RESEARCH ARTICLE

Psychosocial Predictors of Breast Self-Examination among Female Students in Malaysia: A Study to Assess the Roles of Body Image, Self-efficacy and Perceived Barriers

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Abstract

Background: Early detection is a critical part of reducing the burden of breast cancer and breast self-examination (BSE) has been found to be an especially important early detection strategy in low and middle income countries such as Malaysia. Although reports indicate that Malaysian women report an increase in BSE activity in recent years, additional research is needed to explore factors that may help to increase this behavior among Southeastern Asian women. Objective: This study is the first of its kind to explore how the predicting variables of self-efficacy, perceived barriers, and body image factors correlate with self-reports of past BSE, and intention to conduct future breast self-exams among female students in Malaysia. Materials and Methods: Through the analysis of data collected from a prior study of female students from nine Malaysian universities (n=842), this study found that self-efficacy, perceived barriers and specific body image sub-constructs (MBSRQ-Appearance Scales) were correlated with, and at times predicted, both the likelihood of past BSE and the intention to conduct breast self-exams in the future. Results: Self-efficacy (SE) positively predicted the likelihood of past self-exam behavior, and intention to conduct future breast self-exams. Perceived barriers (BR) negatively predicted past behavior and future intention of breast self-exams. The body image sub-constructs of appearance evaluation (AE) and overweight preoccupation (OWP) predicted the likelihood of past behavior but did not predict intention for future behavior. Appearance orientation (AO) had a somewhat opposite effect: AO did not correlate with or predict past behavior but did correlate with intention to conduct breast self-exams in the future. The body image sub-constructs of body area satisfaction (BASS) and self-classified weight (SCW) showed no correlation with the subjects' past breast self-exam behavior nor with their intention to conduct breast self-exams in the future. Conclusions: Findings from this study indicate that both self-efficacy and perceived barriers to BSE are significant psychosocial factors that influence BSE behavior. These results suggest that health promotion interventions that help enhance self-efficacy and reduce perceived barriers have the potential to increase the intentions of Malaysian women to perform breast self-exams, which can promote early detection of breast cancers. Future research should evaluate targeted communication interventions for addressing self-efficacy and perceived barriers to breast self-exams with at-risk Malaysian women. and further explore the relationship between BSE and body image.

Introduction

An estimated 1 in 20 women will be diagnosed with breast cancer over their lifetime (Hisham and Yip, 2003; Yip et al., 2006). Although breast cancer has been recognized as a disease of Western countries, breast cancer incidence and mortality rates have been increasing rapidly in economically less-developed regions of Asia such as in Malaysia (Sharma et al., 2012; Ma and Jernal, 2013). Early screening and detection efforts greatly diminish

the mortality risks linked with breast cancer, because these efforts allow for more effective treatment choice options (Green and Taplin, 2003). Performing breast self-examination (BSE) regularly enables women to become familiar with their own breasts and can be deemed a cost-effective, time-efficient method to help identify changes in breast tissue (Chouliara et al., 2004). Breast self-examinations have been found to be an especially important early detection strategy in low and middle income countries such as Malaysia (Yip et al., 2008;

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Kreps and Sivaram, 2008; Rosmawati, 2011; Corbex et al., 2012).

Prior studies indicate that certain individual psychological variables are related to past practice of breast self-examination and future intentions to practice the exams, such as positive attitudes to the exams, less perceived barriers to the exams and greater perceived self-efficacy in conducting BSEs (McCaul et al., 1993; Champion, 1995; Calnan and Rutter, 1988; Moore et al., 1998; Luszczynska and Schwarzer, 2003; Misovich et al., 2003; Janda et al., 2004; Chait et al., 2009).

However, recent studies have indicated that women's body image disturbances may also negatively influence their cancer-screening behaviors and therefore diminish the likelihood of the early detection and prevention of cancer (Fish and Wilkinson, 2003; Jensen and Moriarty, 2008; Oscarsson et al., 2008; Risica et al., 2008; Chait et al., 2009; Clark et al., 2009; Thomas and Usher, 2009; Ridolfi and Crowther, 2013). Women who estimate their appearance more negatively may engage in avoidance of their body and not perform breast self-exams regularly (Chait et al., 2009). Further research exploring the influence of body image and other cognitive and socio-ecological factors on cancer-screening behavior is needed, especially in otherwise under-researched Asian populations (Ahmadian and Abu Samah, 2013; Ahmadian and Abu Samah, 2014).

Literature Review

A comprehensive literature review by Ridolfi and Crowther (2013) revealed that body shame and body avoidance could predict participation in cancer screenings and that other variables (including risk perception, health anxiety, subjective norms, and self-efficacy) may moderate this relationship. This study builds on the work of Chait, Thompson and Jacobsen, (2009), Ridolfi and Crowther (2013) and Abu Samah and Ahmadian (2014) to explore the role that body image, self-efficacy, and perceived barriers may have on participation in breast cancer self-exams.

Our review found that the construct of body image is complex and can be measured in multiple ways. Body image can include dysfunctional perceptions, cognitions, emotions, and/or behaviors that control one's daily performance, and quality of life (Cash and Deagle, 1997; Cash and Smolak, 2011). Although the majority of research surrounding body image has emphasized its role in eating disorders (Forbes and Frederick, 2008), more recent work has examined how body image may influence health behaviors.

When considered from a biopsychosocial perspective, body image becomes even more complex. Interestingly, body image disturbances are so common among women in Western cultures, that appearance dissatisfaction is normative for them (Rodin, Silberstein; Striegel-Moore, 1984; Cash and Henry, 1995). However, much less is known about body image self-perceptions among Southeast Asian women. Most research examining body image and Asian women has focused on Asian American women; and this research is itself extremely limited (Yokoyama, 2007). Research is therefore needed to explore the relationship between body image and other biopsychosocial factors that may influence breast self-exams and other forms of cancer screening amongst Asian female populations.

Research Questions

The authors of this study posited that several social-psychological factors, self-efficacy, perceived barriers to BSE, and body self-image, may influence Southeastern Asian women's decisions to engage in BSE. This study explored how two cognitive factors (self-efficacy and perceived barriers to BSE) and how body image factors may influence BSE behavior amongst women in Malaysia. Specifically, this study of female university students representing nine Malaysian universities (n=842) examined how these cognitive and body image factors influenced past BSE behavior and/or intention to practice BSEs in the future.

Materials and Methods

Participants

The study conducted a secondary analysis of survey data collected in a previously published study (Ahmadian and Abu Samah, 2014). A multistage cluster random sampling technique was employed to select students in the nine universities in the Klang Valley and in Selangor, Malaysia during November and December, 2013. Participants who reported that they had breast cancer (malignant or benign) were excluded from the study. A total of 842 female students ranging in age from 17 to 52 years old (M=22.51; SD=4.82) completed the survey questionnaire, which was test-piloted prior to the full study.

All respondents were asked to answer to the questions about age, level of education, occupation status, race, origin, ethnicity, religion, marital status, and monthly family income (Samah et al., 2015).

Measures
Multidimensional Body-Self Relations Questionnaire (MBSRQ-Appearance Scales)

To measure body image, this study adopted the Multidimensional Body-Self Relations Questionnaire (MBSRQ-Appearance Scales) developed by Cash (2000) and (Brown, Cash and Mikulka, 1990). The 34-question MBSRQ-AS instrument is a short-version of the 69-item MBSRQ, which emphasizes the appearance-related subscales of the MBSRQ (Cash, 2000). When using this multidimensional instrument, researchers are reminded to "not attempt to combine the various scales of the MBSRQ-AS into a single measure." This study therefore examined the MBSRQ-AS subscales of appearance evaluation (AE), appearance orientation (AO), body area satisfaction (BASS), overweight preoccupation (OWP), and self-classification of weight (SCW) separately. The reliability coefficients of the subscales were fairly high and ranged from α=0.60 (Appearance Evaluation subscale), α=0.69 (Appearance Orientation), α=0.72 (Overweight Preoccupation subscale), α=0.87 (Self-Classified weight subscale), to α=0.89 (Body Areas Satisfaction Scale

subscale).

Self-efficacy and Perceived Barriers

Champion's Health Belief Model Scale (CHBMS) has been applied widely throughout the world in reliable breast cancer-related studies (Wang, Hsu, Wang, Huang and Hsu, 2014). To measure perceived barriers and self-efficacy, Champion's revised Health Belief Model Scale (CHBMS) was used to collect data. The instrument and all items were adapted and adopted from those utilized in previous studies applying Health Belief Model to predict BSE (Tavafian et al., 2009).

Breast Self-exam Behaviors and Intentions

The items to measure BSE behavior in the past year (BSE_P) were already established by Chouliara et al. (2004) and Chait et al. (2009). The intention to practice BSE in the next year (BSE_F) was also developed by Luszczynska and Schwarzer (2003), Chait et al. (2009), Abu Samah and Ahmadian (2014).

Results

The Statistical Package for Social Sciences (SPSS 21.0) as well as AMOS (v.21, IBM Corp) was used for data analysis. After confirmatory factor and descriptive analyses were conducted on the data, both Pearson correlation and Regression analyses were conducted to examine the study variables. Structural modeling was used to test whether associations between body image subscales, self-efficacy, and barriers to self-exams predicted the likelihood of past BSEs and intention to practice BSEs in the future.

Model Fit

The analysis of structural equation modeling using AMOS 21 showed that the structural model is fit, which means the model fits the data as illustrated by the following Goodness-of-Fit indices in the figure 1 below; χ^2 (CMIN)=83.050 (df=17), p=0.000, relative χ^2 (CMIN/df)=4.885, AGFI=0.884, GFI=0.976, CFI=0.903, IFI=0.906, NFI=0.905, and RMSEA=0.034. Conventionally, relative χ^2 (CMIN) should be<0.5, while AGFI, GFI, CFI, IFI and TLI should be>= 0.9 (Bentler, 1990; Bentler, 1992; Hu and Bentler, 1999;

Byrne, 2010) and RMSEA<0.08 (Browne and Cudeck, 1989; MacCallum et al., 1996; Byrne, 2010). According to Hair, Black, Babin and Anderson (2009) if any 3 or 4 of the Goodness-of-Fit indices are within the threshold then the entire model is fit. Taken together, the structural model for this study fits the data well. Moreover, the result produced by the structural model showed that, 10% and 91% of variances in BSE_P and BSE_F respectively, were explained by all the predictor variables entered into the structural model.

Pearson Correlation Analysis

Pearson correlation analysis was performed to determine the relationship between endogenous variables and (BSE_P). The results of the analysis in the table 1 shows that there is a significant, positive relationship between AE (r=0.149, p<0.01), OWP (r=0.084, p<0.05), and SE (r=0.362, p<0.01) and BSE_P. The analysis further revealed significant negative relationships between BR (r=-0.260, p<0.01) and BSE_P. However, the analysis indicated that, there is no significant relationship between AO (r=0.028, p>0.05), BAS (r=0.046, p>0.05) and SCW (r=0.036, p>0.05), and BSE_P.

Consistent with prediction, the Pearson correlation analysis showed significant positive relationship between AE (r=0.117, p<0.01), AO (r=0.087, p<0.05), and SE (r=0.164, p<0.01), and BSE_F. On the other hand, the result also revealed a negative relationship between BR_M (r=-0.270, p<0.01) and BSE_F. In contrast, the finding indicated that there is no significant relationship between BAS (r=0.038, p>0.05), OWP (r=0.034, p>0.05), SCW (r=0.033, p>0.05), and BSE_F.

Correlational analyses were done to test the assumptions that the average endogenous variables score would be positively/negatively related to the measures of past BSE behaviors and future BSE intentions.

Regression Analysis

Structural equation modeling was used to estimate the significant influence of the predictor variables on the criterion constructs; past BSE behavior (BSE_P) and future BSE intention (BSE_F). With regard to (BSE_P), the result indicated significant influences of appearance
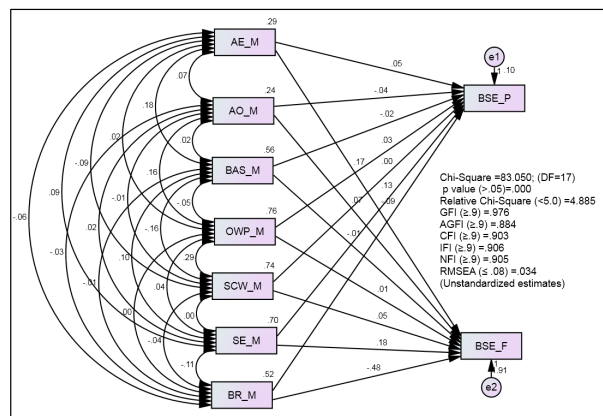

Figure 1. Goodness-of-Fit Indices

Table 1. Correlational Analyses of MBSRQ Subscales, Self-efficacy, Barriers with Self-exams Behaviors

Variables	Correlation Coefficient (r)	
	BSE_P	BSE_F
AE_M	0.149**	0.117**
AO_M	0.028	0.087*
BAS_M	0.046	0.038
OWP_M	0.084*	0.034
SCW_M	0.036	0.033
SE_M	0.362**	0.164**
BR_M	-0.260**	-0.270**

**. Correlation is significant at the 0.01 level (2-tailed); *. Correlation is significant at the 0.05 level (2-tailed); Note: BSE_P: Past Breast self-exam Behavior; BSE_F: Future Breast Self-exam Intention; AE –M: Appearance Evaluation; AO_M: Appearance orientation; BAS_M: Body Areas Satisfaction; OWP_M: Overweight Preoccupation; SCW_M: Self-Classified Weight; SE_M: Self-efficacy; BR_M: Barriers

Table 2. Unstandardized and standardized regression weight in the hypothesized path model

Hypothesized relationships			(B)	S.E	(β)	CR	p
BSE_P	←	AE_M	0.054	0.024	0.084	2.278	0.023
BSE_P	←	AO_M	-0.038	0.025	-0.054	-1.509	0.131
BSE_P	←	BAS_M	-0.017	0.016	-0.037	-1.039	0.299
BSE_P	←	OWP_M	0.032	0.015	0.081	2.171	0.03
BSE_P	←	SCW_M	0	0.014	0	0.009	0.993
BSE_P	←	SE_M	0.129	0.013	0.311	9.55	0
BSE_P	←	BR_M	-0.094	0.015	-0.196	-6.064	0
BSE_F	←	AO_M	0.072	0.111	0.024	0.644	0.519
BSE_F	←	BAS_M	-0.011	0.072	-0.006	-0.149	0.882
BSE_F	←	OWP_M	0.012	0.065	0.007	0.186	0.852
BSE_F	←	SCW_M	0.047	0.064	0.028	0.74	0.459
BSE_F	←	SE_M	0.183	0.06	0.106	3.082	0.002
BSE_F	←	BR_M	-0.478	0.068	-0.238	-6.997	0
BSE_F	←	AE_M	0.165	0.105	0.062	1.578	0.115

*BSE_P:-; BSE_F:-; AE –M:-; AO_M:- ; BAS_M:-; OWP_M:-; SCW_M:-; SE_M:-; BR_M:-; CR: - Critical ratio; S.E:- Standard error; B: - Unstandardized Regression Weight Estimate; β: - Standardized Regression Weight Estimate

evaluation (AE) (β=0.084, p=0.023), overweight preoccupation (OWP) (β=0.081, p=0.030), self-efficacy (SE) (β=0.311, p=0.000), barriers (BR) (β=-0.196, p=0.000). But, the finding revealed no significant effects of appearance orientation (AO) (β=-0.054, p=0.131), body areas satisfaction (BAS) (β=-0.037, p=0.299), and self-classified weight (SCW) (β=0.000, p=0.993) on (BSE_P).

Likewise, the regression analysis to estimate the significant influence of independent variables on (BSE_F) showed that, only self-efficacy (SE) (β=0.106, p=0.002) and barriers (BR) (β=-0.238, p=0.000) were reported to have a significant contribution on (BSE_F). Conversely, appearance orientation (AO) (β=0.024, p=0.519), body areas satisfaction (BAS) (β=-0.006, p=0.882), overweight preoccupation (OWP) (β=0.007, p=0.852), self-classified weight (SCW) (β=0.028, p=0.459) and appearance evaluation (AE) (β=0.062, p=0.115) showed no significant effects on (BSE_F).

Discussion

In this sample study of female Malaysian students, health belief model factors (self-efficacy and barriers to behavior) predicted the likelihood of self-reports of breast self-exams and intentions to conduct breast self-exams in the future.

The study supported the premise that the health belief (HB) model can be applied in BSE research and intervention design for Malaysian populations. The health belief model (Champion and Scott, 1997) proposes that if one has high self-efficacy towards a health behavior, and low perceived barriers that would prevent that behavior, there will be more likelihood for the subject to perform the behavior.

Consistent with prior behavioral research applying the Health Behavior model in BSE contexts by Parsa et al. (2008), this study showed that both self-efficacy and perceived barriers may influence whether or not Malaysian women reported performing BSEs in the past, as well as the likelihood that they will perform breast self-exams in the future.

The findings from this study indicate that if a Malaysian female has self-efficacy towards conducting BSEs, and low perceived barriers for doing so, she will be more likely to report that she has conducted self-exams in the past and she will have a greater likelihood of conducting BSEs in the future. Self-efficacy was not only positively correlated with reports of past BSEs (r=0.362, p<0.01) and intention to conduct future self-exams (r=0.164, p<0.01), it statistically predicted self-reports of past breast self-exams (β=0.311, p=0.000), and intention to conduct future self-exams (β=0.106, p=0.002).

Perceived barriers were negatively correlated with self-reports of past BSEs (r=-0.260, p<0.01) and intention to conduct future self-exams (r=-0.270, p<0.01). There was also a predictive negative relationship between perceived barriers and past self-exams (β=-0.196, p=0.000) as well as the intention to conduct future BSEs (β=-0.238, p=0.000).

In this sample study of female Malaysian students, the body image subscale of appearance evaluation predicted the subjects' likelihood of past breast self-exam behavior, and was positively correlated with intention to conduct breast self-exams in the future

The body image sub-construct of appearance evaluation (AE) examines: "Feelings of physical attractiveness or unattractiveness; satisfaction or dissatisfaction with one's looks. High scorers feel mostly positive and satisfied with their appearance; low scorers have a general unhappiness with their physical appearance" (Cash, 2000).

Appearance evaluation (AE) was positively correlated with self-reports of past conduction of BSEs (r=0.149, p<0.01), and predicted the likelihood of past self-exam behavior (β=0.084, p=0.023). Appearance evaluation was also positively correlated with intention to conduct future self-exams, but did not show a predictive relationship with this intention (β=0.062, p=0.115). This finding was not surprising; women who are satisfied with themselves and their attractiveness were more likely to engage in the self-care practice of BSEs previously and were more likely to do so in the future.

In this sample study of female Malaysian students,

the body image subscale of overweight preoccupation predicted the likelihood of past breast self-exam behavior, but was not correlated with intention to conduct breast self-exams in the future.

Overweight (OWP) assesses one's "fat anxiety, weight vigilance, dieting, and eating restraint" (Cash, 2000). OWP had similar results to appearance evaluation with regards to past BSE. Like appearance evaluation, OWP was positively correlated with self-reports of past BSEs (r=0.084, P<0.05) and predicted the likelihood of past BSEs (β=0.081, p=0.030). However OWP was not correlated with (r=0.034, p>0.05), and did not predict (β=0.007, p=0.852) intention to conduct future self-exams. It was puzzling to the authors why overweight preoccupation had such a strong relationship with prior self-exam behaviors, and had no relationship with intention to engage in future behaviors. The authors postulated that this may be caused in part by these women's general sense of unease and dissatisfaction (preoccupation) with their bodies; they may not wish to imagine themselves engaging with their bodies (through BSEs) in the future. Future studies should explore this finding further, to determine the biopsychosocial influences of OWP on BPE_F.

In this sample study of female Malaysian students, the body image subscale of appearance orientation did not show a correlation with self-reports of past breast self-exams but did show a positive correlation with the subject's intention to conduct breast self-exams in the future.

The body image sub-construct of Appearance orientation (AO) is described as:"The extent of investment in one's appearance. High scorers place more importance on how they look, pay attention to their appearance, and engage in extensive grooming behaviors. Low scorers are apathetic about their appearance; their looks are not especially important and they do not expend much effort to "look good" (Cash, 2000).

Appearance orientation (AO) and past BSEs (BSE_P) were not shown to have a statistically significant relationship. AO was not correlated with BSE_P (r=0.028, p>0.05), and it did not predict BSE_P (β=-0.054, p=0.131). However, appearance orientation and intention to conduct BSEs in the future did show statistical promise. AO was correlated with intention to conduct future BSEs (r=0.087, p<0.05) but did not predict this intention (β=0.024, p=0.519). The authors propose that this finding may indicate that those who expend a great deal of energy (invest) in their appearance may have not valued BSEs previously in their day-to-day lives, but that they would consider BSEs a potential "investment in themselves" in the future. Future studies and health promotion campaigns should examine this posit further.

In this sample study of female Malaysian students, the body image subscale of body area satisfaction showed no correlation with the subjects' past breast self-exam behavior nor with their intention to conduct breast self-exams in the future

Body Area Satisfaction (BASS) is a body image subscale similar to the appearance evaluation subscale (AO); however BASS taps satisfaction with discrete aspects of one's appearance. High composite scorers are generally content with most areas of their body. Low scorers are unhappy with the size or appearance of several areas. In this study of Malaysian female students, BASS did not correlate with BSE-P (r=0.046, p>0.05) and did not predict BSE-P (β=-0.037, p=0.299). In addition, BASS did not correlate with BSE-F(r=0.038, p>0.05), and did not predict BSE-F (β=-0.006, p=0.882). These findings were consistent with a prior study (Chait, Thompson, Jacobsen, 2008) which illustrated that there was no relationship between BASS and AE scores and measures of BSE behaviors or intentions. However, we found these results to be surprising, since prior work indicates that BASS and AE are strongly correlated (Cash, 2000). Further study is needed to explore the relationships of BASS, AE, and BP_P and BP_F.

In this sample study of female Malaysian students, the body image subscale of self-classified weight showed no correlation with the subjects' past breast self-exam behavior nor with their intention to conduct breast self-exams in the future

Self-classified Weight (SCW) is a body image subscale that "reflects how one perceives and labels one's weight, from very underweight to very overweight" (Cash, 2000). In this study of Malaysian female students, SCW did not correlate with past BSE (r=0.036, p>0.05) and did not predict it (β=0.000, p=0.993). In addition, SCW did not correlate with intention to conduct future BSE behavior (r=0.033, p>0.05) and did not predict it (β=0.028, p=0.459). This finding indicates that further research is needed to explore the relationship between a Southeastern Asian woman's self-classification of weight and the likelihood that she will perform BSEs (previously or in the future).

The study did have several limitations. First, although participants in the study represented nine universities from two Malaysian states, it did not include female students from other Malaysian and Southeastern Asian localities. Future studies should explore whether these findings are consistent with other university populations within Malaysia, within Asia, and cross-culturally. Future studies should also explore whether the findings are consistent with other Southeastern Asian populations, Asian populations, and Asian American populations.

Second, the participants were randomly selected and engaged in self-report measures; accuracy in self-reporting is an ongoing issue for all research studies, including BSE studies. Women may have been reluctant to report that they previously had breast cancer (a factor which would preclude them from participating in the study) and/or they may be reluctant to report their BSE behavior or lack thereof.

Third, the study utilized the short-form (34-item) version of the MBSRQ-AS, which analyzes the full version of multidimensional body self-relation questionnaire MBSRQ. Although this survey instrument has been statistically-validated, it does not capture the multi-dimensional view of the full MBSRQ instrument. Future studies can utilize the larger instrument to determine if these results would replicate to this multi-dimensional analysis of body image, in relation to past and future BSE behaviors.

Fourth, the study did not capture other socio-ecological factors beyond body image, self-efficacy, and perceived barriers. Future studies should explore other socio-ecological factors which may influence preventative health behaviors such as BSEs.

In conclusion, this study is the first of its kind to explore how the predicting variables of self-efficacy, perceived barriers, and body image factors can correlate with, and predict, self-reports of past BSE behaviors, and intention to conduct future BSEs among female students in Malaysia. The findings are promising; this study indicates that self-efficacy, perceived barriers, appearance evaluation and overweight preoccupation can predict the likelihood that a female Malaysian student has conducted previous self-exams. The study also indicates that self-efficacy and perceived barriers can predict the likelihood that she will conduct self-exams in the future.

Findings from this study indicate that both cognitive factors (self-efficacy and perceived barriers) as well as certain body image sub-scales predict the likelihood that female Malaysian students will report the conduct of past BSE behavior and/or the intention to conduct breast self-exams in the future. The study's structural modeling revealed that perceived barriers, self-efficacy, appearance evaluation and overweight preoccupation are significant predictors of past BSE behaviors among Malaysian female students.

These findings indicate that Southeastern Asian socio-ecological body ideals may influence a woman's body image, self-efficacy, and/or perceived barriers with regards to breast self-exam health behaviors. The results of this study can be applied in public health research and practice within Malaysia and in other Southeastern Asian and Islamic countries, in order to benefit the these populations.

Recommendations: Our findings provide support that future studies should investigate the ways that health behaviors and body image variables can potentially influence reports of past BSEs, and the intention to practice breast exams in the future. These findings can benefit policy makers and public health promotion strategists seeking to improve the health of female student populations, especially in Malaysian, Asian and Islamic populations, by providing insights into what variables to target to increase BSE behaviors and other breast self-care practices. These findings specifically suggest that health interventions promoting breast self-exams in Malaysia and other Southeastern Asian countries and/or Muslim populations should especially focus on: (1) the promotion of self-efficacy for BSE; (2) the reduction of perceived barriers to conducting these self-exams; (3) the awareness on obesity, body image and weight preoccupation and health seeking behaviors and (4) the enhancement of these women's appearance evaluations.

While the body image variables did not strongly predict future intentions to conduct BSEs, we believe that perceived personal appearance is a promising area for future research concerning early detection of breast cancers. This study explored female student populations in Malaysia, a predominantly Muslim country located in Southeastern Asia. Although reports indicate that Malaysian women are reporting an increase in breast self-exam activity as compared to 2006 (Dahlui et al., 2013; Rosmawati, 2011), there is still room for much improvement with regards to these populations' breast self-exam behaviors. Additional research is therefore needed to explore which biopsychosocial factors may positively influence Southeastern Asian women's adoption of breast self-exam behaviors.

One way to begin to understand the many factors that may influence breast self-exam behaviors amongst Southeastern Asian women, is through application of the Ecological Systems Theory (Brofenbrenner, 1989), often referred to as the "socio-ecological model" which emphasizes how an individual's health behavior is influenced not only by their individual attitudes, beliefs and values, but also by societal, community and relationship factors. When considered from this socio-ecological perspective, a woman's participation in BSEs is likely to be influenced by her attitudes, beliefs and values including body image factors. Moreover, this likelihood is also influenced by societal, community and relationship factors. The act of BSE is not just a personal (individual) physical and visual act (between a woman and her body); it is simultaneously a cultural act (influenced by norms surrounding the woman's sense of cultural identity) that has meaning for her both role/s in society and her role/s in her relationships.

When considering these multiple (individual, relationship, community and societal) meaning structures, a BSE becomes an act that has multiple meanings. It is not solely a private act of health behavior; it is influenced by a woman's relationships, role in her community, and cultural/societal norms. As noted by Millsted and Frith (2003):

"Women's breasts are invested with social, cultural, and political meanings…Breasts are seen simultaneously as a marker of womanhood, as a visual signifier of female sexualisation, [and] as synonymous with femininity." Millsted and Frith (2003, p. 455)

These sociocultural meaning structures, as well as her individualized roles in her major relationships (as daughter, mother, sister, friend, and colleague) will all influence her relationship with her body in general, and her breasts in particular.

Although the combination of these socio-ecological factors will present in individualized ways for every woman, trends with regards to these factors can be seen on both cultural and societal levels. One indicator of these socio-ecological factors is to consider cultural fashion norms. Although every woman makes her own unique fashion choices, she does so influenced by her social, cultural, political, religious and even relationship identities. Although her clothing may change depending upon the role that she plays, her overall fashion sense will remain generally consistent. This fashion sense therefore provides valuable insights into the socio-ecological factors that may influence her health behaviors, such as BSEs.

In Southeast Asia, women's clothing choices have traditionally indicated religious and/or cultural norms. Because there are changes currently underway with regards to women's roles in Malaysian society-transforming from the traditional Muslim role of subservience to one of civic

100.0	6.3
75.0	56.3
50.0	
25.0	31.3
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Newly diagnosed without treatment

and/or political activism -- women's fashion choices are in the midst of a transformation too. Traditionally, Malaysian Muslim women have worn garb that covers their body (as well as their hair and face) in order to indicate their religious practices of humility and service. Today, a Malaysian woman may choose to wear loose-fitting clothing as an act of comfort, and/or as an avowal of her religious status and/or as an expression of her femininity. Her choice may also indicate cultural and/or religious status within society. Although not all Southeastern Asian women follow the particular Muslim woman's fashion norms, this example illustrates at least some of the cultural differences surrounding Western vs. Southeast Asian fashion and behavior.

Findings from this study indicated that both self-efficacy and perceived barriers to breast self-exams were significant psychological factors that influenced adoption of BSEs in the past and intentions to engage in BSEs in the future. These results suggest that health promotion interventions that help enhance self-efficacy and reduce perceived barriers have the potential to increase the intentions of Malaysian women to perform breast self-exams, which can promote early detection of breast cancers. Future research should evaluate targeted communication interventions for addressing self-efficacy and perceived barriers to breast self-exams with at-risk Malaysian women (Kreps and Sivaram, 2008).

Acknowledgements

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