Breast Self-Examination Behavior Predictors of Turkish Young Women: A Health Belief Structural Equation Model*

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Keywords: Breast self-examination, Health Belief Model, predictor, Structural Equation Model.

Abstract
To explore the predictors of Breast Self-Examination (BSE) behaviors of young women and to examine the potential relationships between Health Belief Model (HBM) variables, a cross-sectional study which was carried out with 300 female university students. The Structural Equation Model was used to analyze. Firstly, the theoretical framework was examined by the Confirmatory Factor Analysis (CFA). Secondly, a path model was developed to identify potential associations between BSE behavior and the HBM variables based on the CFA result. Finally, a final model was created by removing the non-significant paths in the path model. The BSE behavior was significantly associated with self-efficacy, perceived susceptibility, and perceived barriers. High self-efficacy and high perceived severity were related to high perceived benefits ($\beta = .25$ and $\beta = .35$, respectively). High self-efficacy and high perceived benefits were related to low perceived barriers ($\beta = -.13$ and $\beta = -.36$, respectively). High perceived susceptibility and low self-efficacy were associated with more BSE behavior ($\beta = .14$ and $\beta = -.17$, respectively). The HBM offers a useful framework for investigating the predictors of BSE behavior. Future studies on breast cancer prevention should focus on increasing perceived benefits, increasing perceived susceptibility, reducing perceived barriers and improving self-efficacy.

1. Introduction
Breast cancer (BC) is the most common cancer among women especially in developing countries. These countries in which BC is diagnosed at late stages still cannot remove the majority of the risk. Low-cost approaches such as breast examination are more suitable for countries with limited resources. For this reason, breast self-examinations (BSE) is recommending for raising awareness among women beginning in their 20s (WHO, 2016). According to some studies results, many women miss out on BC early diagnosis and treatment opportunities,

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are not adequately informed about BC prevention, and have multiple risk factors (Akhtari-Zavare, Juni, Ismail, Said, & Latiff, 2015; Anwar et al., 2018; Gulten, Memnun, Ayse, Aygul, & Gulcin, 2012). Women’s BC awareness is not at the desired level (Birhane, Mamo, Girma, & Asfaw, 2015; Erbil & Bolukbas, 2014; Shin, Park, & Kim, 2012).

The Health Belief Model (HBM) is one of the most widely used models for describing effective factors in studying cancer screening and preventive behaviors. According to the model, protective health behaviors are affected by some perceptions or internal processes: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, and self-efficacy (Bourne, McGrowder, & Desmalee Holder-Nevins, 2010). Perceived susceptibility is perceived risks of BC and undesirable consequences. Perceived severity is the worries that the threatening situation creates on the person and the perception of the harmful consequences of the threat. Perceived benefits are positive aspects of protective behavior. Perceived barriers are negative aspects of protective behavior. Self-efficacy refers to individual’s adequacy in applying health behavior. According to the HBM model, a BC susceptible woman is more likely to do BSE. On the other hand, high perceived benefits and low perceived barriers are associated with BSE behavior (Champion, 1993). In studies in this field, the predictors of BSE behavior are generally determined by logistic regression analysis (Abolfotouh et al., 2015; Darvishpour, Vajari, & Noroozi, 2018; Didarloo, Nabilou, & Khalkhali, 2017; Lee, Stange, & Ahluwalia, 2015). Apart from these studies, in the study of Ahmadian et al. (2016), the relationship between BSE behavior and several psychosocial factors (self-efficacy, perceived barriers to BSE, and body self-image) was investigated by using structural equation modeling (SEM). In Turkey, although some studies were conducted on BSE (Erbil & Bolukbas, 2014; Talas, Kocaöz, & Kocaöz, 2015; Tastan, Iyigün, Kılıc, & Unver, 2011), yet none of these studies investigated the BSE behavior predictors using Health Belief Structural Equation Model. It is important to determine the BSE behavior predictors in order for young women to realize and sustain this behavior. The aim of this study is to explore the predictors of BSE behaviors of young women and examine the potential relationships between HBM variables.

2. Methodology

A cross-sectional study based was carried out between 5 and 28 April 2017 in health sciences departments (Nursing, Nutrition and Dietetics, Physiotherapy and Rehabilitation, and Healthcare Management) of Afyon Kocatepe University in the Turkish Aegean region. 819 students in these departments who met inclusion criteria were invited to the study. The inclusion criteria were: being over 18 years old, being a female, and agree to participate in the study. Due to secondary education (n=158), age<18 (n=12), and interrupting or withdrawing (n=25), 196 students excluded at the beginning of study. It was determined that 624 students may be suitable at this stage. But, 324 students excluded while the study is ongoing, because of declined to participate (n=27), absentee (n=22), inaccessible due to being in practice or internship (n=257), and incomplete or inconsistent data (n=18). Thus, the study was completed with 300 students.

The data were collected with a self-reported questionnaire. It consists of two parts;
The survey form: consists of questions including the socio-demographic characteristics (age, learning field, class, ... etc.) and BSE behavior of the students. BSE behavior was measured with a question ("Are you doing regular breast self-examination?"). Answer options were 1 yes or 0 no.

The Champion’s Health Belief Model Scales: It was developed by Victoria Champion based on HBM for BC screenings (Champion & Springston, 1999). The scale evaluates the women’s judgment on BC in seven subscales: perceived susceptibility, perceived severity, perceived barriers, perceived benefits, self-efficacy, benefits of mammography, and barriers to mammography. In the study, first five subscales with 31 items adapted by Gözüm and Aydin (2004) were used. The respond for each item is evaluated from 1 to 5 points: "I definitely do not agree, ..., I strongly agree". A higher score indicated the high level of perceptions. The Cronbach’s alpha for these subscales were between 0.78 and 0.91.

The sample characteristics are defined by descriptive statistics. The SEM was used to analyze the potential relationships between HBM variables. This process are: (1) the relationship between the variables of the theoretical framework was examined by the Confirmatory Factor Analysis (CFA); (2) based on the CFA result, a path model was developed to identify potential associations between BSE behavior and latent variables; (3) a final model was created by removing the non-significant paths. The model fit was assessed according to the following criteria (Özdamar, 2013): $x^2/df<3$, root mean square errors of approximation (RMSEA)<0.08, goodness of fit index (GFI)>0.70, and comparative fit index (CFI)>0.90. The data were analyzed using SPSS 22 and the AMOS 21 programs. Statistically significant level was accepted as 0.05.

Ethical approval was obtained from Afyon Kocatepe University Health Sciences Scientific Research and Publication Ethics Committee (No. 2018/6). Informed consent was obtained from all participants.

3. Results

The average age of the students is 20.4±1.8. 36.7% of the students were in the 1st class; 19% were in the 2nd class, 23% in the 3rd class, and 21.3% in the 4th class. It was determined that 13% of the students had BC stories in their family and relatives, 59% were informed about BC, 12.7% had regularly done BSE, 41% did not know BSE, and 46.7% did not receive any information about BSE.

According to the CFA results of the HBM variables (Figure 1), six items with lower factor loadings were removed. The fit indices of the CFA model seemed acceptable ($x^2/df=2.448$, GFI=0.85, CFI=0.91, RMSEA=0.070). All standard regression weights were statistically significant ($p<0.05$).
The regression paths and the pair-wise correlation coefficient between the HBM variables are shown Figure 2. Because goodness of fit indexes of model was bad, non-significant paths were removed from the path model. Finally, a final model was generated by using a model-fitting in which non-significant paths were dropped gradually. The final model is shown in Figure 3. All standardized regression weights were statistically significant (p<0.05). The goodness of fit indexes of the final model are $\chi^2/df =1.292$, GFI=0.99, AGFI=0.97, CFI=0.98, RMSEA=0.031. Thus, BSE behavior was associated with self-efficacy, perceived susceptibility, and perceived barriers.
There were three exogenous variables (i.e., perceived severity, perceived susceptibility, and self-efficacy) and three endogenous variables (i.e., BSE behavior, perceived barriers, perceived benefits) in the final model. There was a correlation between perceived susceptibility and perceived severity ($r=0.26$, $p<0.001$; Figure 3). Both higher level of self-efficacy and perceived severity were related to higher perceived benefits ($\beta=0.25$ and $\beta=0.35$, respectively), explaining 19% of the variability in perceived benefits. Low self-efficacy and low perceived benefits were related to high perceived barriers ($\beta=-0.13$ and $\beta=-0.36$, respectively), explaining 18% of the variability in perceived barriers. Self-efficacy also indirectly affects perceived barriers ($\beta=-0.09$, $p=0.01$). High perceived susceptibility and low self-efficacy were associated with BSE behavior ($\beta=0.14$ and $\beta=-0.17$, respectively). Although there seems to be a relationship between perceived barriers and BSE behavior ($\beta=0.11$, $p=0.049$), perceived barriers do not directly (and indirectly) affect BSE behavior ($\beta=0.11$, $p=0.214$). Perceived susceptibility and self-efficacy
directly affected BSE behavior and explaining 7% of the variability in BSE behavior (Table 1).

<table>
<thead>
<tr>
<th>Endogenous</th>
<th>Exogenous</th>
<th>β</th>
<th>CR</th>
<th>p</th>
<th>SMC</th>
<th>SDE (p)</th>
<th>SIE (p)</th>
<th>STE (p)</th>
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<td>Perceived benefits</td>
<td>Self-efficacy</td>
<td>0.25</td>
<td>4.96</td>
<td>***</td>
<td>0.19</td>
<td>0.25</td>
<td>0.25</td>
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<td></td>
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<td>0.35</td>
<td>6.80</td>
<td>***</td>
<td>0.35</td>
<td>0.35</td>
<td>0.35</td>
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<tr>
<td>Perceived barriers</td>
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<td>2.52</td>
<td>0.12</td>
<td>0.18</td>
<td>-0.14</td>
<td>-0.09</td>
<td>-0.23</td>
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<tr>
<td></td>
<td>Perceived benefits</td>
<td>0.36</td>
<td>6.69</td>
<td>***</td>
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<td>-0.36</td>
<td>-0.36</td>
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<tr>
<td>Behavior</td>
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<td>2.59</td>
<td>0.09</td>
<td>0.07</td>
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<td>0.14</td>
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<tr>
<td></td>
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<td>3.13</td>
<td>0.02</td>
<td>0.07</td>
<td>-0.18</td>
<td>-0.02</td>
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<tr>
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<td>Perceived barriers</td>
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<td>1.96</td>
<td>0.049</td>
<td>0.11</td>
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Note. ***p<0.001, CR: Critical Ratio, SMC: Squared Multiple Correlation, SDE: Standardized Direct Effect, SIE: Standardized Indirect Effect Standardized Total Effect, Behavior: Breast self-examination behavior

4. Discussion

BC is one of the main cancers of women. Understanding and identifying factors related to women’s behavior regarding BC screening will be beneficial in preventing BC (Glanz, Rimer, & Viswanath, 2008). With this reasoning, we are trying to explore the predictors of BSE behaviors of students and examine the relationship between HBM constructs.

According to the HBM, individuals’ exhibit more preventive health behaviors when they are in danger of disease or when they make preventive things and benefit from them. This means that if women who perceive BC as a threat, has high self-efficacy, high perceived benefits, and low perceived barriers, women will be more likely to perform BSE (Champion, 1993). Some studies reported that women who have high self-efficacy prone to perform regular BSE (Hasani, Aghamolaei, Tavafian, & Zare, 2011; Lotfi, Hashemi, & Ansari-Moghadam, 2012). Differently, in current study, it was found that lower level of self-efficacy was associated with more BSE behavior. We think that the low level of BSE knowledge leads to this result. Indeed, the study results of Kosgeroğlu et al. (2011) indicates that knowledge and breast examination are effective for early diagnosis and treatment of breast cancer.

According to the HBM, lower level of perceived barriers is important predictor for BSE behavior. In this study, it was found that perceived barriers do not directly affect BSE behavior. Some studies (Abolfotouh et al., 2015; Gözüm & Aydin, 2004) reported that the self-efficacy score was found to be significantly higher in women who apply BSE.

Perceived benefits indicate women’s perception towards the positive health consequences of performing BSE. In a study, women reported that BSE has benefits such as early detection of BC and reduction operation risks (Abolfotouh et al.,
In the study, it was not significantly associated with BSE. However, Birhane et al. (2015) reported that perceived benefits were significantly associated with BSE.

Perceived severity is the perception of the threatening situation and its detrimental consequences. In the current study, perceived severity was not statistically correlated with BSE behavior. Yüksel et al. (2017) stated that perceived severity associated with BC story at family, practice of BSE, and having regular clinic breast examination. Didarloo et al. (2017) reported similar results.

Perceived susceptibility shows women’s perception towards the risk of BC. We found that higher level of perceived susceptibility was associated with more BSE behavior. This finding is consistent with the study of Birhane et al. (2015). It can be explained by the fact that BSE behavior among high-sensitivity women may improve cancer outcomes.

This study has a number of limitations. First, the results can only be generalized to similar examples. It is another limitation that the study is performed with young women. The inclusion of older women in the study could change the results. In this case, it could affect the planning of BC prevention strategies. BSE also has low sensitivity in BC detection which is considered as another limitation. Finally, the data were collected through a self-reported questionnaire. For this reason, participants may have underestimated or overestimated their responses.

5. Conclusion

This study highlighted that BSE behavior of students was far from favorable levels. The study documented that participants’ self-efficacy and perceived susceptibility levels were factors that influence their decisions related to performing BSEs. Future breast cancer prevention studies should focus on increasing perceived sensitivity, increasing perceived benefits, reducing perceived barriers, and improving self-efficacy among students. Knowing these factors helps researchers to design and implement appropriate interventions in behavioral change.
References


