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Development and Validation of Breast Cancer Knowledge and Beliefs Questionnaire for Malaysian Student Population

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ABSTRACT

This study aimed to develop and validate a questionnaire on Malaysian students' knowledge and belief toward breast cancer and breast cancer screening. A cross sectional study was conducted among 792 female undergraduate students in selected public universities in Klang Valley, Malaysia. Convergent and discriminant validity tests were used for assessing construct validity of the questionnaire while the internal reliability of the instrument was checked by Cronbach's alpha. The average age of respondents was 22 years (21.77± 1.20). Majority of them were single (96.8%), Malay (91.9%), and Muslim (94.6%). This instrument had a good face and content validity. Cronbach's alpha coefficient for Health Belief Model Scales ranged between 0.73-0.83, indicating acceptable levels of internal consistency. The Kappa value for the knowledge part ranged between 0.52-0.90, also showing acceptable reliability. The developed instrument indicated good construct validity and reliability for Malaysian female students. This instrument can help health care planners and providers to measure levels of knowledge and beliefs of Malaysian women toward breast cancer before planning appropriate intervention.

Keyword: Breast cancer, breast cancer screening, Malaysia, validity

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INTRODUCTION

In 2012, nearly 1.7 million cases of breast cancer diagnosed in worldwide and make it the major cause of death and most of common cancer among women in developing countries (Akhtari-Zavare, Juni, Irmi, Said, & Latiffah, 2015; World Cancer Research Fund International, 2017). In Malaysia, breast cancer is the most common cancer and main cause of cancer deaths among females (Parsa, 2008). The National Cancer Registry revealed that there are 11,952 female breast cancer cases, which account for 31.3 % of all cancer cases registered (National Cancer Registry Malaysia, 2008).

As in other developing countries, in Malaysia the rate of breast cancer is lower than that of the developed countries, but 50-60% of breast cancer patients are diagnosed in late stages (stage III & IV) (Hisham & Yip, 2004). Patients' low level of knowledge about breast cancer and breast cancer screening (BCS) (Akhtari-Zavare et al., 2016) are the causes for the low rate of performing breast cancer screening test among females (Akhtari-Zavare, Juni, Irmi, Said, & Latiffah, 2015a, Akhtari-Zavare, Lattifah, Juni, Said, & Irmi, 2015b). Social and cultural perception of breast cancer (Hisham & Yip, 2003) and low access to treatment centres in urban areas (Yip, Pathy, & Teo, 2014) are found to be main reasons for late diagnosis of breast cancer in Malaysia. Studies conducted on different groups in Malaysia showed low level of knowledge which was between 40% and 71% and breast self-examination (BSE) practice ranged from 19.6% to 36.7 %, respectively (Akhtari-Zavare, Latiff, Juni, Said, & Irmi, 2015c; Rosmawati, 2010). In Malaysia, many studies highlight the need for breast health education among Malaysian women to increase their awareness about breast cancer and BCS test and to educate them to report any abnormalities in their breast to the healthcare workers (Akhtari-Zavare et al., 2016; Ghanbari-Baghestan, Indriyanto, SazmandAsfaranjan, & Akhtari-Zavare, 2016; Radman et al., 2012).

Early detection of breast cancer, which can be diagnosed by mammography, clinical breast examination (CBE), and breast self-examination (BSE), can result in lower mortality rate and more effective treatment (Ersin & Bahar, 2013; Yilmaz, Bebis, & Ortabag, 2013). Reportedly, the five-year survival rate among breast cancer patients increased from 93% to 100% when detected in stages I or II while it decreased to 72%-22% when detected in stages III or IV (American Cancer Society, 2013). There are doubts about the efficacy of BSE (Babu et al., 2011). The results from two large randomized control trials in Shanghai, China and St, Petersburg, Russia have failed to show any impact of the BSE technique on breast cancer mortality or on the stage or size of the cancer when detected (Thomas et al., 2013; Semiglazov, Sagaidak, Moiseyenko, & Mikhailov, 1993). However, BSE is recommended for raising breast health awareness among women because it is cheap, simple, and easy to learn with

no need to sophisticated technology (Babu et al., 2011). Additionally, it provides opportunity for women who are familiar with normal breast, notice any changes in their breast, and search for CBE and mammography screening guideline later in life (Akhtari-Zavare, Ghanbari-Baghestan, Latiffah, Matinnia, & Hoseini, 2014; Anderson, Braun, & Carlson, 2003; Secginli & Nahcivan, 2006).

Due to the known association between low level of breast cancer and BCS test and advanced clinical stages of breast cancer (Akhtari-Zavare et al., 2015a, 2016), it is important to evaluate women's knowledge on breast cancer and their ability to conduct breast cancer screening test. It is similarly crucial to investigate the related factors that cause Malaysian females to procrastinate their breast cancer tests. In this paper, we report the development and validation of a questionnaire to measure Malaysian female students' knowledge of breast cancer and breast cancer screening as well as their beliefs regarding performing breast cancer screening.

METHODS

Study Design

A cross-sectional study was conducted among undergraduate female students in four public universities in Klang Valley, Malaysia. The participants of this study were; (1) Malaysian citizen, (2) aged 20 and above, (3) with no history of breast cancer, and (4) not pregnant or breastfeeding.

Sampling Method and Data Collection

Multistage random sampling was used to select the respondents. Four universities out of six public universities in Klang Valley were chosen by simple random number table. Then, from each of these four public universities one faculty was selected by simple random sampling. List of female students which had inclusion criteria were used as sampling frame for this study; and 820 respondents were randomly selected from sampling frame by using simple random number table.

Data were collected via self-administered dual-language questionnaire from January to April 2011. Before data collection, an information sheet containing the aim and detailed information of study was given to the students and a participant's completion of the questionnaire was considered to constitute her written consent.

Construction of Questionnaire

The questionnaire was developed based on the previous research publications (Dundar et al., 2007; Parsa, 2008) and a review of the current material containing knowledge of breast cancer screening (CBE, mammography, BSE), knowledge of breast cancer and health belief model. It was decided to divide the questionnaire into two sections. The first section (Section A) included four sub-scales (knowledge of risk factors in breast cancer, knowledge of symptoms in breast cancer, knowledge of BSE and CBE). Nominal scale of "True", "False" and "I do not know" were used to

measure responses. Participants were scored one mark for each correct answer and zero for every wrong or 'I don't know' response.

The second section (Section B) was adapted from Champion's Revised Health Belief Model Scale (CHBMS) which assesses respondents' beliefs (Champion, 1993). This section included six sub-scales (susceptibility and seriousness of breast cancer, benefit of BSE, barrier of BSE, the confidence of doing BSE and health motivation). Likert scale one (strongly disagree) to five (strongly agree) were used to measure level of agreement of respondents.

Socio-demographic information included age, marital status, ethnicity, religious, and family monthly income, which were included at the end of the questionnaire.

Translation of Questionnaire

The back-translation technique was used for translating questionnaire. Two bilingual linguistic experts translated the questionnaire (health belief model scale and knowledge of breast cancer and breast cancer screening) from English into Malay. The experts met and reviewed the translations together for inconsistencies with the English form. Conceptual rather than literal translation was needed to preserve the meaning of each item, and these guidelines were provided to the translators. By using back-translation technique and content validity, the adequacy of the Malay translation of the questionnaire was evaluated; the Malay version of questionnaire was translated back into English by a bilingual individual from a health research center. The back-translated and English versions of the questionnaire were compared with attention given to the meaning and grammar. Finally, an expert committee (two professors from family medicine, one professor from community health, one nurse and one epidemiologist) examined all the translation and adaptation processes and provided the pre-final version of questionnaire.

Face Validity

Face validity is concerned with whether a measurement seems to be assessing the intended parameters (Norman & Streiner, 1994). Face validity was carried out on pre-final version of questionnaire by discussing the items individually with 10 students to establish brevity, clarity and simplicity of the questionnaire. The authors were evaluated all results which obtained from adaptation procedure; and then the final Malay version of questionnaire was developed.

Test–retest Reliability

The test-retest reliability was used to determine the reliability of knowledge part of questionnaire. The test-retest reliability was conducted among 80 female undergraduate students that did not participate in the main study with 14 days interval between the first and second administrations of the questionnaire.

Ethical Approval

The study protocol was approved by the Ethical Committee of Universiti Putra Malaysia, Ministry of Higher Education in Malaysia as well as the president of the selected public universities in Klang Valley, Malaysia.

Sample Size

The sample size of this study was calculated by using Daniel formula; based on the estimated prevalence of dependent variable in this study (Daniel, 1999). To calculate the sample size, in order to achieve 80% power, and based on the prevalence of breast cancer knowledge in Malaysia (11.2%) (Parsa, 2008), with 20% attrition rate, 792 respondents were required.

Statistical Analysis, Construct Validity of Questionnaire

Descriptive statistics (frequency, mean and standard deviation) were applied to summarize socio-demographic characteristics of the respondents. Convergent and discriminant validity were used for assessing construct validity of the questionnaire while its reliability was checked by Composite reliability. In this study the questionnaire consisted of two sections; "knowledge on breast cancer screening & breast cancer" and "health belief model". The first section (knowledge on breast cancer screening & breast cancer) included 4 sub-scales which are formative constructs and the second part (health belief model) was measured by 6 reflective constructs.

Convergent validity was used for "health belief model" based on the value of inter correlations (range from -1.00 to +1.00) for all 6 subscales (seriousness, severity, benefit, barrier, confidence and motivation). This provided evidence that all six items are related to the same construct (health belief model). For checking the validity of section A "knowledge on breast cancer screening & breast cancer", initially collinearity was checked based on VIF and Tolerance among all items, followed by assessing the significance and relevance of outer weights and outer loading of all items using Bootstrap method.

In this study the construct validity of both measurements (convergent and discriminant) were evaluated using SEM-PLS method applying smart-PLS Ver 2.

RESULTS

Out of 820 selected female students, 792 completed the questionnaire resulting in a response rate of 96.5%). The socio-demographic characteristics of the 792 participants who completed the questionnaire are summarized in Table 1. The average age of respondents was 22 (21.77± 1.20). Majority of them were single (96.8%), Malay (91.9%), Muslim (94.6%) with average family income of RM 5000.00 (4722.72±2126.72).

Table 1
Socio-demographic characteristics of respondents (n=792)

Variables	No	%
Age		
(Mean±SD)	21.77± 1.20	
Marital Status		
Single	767	96.8
Others	25	3.2
Ethnicity		
Malay	728	91.9
Non-Malay	64	8.1
Religious		
Islam	749	94.6
Non-Islam	43	5.4
*Family Income (RM)		
(Mean±SD)	4722.72±2126.72	

SD standard deviation, *USD1= RM4

Convergent Validity of Health Belief Model

The measurement model results for Health Belief Model showed that all items had an outer loading above 0.5 and were above the threshold except for two items, belonging to motivation (items 6 and 7) which had low factor loadings; therefore, these items were removed from the final measurement model. These results revealed that Composite Reliability (CR) was 0.820 to 0.900. In addition, in this study, convergent validity (AVE) for all the six subscales was above 0.5 (Table 2). Cronbach's alpha, which provides an estimate of internal reliability based on the inter-correlations of the observed indicator variables, also was more than the threshold (0.7). Thus, the results prove that convergent validity (AVE) and Composite Reliability (CR) exist for the constructs of this study. The p values for factor loading were calculated through Bootstrap method and the results were significant for all items.

Table 2
Results summary for Measurement Model of Health Belief Model (Convergent validity)

Construct	Item	Loading	p value	AVE	Composite Reliability	Cronbachs Alpha
Barrier	BAR1	0.616	<0.001	0.533	0.872	0.830
	BAR2	0.757	<0.001			
	BAR3	0.781	<0.001			
	BAR4	0.770	<0.001			
	BAR5	0.778	<0.001			
	BAR6	0.661	<0.001			

Table 2 *(continue)*

Construct	Item	Loading	p value	AVE	Composite Reliability	Cronbachs Alpha
Benefit	BEN1	0.747	<0.001	0.541	0.876	0.834
	BEN2	0.684	<0.001			
	BEN3	0.795	<0.001			
	BEN4	0.748	<0.001			
	BEN5	0.724	<0.001			
	BEN6	0.709	<0.001			
Confidence	CONF1	0.646	<0.001	0.475	0.900	0.879
	CONF2	0.731	<0.001			
	CONF3	0.718	<0.001			
	CONF4	0.720	<0.001			
	CONF5	0.691	<0.001			
	CONF6	0.684	<0.001			
	CONF7	0.697	<0.001			
	CONF8	0.619	<0.001			
	CONF9	0.680	<0.001			
	CONF10	0.697	<0.001			
Motivation	MOT1	0.804	<0.001	0.619	0.887	0.836
	MOT2	0.905	<0.001			
	MOT3	0.818	<0.001			
	MOT4	0.843	<0.001			
	MOT5	0.501	<0.001			
	MOT6*	0.119	----			
	MOT7*	0.082	-----			
Seriousness	SER1	0.602	<0.001	0.432	0.820	0.739
	SER2	0.648	<0.001			
	SER3	0.639	<0.001			
	SER4	0.683	<0.001			
	SER5	0.727	<0.001			
	SER6	0.639	<0.001			
Susceptibility	SUS1	0.619	<0.001	0.634	0.895	0.863
	SUS2	0.813	<0.001			
	SUS3	0.805	<0.001			
	SUS4	0.835	<0.001			
	SUS5	0.883	<0.001			

* Items were removed from the final model

Convergent Validity of Knowledge on Breast Cancer Screening and Breast Cancer

This measurement consisted of four subscales including breast self-examination, CBE, risk factors and symptoms of breast cancer. All the constructs were designed as formative construct due to independency among items.

The first step in evaluation of formative constructs is checking collinearity issues via assessment of Formative Measurement Models. First, collinearity among the indicators should be checked if there were high correlations between indicators of the same construct (Table 3).

Second, an indicator may not significantly contribute to the construct both relatively and absolutely. This can be evaluated by assessing the significance and relevance of the formative indicators for outer weight and outer load using Bootstrap method. The results indicated all items for these constructs showed significant contribution in related constructs with an exception of item 3, belonging to symptoms of breast cancer which was not statistically significant. Therefore this item was removed from the final measurement (Table 4).

Discriminant Validity

Discriminant validity is enough for all of the constructs; because AVE of each construct is more than each squared correlation between constructs (refer to table 5). Also, the correlations between the latent variables ranged from -0.198 to 0.340, which were below the threshold 0.85. The correlation

Table 3
Collinearity assessments for formative construct based on VIF and Tolerance

Construct	Item	Tolerance	VIF	Construct	Item	Tolerance	VIF
Clinical breast examination — Breast Self-Examination	BSE1	0.86	1.16	Risk factors in breast cancer	RF1	0.52	1.90
	BSE2	0.89	1.11		RF2	0.96	1.03
	BSE3	0.92	1.07		RF3	0.81	1.23
	BSE4	0.60	1.66		RF4	0.92	1.07
	BSE5	0.88	1.12		RF5	0.72	1.38
	BSE6	0.82	1.21		RF6	0.6	1.47
	BSE7	0.88	1.12		RF7	0.88	1.13
	BSE8	0.92	1.08		RF8	0.83	1.20
	BSE9	0.81	1.24		RF9	0.40	2.48
	BSE10	0.42	2.36	Symptoms of breast cancer	SYM1	0.39	2.52
	BSE11	0.34	2.86		SYM2	0.92	1.08
	CBE1	0.39	2.54				
	CBE2	0.50	1.97		SYM4	0.83	1.20
	CBE3	0.78	1.26		SYM5	0.29	3.37
	CBE4	0.79	1.26		SYM6	0.80	1.24

Table 4
Assessment of significance and relevance of outer weights and outer loading using bootstrap

Construct		Item	Outer weight	SE	t value	p value	Outer loading	SE	t value	p value
Breast Self-Examination		BSE1	-0.15	0.10	1.50	0.13	0.15	0.10	1.46	0.14
		BSE2	0.28	0.12	2.27	0.02	0.48	0.11	4.14	<0.001
		BSE3	0.21	0.11	1.94	0.05	0.38	0.11	3.29	0.001
		BSE4	-0.05	0.10	0.51	0.60	0.35	0.12	2.97	0.003
		BSE5	0.07	0.08	0.82	0.40	0.26	0.11	2.26	0.02
		BSE6	0.34	0.13	2.56	0.01	0.63	0.11	5.53	<0.001
		BSE7	0.07	0.09	0.85	0.39	0.33	0.12	2.66	0.008
		BSE8	0.17	0.10	1.59	0.11	0.41	0.11	3.55	<0.001
		BSE9	0.38	0.13	2.96	0.00	0.68	0.09	7.28	<0.001
		BSE10	0.39	0.16	2.38	0.01	0.61	0.10	5.95	<0.001
		BSE11	-0.02	0.12	0.21	0.82	0.56	0.10	5.26	<0.001
Clinical breast examination		CBE1	0.67	0.17	3.95	0.000	0.92	0.04	19.88	<0.001
		CBE2	0.47	0.14	3.28	0.001	0.89	0.05	17.18	<0.001
		CBE3	-0.07	0.09	0.76	0.44	0.37	0.13	2.78	0.006
		CBE4	-0.08	0.10	0.81	0.41	0.25	0.12	1.99	0.04
Risk factors in breast cancer		RF1	0.06	0.08	0.82	0.40	0.62	0.07	8.49	0.000
		RF2	0.23	0.10	2.20	0.02	0.35	0.11	3.15	0.002
		RF3	0.11	0.07	1.62	0.10	0.48	0.07	6.77	<0.001
		RF4	0.18	0.08	2.02	0.04	0.40	0.09	4.17	<0.001
		RF5	0.18	0.09	2.05	0.04	0.62	0.06	9.15	<0.001
		RF6	0.32	0.09	3.41	0.001	0.72	0.05	12.41	<0.001
		RF7	-0.04	0.06	0.64	0.51	0.17	0.09	1.97	0.04
		RF8	0.19	0.09	2.08	0.03	0.54	0.08	6.49	<0.001
		RF9	0.38	0.12	2.98	0.00	0.78	0.05	15.22	<0.001
Symptoms of breast cancer		SYM1	-0.43	0.18	2.34	0.01	0.12	0.11	1.13	0.25
		SYM2	0.62	0.09	6.93	0.00	0.76	0.07	10.91	<0.001
		SYM3*	-0.09	0.10	0.90	0.36	0.10	0.08	1.26	0.20
		SYM4	0.22	0.10	2.22	0.02	0.48	0.08	5.50	<0.001
		SYM5	0.37	0.18	2.00	0.04	0.38	0.11	3.22	0.001
		SYM6	0.50	0.11	4.54	0.00	0.66	0.08	7.82	<0.001

coefficients were less than the square root of the AVE for reflective constructs, demonstrating good discriminate validity between these factors (Kline, 2005).

Table 6 shows the result of test-retest reliability for knowledge of breast cancer and breast cancer screening. Based on the value of kappa, reliability was at an acceptable level. The high value of kappa related to knowledge of CBE (0.80-0.90) and lower value related to knowledge about risk factors of breast cancer (0.52-0.97).

Table 5
Correlation of latent variables and discriminant Validity

	BAR	BEN	BSE	CBE	CONF	MOT	RF	SER	SUS	SYM
BAR	0.73									
BEN	-0.02	0.73								
BSE	-0.12	0.17	Form*							
CBE	-0.11	0.15	0.25	Form*						
CONF	-0.09	0.25	0.21	0.15	0.68					
MOT	-0.14	0.34	0.25	0.10	0.10	0.78				
RF	-0.08	0.17	0.29	0.35	0.19	0.11	Form*			
SER	0.28	0.18	0.03	-0.02	-0.04	0.15	-0.04	0.65		
SUS	0.13	-0.05	-0.15	-0.01	-0.01	-0.19	0.06	0.05	0.79	
SYM	-0.14	0.09	0.33	0.30	0.13	0.13	0.34	0.04	0.00	Form*

*Form: Formative constructs, BAR barrier, BEN benefit, CBE knowledge clinical breast examination, BSE knowledge of breast self-examination, CONF confidence, MOT motivation, RF knowledge of risk factors breast cancer, SER seriousness of breast cancer, SUS susceptibility of breast cancer, and SYM knowledge of symptoms of breast cancer

Table 6
Result of test-retest reliability for knowledge part

Scales	Kappa value
Knowledge about risk factors of breast cancer	0.52-0.97
Knowledge about symptoms of breast cancer	0.70-0.97
Knowledge of clinical breast examination	0.80-0.90
Knowledge of breast self-examination	0.70-0.87

DISCUSSION

Early detection of breast cancer by improving female knowledge of breast cancer screening is important because of its reducing rate of morbidity and mortality (Kwok, Ogunsiji, & Lee, 2016). It is equally important to investigate women's knowledge and beliefs about BC and BCS as they play important roles among female to motivate them to doing health protection behaviour in different cultures and countries (Champion, 1994). This fact lends particular importance to the development of our questionnaire as the first step to early detection of BC is assessing patients' knowledge and beliefs towards breast cancer and BCS.

Construct validity of this instrument was checked by using convergent and discriminant validity and Cronbach alpha coefficients were used for checking the internal reliability of the questionnaire items (Unger-Saldaña, Peláez-Ballestas, & Infante-Castañeda, 2012). The result of the current study showed that the questionnaire

had good face validity, comprehensibility and good reliability for most items. This result is in line with studies conducted in Australia (Kwok et al., 2016) and Mexico (Unger-Saldaña et al., 2012).

The four factors in the Malaysian version of the knowledge construct are similar to those of Kwok et al. (2016) who investigated 284 African Australian women. Consistent with previous findings in Uganda (Elsie et al., 2010), Iran (Tilaki & Auladi, 2015), Malaysia (Akhtari-Zavare et al., 2015c) and Eastern China (Liu et al., 2014) this study had an acceptable and good kappa value for reliability of knowledge on breast cancer, BSE and CBE.

The result of this study showed that Modified version of Champion Health Belief Model is a suitable instrument for assessing belief of breast cancer screening and breast cancer among young female in Malaysia. The result is similar to that of a previous study by Parsa among Malaysian Teachers (Parsa, Kandiah, Nasir, Hejar, & Afiah, 2008). The Cronbach's alpha coefficients for all subscales of HBMS ranged from 0.73 to 0.83, showing acceptable and good levels of internal consistency. These results are similar with original version of CHBMS (Champion, 1993) and previous studies done in Malaysia (Akhtari-Zavare, Ghanbari-Baghestan, Latiffah, & Khaniki, 2015d), Turkey (Secginli & Nahcivan, 2004) and Jordan (Mikhail & Petro-Nustas, 2001).

This study had some limitation. Firstly, this study was conducted among Malaysian young educated women; therefore, its findings cannot be represented from the whole Malaysian female population. Secondly, this study used self-administered questionnaire with no objective measure to assess the women.

CONCLUSION

This study showed that the current questionnaire is a valid and reliable tool for evaluating knowledge of breast cancer screening and breast cancer and beliefs toward breast cancer screening among Malaysian women. This questionnaire can be used by health care planners and providers to understand level of knowledge and beliefs of Malaysian women toward breast cancer before planning appropriate intervention. It is recommended that the instrument be tested on culturally-diverse populations. The results of such tests would strengthen the generalizability of the current findings.

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REFERENCES

Akhtari-Zavare, M., Juni, M. H, Irmi, I. Z., Said, S. M., & Latiffah, A. L. (2015). Health beliefs and breast self-examination among undergraduate female students in public universities in Klang Valley, Malaysia. *Asian Pacific Journal of Cancer Prevention*, *16*(9), 4019–4023.

Akhtari-Zavare, M., Juni, M. H., Irmi, I. Z., Said, S. M., & Latiffah, A. L. (2015a). Barriers to breast self-examination practice among Malaysian female students: A cross sectional study. *Springer Plus, 4,* 692. doi: 10.1186/s40064-015-1491-8

Akhtari-Zavare, M., Juni, M. H., Said, S. M., Irmi, I. Z., Latiffah, L. A., & Eshkoor, S. A. (2016). Result of randomized control trial to increase breast health awareness among young females in Malaysia. *BMC Public Health*, *16,* 738. doi: 10.1186/s12889-016-3414-1

Akhtari-Zavare, M., Lattifah, L. A., Juni, M. H., Said, S. M., & Irmi, I. Z. (2015b). Predictors affecting breast self-examination practice among undergraduate female students in Klang Valley, Malaysia. *Journal of Obstetrics and Gynaecology Research, 41*(12), 1982-1987.

Akhtari-Zavare, M., Latiff, L. A., Juni, M. H., Said, S. M., & Irmi, I. Z. (2015c). Knowledge of female undergraduate students on breast cancer and breast self-examination in Klang Valley, Malaysia. *Asian Pacific Journal of Cancer Prevention, 16*(15), 6231-6235.

Akhtari-Zavare, M., Ghanbari-Baghestan, A., Latiffah, L. A., & Khaniki, H. (2015d). Breast cancer prevention information seeking behavior and interest on cell phone and text use: A cross-sectional study in Malaysia. *Asian Pacific Journal of Cancer Prevention, 16*(4), 1337-1341.

Akhtari-Zavare, M., Ghanbari-Baghestan, A., Latiffah, L. A., Matinnia, N., & Hoseini, M. (2014). Knowledge of breast cancer and breast self-examination practice among Iranian women in Hamedan, Iran. *Asian Pacific Journal of Cancer Prevention*, *15*(16), 6531- 6534.

American Cancer Society. (2013). *Breast cancer fact and figure 2013–2014.* Atlanta, USA: American Cancer Society.

Anderson, B. O., Braun, S., & Carlson, R. W. (2003). Overview of breast cancer guidelines for countries with limited resources. *Breast Journal*, 9, S42-S50.

Babu, G. R., Samari, G., Cohen, S. P., Mahapatra, T., Wahbe, R. M., Mermash, S., & Galal, O. M. (2011). Breast cancer screening among females in Iran and recommendations for improved practice: A review. *Asian Pacific Journal of Cancer Prevention, 12*(7), 1647-1655.

Champion, V. L. (1993). Instrument refinement for breast cancer screening behaviors. *Nursing Research, 42,* 138-143.

Champion, V. L. (1994). Beliefs about breast cancer and mammography by behavioral stage. *Oncology Nursing Forum*, *21,* 1009-1014.

Daniel, W. W. (1999). *Biostatistics: A foundation for analysis in the health sciences* (7th ed.). New York, USA: John Wiley & Sons.

Dundar, P.E., Ozmen, D., Ozturk, B., Haspolat, G., Akyildiz, F., Coban, S., & Cakiroglu, G. (2007). The knowledge and attitudes of breast self-examination and mammography in a group of women in a rural area in western Turkey. *BMC Cancer*, *24*, 6-43.

Elsie, K., Gonzaga, M., Francis, B., Michael, K., Rebecca, N., Rosemary, B., & Zeridah, M. (2010). Current knowledge, attitudes and practices of women on breast cancer and mammography at Mulago Hospital. *Pan African Medical Journal, 5*(1), 1-19.

Ersin, F., & Bahar, Z. (2013). Barriers and facilitating factors perceived in Turkish women's behaviors towards early cervical cancer detection: A qualitative approach. *Asian Pacific Journal of Cancer Prevention*, *14*, 4977-4982.

Ghanbari-Baghestan, A., Indriyanto, S., SazmandAsfaranjan, Y., & Akhtari-Zavare, M. (2016). Preferred communication channels used by students to interact with their lecturers. *International Journal of Innovation and Learning, 19*(2), 227-241.

Hisham, A. N., & Yip, C. H. (2003). Spectrum of breast cancer in Malaysian women: Overview. *World Journal of Surgery*, 27, 921-923.

Hisham, A. N., & Yip, C. H. (2004). Overview of breast cancer in Malaysian women: A problem with late diagnosis. *Asian Journal of Surgery,* 27, 130-133.

Kline, R. B. (2005). *Principles and practice of structural equation modelling* (2nd ed.). New York, USA: The Guilford Press.

Kwok, C., Ogunsiji, O., & Lee, C. F. (2016). Validation of the breast cancer screening beliefs questionnaire among African Australian women. *BMC Public Health*, *16*, 117. doi: 10.1186/s12889-016-2793-7

Liu, L.Y., Wang, F., Yu, L. X., Ma, Z.B., Zhang, Q., Gao, D. Z., ... & Yu, Z. G. (2014). Breast cancer awareness among women in Eastern China: A cross-sectional study. *BMC Public Health*, 14, 1004. doi: 10.1186/1471-2458-14-1004

Mikhail, B. I., & Petro-Nustas, W. I. (2001). Transcultural adaptation of Champion's Health Belief Model scale. *Journal of Nursing Scholarship*, *33*, 159-165.

National Cancer Registry Malaysia. (2008). *Cancer incidence in Peninsular Malaysia 2003-2005*. Putrajaya, Malaysia: Ministry of Health Malaysia.

Norman, G. R., & Streiner, D. L. (1994). *Biostatistics: The bare essentials*. St. Louis, USA: Mosby.

Parsa, P. (2008). *Effects of educational interventions pertaining to knowledge, beliefs, practices on breast cancer screening behaviors among teachers in Selangor, Malaysia* (Unpublished doctoral dissertation), Universiti Putra Malaysia, Malaysia.

Parsa, P., Kandiah, M., Nasir, M. T. M., Hejar, A. R., & Afiah, M. Z. N. (2008). Reliability and validity of Champion's Health Belief Model Scale for breast cancer screening among Malaysian women. *Singapore Medical Journal, 49*(11), 897-903.

Radman, S. A., Ganasegeran, K., Alabsi, A. M., Abdul-Manaf, M. R., Sharea, I., & Kassim, S. (2012). Exploration of barriers to breast-self-examination amongurban women in Shah Alam, Malaysia: A cross sectional study. *Asian Pacific Journal of Cancer Prevention, 13,* 1627-1632.

Rosmawati, N. H. (2010). The usage and knowledge of mammography among women in sub-urban area in Terengganu, Malaysia. *Asian Pacific Journal of Cancer Prevention, 11,* 767–771.

Secginli, S., & Nahcivan, N. O. (2004). Reliability and validity of the Breast Cancer Screening Belief Scale among Turkish women. *Cancer Nursing, 27*(4), 287-294.

Secginli, S., & Nahcivan, N. O. (2006). Factors associated with breast cancer screening behaviors in a sample of Turkish women: A questionnaire survey. *International Journal of Nursing Studies, 43,* 161–171.

Semiglazov, V. F., Sagaidak, V. N., Moiseyenko, V. M., & Mikhailov, E. A. (1993). Study of the role of breast self-examination in the reduction of mortality from breast cancer: The Russian Federation/World Health Organization study. *European Journal of Cancer, 29,* 2039-2046.

Thomas, D. B., Gao, D. L., Ray, R. M., Wang, W. W., Allison, C. J., Chen, F. L.,… & Self, S. G. (2013). Randomized trial of breast self-examination in Shanghai: Final results. *Journal of the National Cancer Institute, 94,* 1445–1457.

Tilaki, K. H., & Auladi, S. (2015). Awareness, attitude, and practice of breast cancer screening women, and the associated socio-demographic characteristics, in Northern Iran. *Iranian Journal of Cancer Prevention*, *8*(4), e3429. doi: 10.17795/ijcp.3429

Unger-Saldaña, K., Peláez-Ballestas, I., & Infante-Castañeda, C. (2012). Development and validation of a questionnaire to assess delay in treatment for breast cancer. *BMC Cancer*, 12, 626. doi: 10.1186/1471-2407-12-626

World Cancer Research Fund International. (2017). *Breast cancer statistics*. Retrieved May 6, 2017, from http://www.wcrf.org/int/cancer-facts-figures/data-specific-cancers/breast-cancer-statistics.

Yilmaz, D., Bebis, H., & Ortabag, T. (2013). Determining the awareness of and compliance with breast cancer screening among Turkish residential women. *Asian Pacific Journal of Cancer Prevention*, *14*, 3281-3288.

Yip, C. H., Pathy, N. B., & Teo, S. H. (2014). A review of breast cancer research in Malaysia. *Medical Journal of Malaysia*, *69*(Supplement A), 8-22.