5.2)                 | NS     |
| Having benign breast disease            | 19 (8.5)                | 11 (5.8)                 | <0.01  |

benign breast complications. In contrast, the 2 groups were consistent with respect to the age at menarche, breastfeeding, menopause state, and hormone replacement therapy.

The level of knowledge, as well as the attitudes and behaviors of the participants toward BSE were evaluated, and the results are presented in Table 3. Higher education was associated with a more common belief in early diagnosis of BC, and performing regular BSE. The education level also influenced the reasons for irregular BSE, as nearly 50% of the graduate women argued that they were too busy, compared to 24% among the less educated women. In contrast, both groups responded similarly with respect to the age at which they should begin BSE, about whether they were examined by a breast surgeon, and about obtaining mammograms.

When all participants were asked where they first heard about BSE, the top 3 answers were “internet” (34%), “television” (23%), and “primary health care clinic” (11.1%). While the most common answers were internet (58%) and hospital (9.4%) in Group I, television (39.7%) and primary health care clinic (15.3%) were the most frequent answers in Group II (Table 4).

The odds ratios (ORs) of the variables were identified by logistic regression analysis to predict the effectiveness of the TCR-HBM in determining behavior towards performing BSE. Despite significantly lesser (p <

**Table 3. Level of Knowledge, Attitude, and Behavior of the Participants Concerning Breast Self-examination**

| Characteristics                         | Group I*<br>224 (54.2%) | Group II*<br>189 (45.8%) | p**      |
|---|-------------------------|--------------------------|----------|
| Believe in early diagnosis for BC       | 207 (92.4)              | 153 (81)                 | <0.001   |
| Age for beginning regular BSE: <39      | 169 (75.5)              | 157 (83.1)               | NS       |
| Examination by a breast surgeon         | 57 (25.5)               | 37 (19.6)                | NS       |
| Mammography                             | 53 (23.7)               | 29 (15.3)                | NS       |
| BSE at least once                       | 167 (74.6)              | 116 (61.4)               | NS       |
| BSE: Regular (monthly or less frequent) | 72 (32.1)               | 41 (21.7)                | <0.01    |
| BSE: Irregular (very rarely or never)   | 152 (67.9)              | 148 (78.3)               |          |
| Reasons For Irregular BSE n = 300       | 152 (67.9)              | 148 (78.3)               | <0.01*** |
| Ignorant about how to perform BSE       | 56 (36.9)               | 52 (35.1)                | <0.01*** |
| Considered BSE as unnecessary           | 26 (17.1)               | 29 (19.6)                | <0.01*** |
| Neglected BSE because of other duties   | 47 (30.9)               | 24 (16.2)                | <0.01*** |
| Considered herself not to be at risk    | 23 (15.1)               | 43 (29.1)                | <0.01*** |

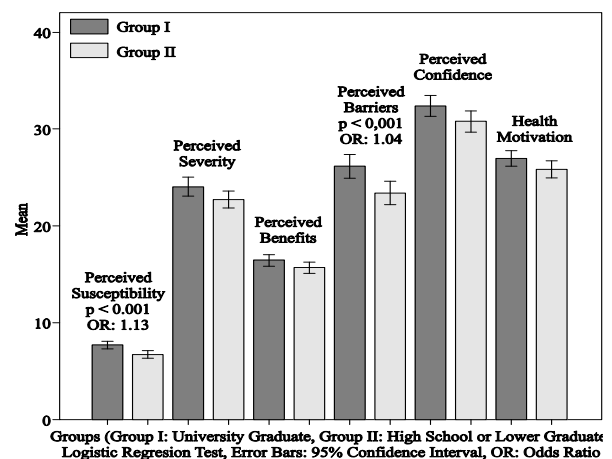
\*Group I: University graduate, \*Group II: High school or lower graduate. \*\* p: chi-square test.

**Table 4. Source of Information for BSE**

| Source                     | Group I*<br>224 (54.2%) | Group II*<br>189 (45.8%) | p**    |
|----------------------------|-------------------------|--------------------------|--------|
| Internet                   | 130 (33.9)              | 10 (5.3)                 | <0.001 |
| Hospital                   | 21 (9.4)                | 19 (10.1)                |        |
| Television                 | 19 (8.5)                | 75 (39.7)                |        |
| Primary health care clinic | 17 (7.6)                | 29 (15.3)                |        |
| Newspaper/magazine         | 16 (7.2)                | 19 (10)                  |        |
| Other people               | 9 (4)                   | 16 (8.5)                 |        |
| Was not aware              | 7 (3.1)                 | 13 (6.9)                 |        |
| Private doctor/hospital    | 5 (2.2)                 | 8 (4.2)                  |        |

\*Group I: University graduate, Group II: High School or lower graduate. \*\*p: chi-square test.

0.001) “perceived susceptibility” scores in Group II, the “perceived barrier” scores were significantly higher (p < 0.001) in Group I (Figure 1). Logistic regression analysis

**Figure 1. Comparison of the Mean Scores of the TCR-HBM Subscales According to the Educational Level**

**Table 5. Prediction of the Effect of University or Higher Education on Breast Self-examination Performance Status (Logistic regression test)**

| Variable  | $\beta$ | SE   | Wald  | P      | OR   | 95% CI      |
|-----------|---------|------|-------|--------|------|-------------|
| Education | 0.60    | 0.23 | 7.44  | <0.01  | 1.81 | 1.28 - 2.78 |
| Constant  | -1.12   | 0.16 | 51.39 | <0.001 | 0.33 | -           |

$\beta$ : Coefficient, SE: Standard error, Wald: Wald Statistic, P: Significance, OR: Odds ratio, CI: Confidence interval

that was performed to identify the effect of education level on women performing BSE showed that being in Group I significantly increased the likelihood of performing BSE by 1.8 times (Table 5).

## Discussion

BSE is a simple, cost-free, and easily applicable method. It is remarkably effective in increasing self-responsibility about health, encouraging adoption of preventive health behaviors, and creating awareness about BC among women (Austoker, 2003; Hall et al., 1980; Manasciewicz, 2003). The Kotka pilot project reported routine BSE as an important diagnostic tool for BC, which decreased the mortality rate associated with BC (Hakama et al., 1995).

In the present study, the percentage of women performing BSE regularly was 27.4%, and those who had performed BSE at least once in their lifetime was 68.5%. Different results have been reported in the literature. Tavafian et al. (2009) showed that only 7.1% of Iranian women were performing BSE regularly and that 31.7% had performed it once in the past. The large differences between these two countries suggest that socioeconomic factors may affect the perception of BSE.

Age and educational level may influence the attitude of women toward BSE. In a study conducted on 718 female high school students in Turkey, Karayurt et al. (2008) found that the percentage of students who had performed BSE at least once was 20%, whereas the percentage that regularly performed BSE was 6.7%. Higher rates in our study as compared to those reported by Karayurt may be attributed to the average older age of the women in our study population. The higher percentage of UG women (54.2%) in our study population could be the main factor contributing to the higher rates of BSE. In addition, older women are considered to be at a higher risk for BC and, being at higher risk of BC may create a self-awareness that contributes to the preventive measures undertaken by these women. Although the percentage of women reported to perform BSE varies widely across reports, including this one, most of the studies revealed that BSE practice increased in concert with an increase in educational level (Ceber et al., 2010; Karayurt and Dramali, 2007; Karayurt et al., 2008; Oluwatosin, 2010). The positive impact of educational interventions on BSE and BC awareness has also been emphasized frequently (Ceber et al., 2010; Haji-Mahmoodi et al., 2002; Karayurt et al., 2008; Yavari and Pourhoseingholi, 2007).

Media, internet, hospitals, primary health care clinics, and friends and acquaintances play roles in educating the public and increasing awareness about the importance of

BSE (Thomas et al., 2002; Dündar et al., 2006; Temiz et al., 2008). In the present study, internet, television, and hospital or primary health care clinic were the most common sources of information concerning BSE for both groups. However, the source of information is influenced by the level of education, as the internet was the first choice for 58% of the UG women, compared to 5.3% for the less educated women. UG women might make greater use of the internet than do undergraduate women for BSE information. Both education and income are closely related to internet access (Thomas et al., 2002). The differences between our groups may be related to the varying opportunities for access to internet resources. As access to computers become commonplace through universities and work places, the internet might be the first choice of women who work at universities. Because all the women in Group I were UGs, it might also explain that the hospital was the second most common source of information. Nearly 40% of Group II women reported that their main source of information on BSE was the television. The Group II population consisted of under-educated women for whom the television is easily accessible at home, explaining why it is the main and important source of information. Television appears to be the most common information source for BSE in developing countries in literature (Thomas et al., 2002). On the other hand, primary health care clinics as the second most common source of information for women in Group II bear the responsibility of informing women about BSE and increasing BC awareness in the rural areas in Turkey. It has been reported that education effects positive changes in beliefs about the efficacy of BSE (Attia et al., 1997; Gozum and Aydın, 2004; Hacıhasanoglu and Gozum, 2008; Lu, 2001). There is a wealth of data indicating that several belief variables are related to BSE, including perceived susceptibility, severity, benefits, confidence, barriers, and health motivation. In our study, the mean score of positive beliefs such as susceptibility, severity, benefits, confidence and health motivation in Group I were all higher than those in Group II. These findings indicate the lower level of awareness about BC risk among women in group II. These results demonstrated that the educational level was effective in terms of better accurate perception. The only negative variable of HBM, perceived barrier belief, which has been reported to be inversely proportional to BSE performance (Champion, 1990, 1993, 2003; Hacıhasanoglu and Gozum, 2008), was found to be significantly higher in group I than in group II. Education supposedly decreases the perceived barrier for BSE. This contradiction can be explained by the increased responsibility towards work shared by women with a higher level of education. Our study too indicates that the educational level is one of the important determinants of increased awareness about BC risk and positive beliefs regarding BSE.

In the current study, the education level of women emerged as a significant determining factor for BSE performance. University level education increased BSE performance by 1.8 times. However, some serious deficiencies and inadequacies were also observed in BSE performance in the UG group. The primary cause in both



groups for not performing regular BSE appears to be a lack of education and understanding of how to perform BSE. This demonstrates the inadequacy of education among women regarding BSE. Institutions involved in public education for BC early diagnosis should continue to teach women of all education levels about BSE. Specifically, the teaching of BSE techniques should be of priority for all women, regardless of the educational level.

The second most common responses for not performing regular BSE, which included “neglecting because of duties” in the UG group and “considering herself not at risk” in the HS or lower graduate group, demonstrated significant differences between the groups. Together with the lower perceived susceptibility score of Group II, and higher perceived barriers score of Group I, it appears that while less educated women consider themselves to have a lower BC risk, UG women do not allocate time for BSE due to their duties, despite a higher awareness of BC risk.

In conclusion, A higher education level positively affects the practice of BSE in women. Therefore, BSE needs to be taught to all women, regardless of their education level. In addition, when teaching women about BC and BSE, hospitals, physicians, and primary health care clinics should impart this information bearing in mind the education level of the women. Attention should be given to teaching and encouraging university level educated women to allocate time for breast health despite their intensive workloads. Additionally, the education in women without university level education should focus on inculcating the correct perception of BC risk.

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