Determinants of Breast Self-Examination Practice among Women in Surabaya, Indonesia: An Application of the Health Belief Model

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Abstract

Background Breast cancer has become one of the most prevalent causes of mortality among Indonesian women. Better prognosis of breast cancer will be achieved if it is diagnosed in an earlier stage, thus efforts to detect breast cancer earlier are important. Breast Self-Examination (BSE) is considered as an important first step to encourage women to actively be responsible for their own health, especially for women in developing countries with limited resources and access to other forms of preventive healthcare. The present study aimed to predict BSE behavior among women in Surabaya, Indonesia using the HBM.

Methods This investigation was a cross-sectional survey which was distributed among 1,967 women aged 20-60 years. The Indonesian version of Champion's Health Belief Model Scale (I-CHBMS) was used to explain self-reported BSE practice. Logistic regression analysis was used to examine the association of HBM variables with BSE practice.

Results Almost half of the sample (44.4%) had performed BSE. Further, the results indicated that the HBM variables were significantly associated with BSE practice. Specifically, higher perceived benefits and self-efficacy, lower perceived barriers and less cues to action were unique correlates of BSE behavior. The result also showed that perceived severity and susceptibility were not associated with BSE behavior.

Conclusion This study indicated that several HBM constructs significantly associated with BSE behavior among Indonesian women, suggesting that BSE health education programs should emphasize the perceived benefits of BSE, focus on increasing women's self-efficacy to address and overcome perceived barriers in performing BSE, and help them in identifying personally relevant cues to action.

Keywords: breast cancer, breast self-examination, Champion's Health Belief Model, cues to action, Indonesian women, perceived benefits, perceived barriers, self-efficacy.

Introduction

Globally, breast cancer is the most common type of cancer, especially in developing countries [1]. For example, in Indonesia, incidence and mortality rate of breast cancer is 40.3 and 16.6, respectively, per 100,000 people and both rates show an increasing trend [2]. In Indonesia, most cancer patients are aged 35 years or older, are from diverse socioeconomic backgrounds, and mostly live in urban areas [3]. The cancer management costs, ranging from diagnosis to treatment involving chemotherapy, radiotherapy and other treatments, are high and are increasing every year [4,5]. One of the main reasons cancer treatment efforts are costly is because most patients come to healthcare facilities in an advanced stage. Therefore, cancer early detection programs are important in Indonesia, even though this will not decrease the incidence of breast cancer, it will help improve the prognosis and treatment outcomes, which could ultimately lead to lower mortality rates [6], and reduce the cost of advanced breast cancer treatments.

Regular breast self-examination (BSE) combined with breast awareness, is one of the strategies to achieve breast cancer early detection, especially in developing countries where access to other early detection methods (e.g., mammography, ultrasonography) is limited. BSE is uniquely suited for populations with limited access to formal healthcare: it is cheap, noninvasive, simple, and does not depend on a health practitioner's assistance. Furthermore, performing regular BSE will create breast awareness, and will inspire women to be more actively responsible for their own health [5,7]. The Indonesian Ministry of Health launched the 'Prevention and Early Detection of Breast and Cervical Cancer National Movement' program in 2015, and recommended the targeted group of women aged 20 and above to go to primary health care (PHC) center to receive a regular Clinical Breast Examination (CBE) as well as BSE education so that they can practice this at least monthly [4]. The effort to develop an educational program focusing on BSE as an attempt to increase women's early screening

behaviors for breast cancer, including in less medical settings, constitutes a critical part of health behaviors for early detection and treatment of breast cancer.

Although some literature suggests that BSE has limited effectiveness in reducing breast cancer mortality, there are also indications from developing countries that regular BSE is associated with the identification of breast cancer in an earlier stage, and thereby a reduced mortality [8]. It has to be noted however, that early detection – such as BSE – has to be followed up with prompt diagnosis and effective treatment [9]. In developing countries, as is the case in Indonesia where most cancers are diagnosed at later stage, BSE, followed up by CBE in healthcare facilities, could be considered an effective method for increasing early detection of breast cancer and treatment outcomes [10].

Several studies show positive associations between cancer screening behaviors (including BSE) and psychological variables such as self-efficacy and attitudes, and the Health Belief Model in particular has proven a valid tool to predict such screening behaviors among women in low- and middle-income countries [11-13]. The Health Belief Model (HBM) [14] explains health behavior as being determined by personal beliefs or perceptions about the disease, and the strategies available to an individual to reduce the occurrence of the disease [15]. Specifically, according to this model, a person's beliefs and perceptions influence their health behavior, such that when individuals perceive they are at risk for the disease they will perform the health behaviors necessary if they are reminded of these behaviors and expect positive outcomes – in terms of risk reduction and feasibility – from performing these behaviors [14].

In the most modern conceptualization of the HBM the following components are included [16]: perceived susceptibility: one's perceived personal vulnerability to the risk of incurring the health condition; perceived severity: one's perceived personal harm if one were to incur the health condition; perceived benefits: perceived positive attributes of performing a

certain health behavior; perceived barriers: perceived costs or negative attributes of performing a health behavior; cues to action: a diverse range of internal or external triggers that encourage the performance of the health behavior; and self- efficacy: the confidence of an individual in his/her ability to perform the health behavior.

Champion [17] first applied the HBM framework to investigate the beliefs of women regarding breast cancer and breast screening behavior, including BSE and mammography, and developed Champion's Health Belief Model Scale (CHBMS) [18, 19]. This scale has been widely used to predict breast cancer screening, and has been adapted to many languages and cultural settings such as Iran [20], Taiwan [21], and Turkey [22]. In the current study, the aim was to investigate whether the HBM variables are correlates of BSE among Indonesian women.

The present study

Previous research demonstrated the applicability of HBM to predict a range of health-related behavior, including breast cancer screening practice [15]. Various results on the significance and magnitude of HBM factors to predict BSE practice were also documented [23-25].

However, due to specific characteristics of Indonesian population, further study to explore the variables of the HBM and associated factors among Indonesian women is needed. Indonesian population is characterized with limited health care resources - e.g., there were only 717 (7.6%) PHC centers amongst all PHC centers in the 32 provinces in Indonesia that provided early detection for breast and cervical cancer service [26], and certain psycho-socio-cultural characteristics - e.g., fatalistic beliefs about health and illness, embarrassment to discuss and/or perform breast examination. Knowledge about the determinants of BSE could inform health education programs to create breast cancer awareness and stimulate regular BSE among Indonesian women who are most at risk.

Method

Study design and participants

This study was a cross-sectional study among women in Surabaya. Surabaya is the capital of East Java and the second largest city in Indonesia, which has 31 sub-districts, each of them comprises 3-8 villages. Based on population census in 2010 the population was 2,599,796; thirty percent of them were women aged 20-60 [27]. To have the representative data from each sub-district, we randomly selected 2-3 villages within each of the 31 sub-districts from the list. Participants were recruited by trained research assistants, and used the monthly meetings of PKK (Women's family welfare movement: a nation-wide women's NGO that includes every wife in certain area) to recruit female participants. Research assistants approached PKK's members during these meetings and asked them to join in the research. Most PKK members who attended these meetings agreed to participate. The inclusion criteria were: 1) aged 20 – 60 years old, 2) living in Surabaya, 3) being literate in the Indonesian language. The research assistants explained the study purpose, and it was also explained in the information sheet attached to the questionnaire. Some women took questionnaires home to distribute among their community, or to their daughters. The filled-out questionnaires were then collected by one of PKK representatives in each village. Completion time of the questionnaire was between 10-15 minutes. Care was taken to assure the confidentiality of the data obtained, and all participants provided written informed consent to participate in the study. The data were collected between September 2016 and January 2017.

Materials and Procedures

After providing their informed consent, participants completed the CHBMS. We used the Indonesian version of the CHBMS to investigate the Health Belief Model variables (I-CHBMS) [28]. The scale is specifically targeted at breast cancer and breast self-

examination and consists of 42 items with 5-point response scales ranging from 'strongly disagree' (1) to 'strongly agree' (5). The I-CHBMS consists of 6 subscales: *perceived susceptibility*, consisting of 6 items, e.g., "I am very worried about getting breast cancer"; *perceived severity*, consisting of 12 items, e.g., "Having breast cancer will endanger my relationship"; *perceived benefits*, 5 items, e.g., "Breast self-examination can help me in finding a lump"; *perceived barriers*, 8 items, e.g., "I am afraid I'm not able to do breast self-examination"; *cues to action*, 8 items e.g., "I often do things that can improve my health status"; and *self-efficacy* consisting of 3 items, e.g., "I was able to do my own breast self-examination last month". Sum scores were created for the subscales of the I-CHBMS. All subscales had an acceptable to very good internal consistency reliability: Cronbach's coefficients respectively were .84, .87, .82, .83, .81, .67. The item-total correlation ranged from $r = .37$ to $r = .78$.

After completing the I-CHBMS, participants completed some questions on socio-demographic characteristics, including age, level of education, and marital status. We also asked about whether participants had ever or regularly performed BSE, had a breast affliction in their past, whether there was a history of cancer in the family, and whether the participant had ever performed BSE (all answers yes/no).

Data Analysis

The data were tabulated in excel worksheet and analyzed using IBM SPSS (version 22.0). The significance level was set at $p < .05$. Frequency distributions described the sociodemographic characteristics of the participants, and chi-square tests were used to compare demographic properties between women performed BSE (regular and irregular) and who did not perform it at all. Independent sample t-test was employed to compare HBM construct between BSE performers and non-performers. To examine the

association of HBM variables and BSE practice among women in Indonesia, logistic regression analysis was used.

Results

Participants of the study were 1,967 women from Surabaya, East Java, Indonesia, with a mean age of 36.17 (SD = 11.39). Most were married (72.3%), and more than half had graduated from high school (53.4%). Of all participants, 44.4% had at performed BSE at least once. As shown in Table 1, BSE practice was associated with lower age, higher education, a history of breast afflictions, and a family history of cancer (p 's < .05).

Table 1. *Socio-demographic characteristics of the participants*

	BSE performers (n = 874)		BSE non-performers (n = 1093)		Statistics
	N	%	N	%	
Age					$\chi^2 (1) = 5.892, p = .01$
≤ 40	536	61.30	728	66.66	
> 40	338	38.70	365	33.40	
Marital status					$\chi^2 (2) = .729, p = .69$
Single	197	22.50	264	24.20	
Married	639	73.10	784	71.70	
Widowed/Divorced	38	4.30	45	4.10	
Education					$\chi^2 (3) = 102.342, p = .00$
University	258	29.50	175	16	
High School	486	55.60	565	51.70	
Secondary	80	9.20	201	18.40	
Primary	50	5.70	152	13.90	
History of breast affliction					$\chi^2 (1) = 10.48, p = .00$
Yes	34	3.90	17	1.60	
No	840	96.10	1076	98.40	
Family history of cancer					$\chi^2 (1) = 28.437, p = .00$
Yes	168	19.20	117	10.70	
No	706	80.80	976	89.30	

Independent samples t-tests (see Table 2 for an overview) revealed that perceived benefits, cues to action, and self-efficacy were significantly higher among BSE performers

than among women who never performed BSE (t 's > 6.48 , p 's $< .001$). Additionally, the perceived barriers were significantly lower among BSE performers ($p < .001$). The groups did not differ with respect to perceived susceptibility and perceived severity of developing cancer (t 's < -1.22 , ns).

Table 2. *Comparison of Health Belief Model factors among performers and non-performers of BSE*

Variable	Performing BSE		t	df	p
	Yes Mean (SD)	No Mean (SD)			
Susceptibility	14.11(4.26)	14.11(4.05)	-.01	1965	.99
Severity	38.63(8.53)	39.10 (8.42)	-1.22	1965	.22
Benefits	20.27(2.67)	18.46 (3.23)	13.35	1963*	.001
Barriers	16.34 (4.75)	19.52 (5.05)	-14.25	1915*	.001
Cues to action	29.38 (4.72)	27.88 (5.40)	6.48	1950*	.001
Self-efficacy	11.26 (2.06)	9.03 (2.56)	20.92	1965*	.001

Note: * Levene's test indicated unequal variances (F 's > 14.12 , p 's $< .001$) so degrees of freedom were adjusted

Lastly, logistic regression was used to explain the probability of BSE practice. The HBM components were added as Independent Variables (Model 1). The results showed that the HBM variables were significantly associated with BSE practice ($\chi^2 (6) = 485.92$, $p = .0001$) and accounted for 29.3% of the variance of BSE practice. We also conducted a set of hierarchical logistic regression analyses to examine the association of HBM components with BSE utilization, after controlling for sociodemographic characteristics (age, marital status, education, history of breast affliction and family history of cancer) in Model 2. The model significantly associated with BSE practice ($\chi^2 (11) = 553.35$, $p = .0001$) and explained 32.8% of the variance on whether participants had ever utilized this screening method. For a full overview, see Table 3.

--insert Table 3 here --

Unique correlates of BSE practice in Model 1 were perceived benefits, perceived barriers, cues to action, and self-efficacy (p 's < .001). The women who perceived more benefits (OR = 1.1, CI = [1.05,1.14]) and self-efficacy (OR = 1.44, CI = [1.36,1.51]), but perceived fewer barriers (OR = .93, CI = [.91,.95]) and, surprisingly, less cues to action (OR = .94, CI = [.92,.97]) were more likely to perform BSE. When sociodemographic variables were controlled in Model 2, the HBM components which associated BSE behavior were identical with the first model: perceived benefits, perceived barriers, cues to action and self-efficacy were among HBM components which explained BSE behavior. The women with higher perceived benefits (OR = 1.09, CI = [1.04,1.13]) and self-efficacy (OR = 1.43, CI = [1.35,1.51]), but perceived fewer barriers (OR = .93, CI = [.90,.95]) and less cues to action (OR = .94, CI = [.91,.96]) were more likely to perform BSE. In addition, age (OR = 1.32, CI = [1.05,1.65]), education background (OR = 2.45, CI = [1.88,3.20]) and having family with cancer (OR = 1.63, CI = [1.21,2.20]) were uniquely associated with BSE behavior, suggesting that women who were older, highly educated and having family with cancer had greater likelihood of (past) BSE performance.

Discussion

Breast cancer is the most predominant cancer among Indonesian women. Early detection and treatment of the disease have shown to decrease mortality level [29], but in Indonesia, almost 70% of breast cancer patients present in a late stage of the disease, negatively affecting survival rates [30, 31]. Therefore, early detection strategies are important, and BSE is one of the strategies applicable to achieve both breast (cancer) awareness and earlier detection of breast problems. Especially in developing countries where health-related resources are limited, and where due to sociocultural influences women are hesitant about sharing health issues about their breasts, empowering women to examine their own breasts is

an important first step [32]. The aim of the current research was therefore to investigate which psychosocial variables affect the likelihood of women's performing of BSE.

The findings of the present study seem promising, since almost half of the participants indicated they (had) performed BSE (44.4%). Moreover, a younger age, higher education, having a history of breast afflictions, and having a history of family cancer were significantly associated with performing BSE in this sample. These results support previous findings suggesting that younger and well-educated women were more likely to perform breast cancer screening behavior [25, 33], possibly because of increased knowledge and awareness.

In line with the Health Belief Model [14], perceived benefits, perceived barriers, cues to action, and self-efficacy were unique correlates of the likelihood to perform BSE. In contrast to what was expected, however, the regression analysis revealed a *negative* association between cues to action and the likelihood of performing BSE. This result might be due to the way this variable was measured: Cues to action were probed by asking about general positive health behaviors, such as eating a healthy diet, adherence to physician recommendations, regular exercise, and an ability to find health information, rather than asking about internal or external triggers that encourage BSE performance. We speculate that the participants who indicated they had more of those kinds of cues to action might also have higher optimism regarding their health status. And although in most cases (health) optimism is associated with and is predictive of both psychological and physical wellbeing, some studies have revealed fewer desirable outcomes, for example reduced health protective behavior [34, 35]. In some cases, this health optimism may thus be unrealistic optimism - including perceptions of being invulnerable to the disease, especially since they already feel they take good care of their health. Additionally, people with positive general health behaviors – measured here by the cues to action subscale of the HBM – tend to think that negative events are less likely to happen to them than to other people [36], which might cause them to forego performing BSE

behavior. Since we cannot be certain the current participants were indeed unrealistically optimistic about their health (behaviors), further research is necessary to investigate the association of cues to action with unrealistic optimism, and their association with (the absence of) BSE behavior, particularly in light of how they were operationalized in the current study.

An additional explanation for the negative association between cues to action and BSE performance may be found in the culture of Indonesia: the values of Indonesian women often center around modesty, and with this comes a view that the breast is an intimate, personal organ, not to be openly discussed. These cultural characteristics may bring about defensive and protective thoughts and a hesitation to consider performing BSE, since it is considered an uncomfortable procedure [37].

In line with the finding among Saudi [38] population, our data demonstrated that perceived severity and susceptibility of breast cancer did not predict BSE performance; and the mean scores for these variables did not differ between the BSE performing group and the non-performing group. There are a few possible explanations for this finding. First, there might be insufficient knowledge about personal vulnerabilities of suffering from breast cancer, the severity of breast cancer is, and how breast cancer influences the physical, psychological and social aspects of the patients and their family. Second, is the participants in the current study might see their susceptibility of suffering from breast cancer as the will of God. Previous studies indicated that such fatalistic beliefs negatively affect early detection behaviors in Muslim society [39,40]. The Indonesian population, is characterized by strong religious values, and the current sample was drawn from a largely Muslim population. Future research should focus on establishing the underlying reasons for the absence of a relationship between BSE performance – or other health behaviors – and perceived severity and susceptibility.

The finding that perceived severity and perceived vulnerability did not correlate BSE could also be explained by fear arousal theory. Rogers and Deckner [41] defined a fear appeal as a persuasive form of communication aimed to arouse fear to promote precautionary motivation and self-protective action. Further, Ruiter, Kessels, Peter and Kok [42] explained that fear arousal is an unpleasant emotional state, consisting of physiological, cognitive, affective, and behavioral responses triggered by the perceived threatening stimuli. Thinking about the severity and personal susceptibility to breast cancer are likely to be considered threats, and thus arouse fear. Moreover, if there is an additional assessment that one is unable to effectively avert the risk, or whether this aversion is not easy to perform, then this threat perception will result in ongoing fear arousal. Indeed, previous research indicated that perceived severity and susceptibility, which are combined to perceived threat, were weak predictors of intention and risk-reducing behavior [43,44,45]. Thus, in order for these variables to cause enduring behavior change, fear arousal needs to be combined with other behavioral change techniques like implementation intentions, self-efficacy training, or action instruction [42].

In examining social-demographic variables associated with BSE performance, older age, well-educated and having family with breast cancer were significantly associated with performance of BSE behavior. Similar to study of Noroozi, Jomand, and Tahmasebi [12], our findings showed that women with older age tend to performed more BSE. It might be because they believe that the vulnerability of breast cancer is increasing with age. The BSE practice was also predicted by educational level, in which women with higher education (high school and university graduates) tended to perform more BSE, this finding is in line with findings in Turkey [33] and Singapore [46] population. Having a history of cancer in the family was also associated with higher BSE performance. The finding is in line with a study in a Saudi population which showed that family history of cancer was a significant correlates of BSE

performance [38]. One explanation could be that women with relatives suffering from cancer understand the possible influence of genetic factors in the development of cancer, creating higher awareness about their own susceptibility. Marital status and history of breast affliction were not found to be correlates of performing BSE in this sample.

Conclusion

The current study offers some insights into the determinants of BSE among Indonesian women, thus offer starting points and recommendations for health education. For example, given the significant association between perceived benefits of BSE and actual BSE practice, health promotion activities could focus on the benefits of BSE practice as a breast cancer early detection strategy. In such health promotion projects the local context and culture should be respected, since BSE practice in part relies on individual, family, and community support. Hesitations should be respected, but can be addressed, e.g., by the use of female health educators. Interestingly, in the current research self-efficacy was positively associated with BSE behavior, which suggests that employing methods to increase women's self-efficacy with regard to BSE, for example guided practice, or enactive mastery experiences, could improve the confidence of the women to practice BSE regularly. Further, we have investigated psychosocial variables among a large representative sample of women, making generalization to the larger population possible. However, there are some limitations which should be noted. First of all, we did not measure women's current level of knowledge about breast cancer in general, and BSE practice in particular. Future research should include such measurements, since knowledge – or health literacy in general – could be directly related to perceptions of susceptibility and severity [47]. Further, the unexpected finding that cues to action decreased the likelihood of performing BSE, as well as non-significant relationships between BSE and perceived susceptibility and severity, suggest that the women in our study

may have an unrealistically optimistic perception of their health, and the necessity to perform BSE [48]. Therefore, future studies should investigate an optimistic bias with regard to breast cancer susceptibility and the necessity for screening behaviors. Last, the data were collected based on self-report questionnaires, and we only asked women to report whether they had ever performed BSE, rather than whether they were aware of and (thought they) followed the BSE guidelines. This could be explored further in future studies as well.

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Table 3

Hierarchical Logistic regression analysis of Health Belief Model factors for predicting BSE practice

Variables	Model 1 ^a						Model 2 ^b					
	B (S.E)	Wald	df	OR	OR 95% CI	p	B (S.E)	Wald	df	OR	OR 95% CI	p
<i>HBM constructs</i>												
Susceptibility	.02(.01)	1.87	1	1.02	.99 – 1.04	.17	.01(.01)	.78	1	1.01	.99 – 1.04	.38
Severity	-.01 (.01)	.77	1	.99	.98 – 1.01	.38	.00 (.01)	.001	1	1	.99 – 1.01	.98
Benefits	.09 (.02)	20.28	1	1.1	1.05 – 1.14	.00	.08 (.02)	16.2	1	1.09	1.04 – 1.13	.00
Barriers	-.08 (.01)	42.36	1	.93	.91 – .95	.00	-.08 (.01)	40.10	1	.93	.90 - .95	.00
Cues to action	-.06 (.01)	22.31	1	.94	.92 – .97	.00	-.06 (.01)	26.31	1	.94	.91 - .96	.00
Self-efficacy	.36 (.03)	176.89	1	1.44	1.36 – 1.51	.00	.36 (.03)	163.93	1	1.43	1.35 – 1.51	.00
<i>Sociodemographic</i>												
Older age (ref = no)							.27 (.12)	5.44	1	1.32	1.05 – 1.65	.02
Married (ref = not married)							-.06 (.13)	.21	1	.95	.74 – 1.20	.65
Highly educated (ref = low educated)							.90 (.14)	43.6	1	2.45	1.88 – 3.20	.00
Having history of breast affliction (ref = no)							.60 (.34)	3.06	1	1.82	.93 – 3.56	.08
Having family with cancer (ref = no)							.49 (.15)	10.4	1	1.63	1.21 – 2.20	.00

a. Logistic regression with HBM constructs, Model χ^2 (6) = 485.92, $p < .0001$, $R^2 = .293$ (Nagelkerke)

b. Logistic regression with sociodemographic characteristics + HBM constructs, Model χ^2 (11) = 553.35, $p < .0001$, $R^2 = .328$ (Nagelkerke)