Knowledge of Breast Cancer and its Association with Preventive Practice Among Malaysian School Teachers

ORIGINAL

Abstract

Objective: The study aim was to investigate the association between knowledge of breast cancer and practice of breast self-examination (BSE) and having clinical breast examination (CBE) in a cross-sectional sample of 700 Malaysian secondary school teachers.

Methodology: A two-stage sampling frame was used; a simple random sample of 10 out of 24 schools was selected and all teachers within those schools were invited to participate. The following data were collected using a self-administered questionnaire (i) socio-demographic data, (ii) five knowledge categories: general knowledge of breast cancer, signs and symptoms, risk factors, mammography, recommended frequency of BSE and CBE, and (iii) practice of BSE and CBE.

Results: The response rate was 74% (518/700). Level of exercise was associated with BSE ($p=0.02$) and CBE ($p=0.01$), with exercise twice a week showing the strongest association compared to never exercising, OR=2.71 (95% CI=1.38-5.33, $p=0.004$) for BSE, OR=2.40 (95% CI=1.27-4.55, $p=0.007$) for CBE. Self-report of having an annual medical check up was associated with BSE, OR=2.13, (95% CI=1.29-3.52, $p<0.01$) and CBE, OR=2.41, (95% CI=1.57-3.70, $p<0.01$). Likelihood of practicing BSE improved with increasing total knowledge score (quartiles) in a dose dependent manner, Q2, OR =1.78 (95% CI 0.97-3.27), Q3OR =1.89 (95% CI 1.06-3.36), Q4OR =2.2 (95% CI 1.15-3.91, $p=0.02$) compared to the lowest quartile Q1 when adjusted for exercise and annual checkup. Knowledge of symptoms and signs was associated with BSE practice, OR =1.25 (95% CI 1.06-1.48, $p=0.009$) and CBE, OR =1.3 (95% CI 1.08-1.57, $p=0.005$) having adjusted for exercise and annual checkup (BSE and CBE) and age and marital status (CBE). General knowledge was also positively associated with BSE, OR=1.39 (95% CI 1.07-1.81, $p=0.01$) after adjustment though not with CBE ($p=0.41$). Knowledge of mammography was inversely associated

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with BSE however the association was not statistically significant OR =0.77 (95% CI 0.56-1.05, p=0.10).

Conclusion: Correct knowledge of symptoms and signs of breast cancer is the most important factor associated with BSE and CBE in Malaysian women after adjustment for other positive health behaviors. Knowledge of risk factors, mammography and recommended frequency of BSE and CBE were not associated with practice of BSE and CBE.

Keywords

Breast Cancer, Breast Self-Examination, Clinical Breast Examination, Malaysia.

Introduction

Breast cancer is the most common type of cancer among women worldwide and represents 14% of total cancer deaths in females in 2008. Although breast cancer prevalence in developed countries is more than developing countries, the majority of breast cancer mortality (69%) occurs in developing countries. It accounts for over one million of the estimated 10 million neoplasms diagnosed worldwide yearly.

In Malaysia, the National Cancer Registry (NCR) 2003-2005 reported an age-standardized rate (ASR) of 47.3 per 100,000. The incidence is highest in Chinese (59.9 per 100,000) followed by Indians (54.2 per 100,000) and Malays (34.9 per 100,000) [1]. The Penang Cancer Registry 2004-2008 reported an incidence of 48 per 100,000 [2]. The International Agency for Research in Cancer (GLOBOCAN) 2012 estimated the ASR of breast cancer in Malaysia as 38.7 per 100,000 with 5410 new cases in 2012 [3].

This high incidence of breast cancer requires high attention for health authorities. The knowledge and care-seeking attitude for breast cancer management is so low that majority of the affected patients present late in the hospital when little or nothing can be done again. This indicates a need for increased community awareness of methods for early detection of the disease [4]. Although breast cancer cannot be prevented, the risks of developing breast cancer can be minimized. Diagnosis of breast cancer during the early stage of the disease has

been positively linked to a decrease in mortality, morbidity and effective cost of management of the illness. There are various methods of early detection of breast cancer. These include: Breast self-examination (BSE), clinical breast examination (CBE) and mammography screening [4].

Early detection and prompt treatment offer the greatest chance of long-term survival [5-6]. Mammography, clinical breast examination and breast self-examination (BSE) are the secondary preventive methods used for screening in the early detection of breast cancer [7]. Cancer screening tests play a pivotal role in reducing breast cancer related mortalities [8]. The American Cancer Society (ACS) recommends CBE and mammography in the early detection of breast cancer [9]. According to ACS recommendations, women should know how their breasts normally feel and report any breast changes promptly to their health care providers. BSE is an option for women starting from the early 20 s [5, 10].

Although breast self-examination (BSE) as a screening method is controversial, it has been reported that this makes women more "breast aware", which in turn may lead to earlier diagnosis of breast cancer [11] and when a woman wants to perform BSE, she should receive instructions in the technique and periodically have her technique reviewed [12]. BSE is suitable and applicable than other methods for developing countries. It is safe, non-invasive and economic [13-14].

This study aim was to investigate the association between knowledge of breast cancer and practice of breast self-examination (BSE) and having clinical breast examination (CBE) in a cross-sectional sample of 700 Malaysian secondary school teachers.

Materials and Methods

This cross-sectional study was conducted among 700 secondary school teachers living and teaching in Shah Alam, Selangor, Malaysia. Shah Alam is located about 25 kilometers west of the country's capital, Kuala Lumpur. A two-stage sampling frame was used; a sample of 10 out of a total of 24 secondary schools in the area was randomly selected using simple random sampling (24 equal piece of papers with the same color were prepared and written on each piece the name of school. Then put the 24 pieces in one container. Then 10 pieces were chosen randomly, and all teachers within those schools were invited to participate. Male secondary school teachers, orthose with a personal history of breast cancer were excluded from this study. Datawere collected using a self-administered questionnaire which consisted of three sections:(i) socio-demographic data, (ii) knowledge of breast cancer (five categories) and (iii) practiceof BSE and CBE. Socio-demographic data included questions on age, race, marital status, level of education, income range Ringgit Malaysia (RM), residency, specialty in teaching, family history of breast cancer, lifestyle questions, alcohol consumption, frequency of exercise and undertaking annual medical checkup. The five knowledge categories comprised: general knowledge about breast cancer, knowledge of signs and symptoms, risk factors, mammography and recommended frequency of BSE and CBE, The questionnaire was distributed in English. Content and face validity of the questionnaire was established by opinion of an expert professor.A pilot study was carried out among 12 women to check face validity. Ethical approval of the study was first obtained from Unit Kajian of KementerianPelajaranMalaysia

(Research unit in Ministry of Education). After a month, permission was granted from the KementerianPelajaran Malaysia. Permission to conduct the research in the secondary schools was sought and obtained from Jabatan Pelajaran Negeri Selangor (State Department of Education). Information meetings were held with the teachers in the schools to explain the purpose of the study. Immediately before the questionnaire administered to them. Their anonymity and right to withdraw was ensured. Each participant signed a consent form. They also received a pamphlet about breast self-examination (BSE), subsequent to completion of the study questionnaires.

Analysis was performed using SPSS version 22.0. Descriptive and inferential statistics were computed for each variable. Separate knowledge scores were computed for each knowledge parameter. Each parameter was assigned equal weighting, (1 for each correct answer, 0 for each incorrect answer). Scores were summated for each of the five knowledge categories and an overall total score. To determine the effects of socio-demographic/lifestyle and knowledge on BSE and CBE practice logistic regression models using a basic ENTER and BACKWARD STEPWISE (Wald) models were developed with BSE and CBE practice as binary outcome measures. The co-varieties used in the model were the socio-demographic variables, mediantotal knowledge score, andmedianknowledge score for eachk nowledge category. To illustrate differencesin effect of high and low knowledge scores on BSE and CBE practice, total knowledge score was grouped into quartiles.

Results

The response rate from the 700 women invited to participate was 74.1% (519). Descriptive statistics are shown in **Table 1**. The majority (73.6%) were aged 30-49 years and were native Malay. Almost all were married, well-educated with an average income and lived and worked in urban areas. Almost one-fifth reported a positive family history of breast

Table 1. Socio-demographic and lifestyle characteristics of Malaysian School Teachers.

Variable	Total n	%	Practice BSE n	%	Practice CBE n	%
Age (n= 519)						
<29	94	18.1	67	17.9	22	12.4
30-39	202	38.9	137	36.6	63	35.6
40-49	180	34.7	141	37.7	72	40.7
50-59	43	8.3	29	7.8	20	11.3
Race (n= 519)						
Malay	471	90.8	338	90.4	156	88.2
Chinese	22	4.2	16	4.3	9	5.1
Indian	22	4.2	18	4.8	10	5.6
Others	4	0.8	2	0.5	2	1.1
Residency (n= 519)						
Urban	510	98.3	368	98.4	173	97.7
Rural	9	1.7	6	1.6	4	2.3
Marital status (n= 519)						
Single	45	8.7	29	7.8	9	5.1
Married	462	89.0	338	90.4	168	94.9
Engaged	6	1.2	2	0.5	0	
Divorced/ Widowed	6	1.2	5	1.3	0	
Education (n= 519)						
SPM/ Diploma	12	2.3	9	2.4	6	3.4
Degree	455	87.7	326	87.2	153	86.4
Master	52	10.0	39	10.4	18	10.2
Specialty (n=511)						
Science	160	31.3	119	32.5	52	30.2
Religion	48	9.4	33	9.0	17	9.9
Languages	139	27.2	97	26.5	49	28.5
Social Studies	164	32.1	117	32.0	54	31.4
Monthly income (n=467)						
1000-2000	32	6.9	21	6.2	6	3.8
2001-3000	168	36.0	123	36.6	55	34.4
3001-4000	149	31.9	111	32.9	60	37.4
4001+	118	25.3	82	24.3	39	24.4
Family history breast cancer (n= 519)						
Yes	99	19.1	64	17.1	27	15.3
No/Don't Know	420	80.9	310	82.9	150	84.7
BMI (n=431)						
Underweight <18.5	22	5.1	16	4.9	1	0.7

Variable	Total n	%	Practice BSE n	%	Practice CBE n	%
Normal 18.5-24.99	230	53.4	172	52.8	85	55.6
Over-weight 25-29.99	133	30.9	106	32.5	57	37.3
Obese 30+	46	10.7	32	9.8	10	6.5
Exercise/week (n= 519)						
Never	126	24.3	77	20.6	25	14.1
Once	197	38.0	143	38.2	66	37.3
Twice	96	18.4	79	21.1	41	23.2
Three times or more	100	19.3	75	20.1	45	25.4
Alcohol consumption (n= 519)						
Yes	3	0.6	2	0.5	0	
No	516	99.4	372	99.5	177	100.0
Annual Medical check-up (n= 519)						
Yes	168	32.4	141	37.7	86	48.6
No	351	67.6	233	62.3	91	51.4

cancer. Almost all women abstained from alcohol. Over two-fifths of women (41.6%) were overweight or obese. Almost a quarter reported never taking exercise and 37.7% reported taking exercise twice a week or more often. One-third of women reported having an annual medical check-up.

Older women (age 40-59) reported ever practicing BSE (76.1% vs 68.9%) and CBE (41.3% vs 28.7%) though the effect was only significant for CBE ($p=0.003$), BSE $p=0.07$. Married or engaged women were more likely to practice CBE than single women (35.9% vs 17.6%) $p=0.009$ but not BSE (ns). Although more women without positive family history of breast cancer reported practicing BSE than those with a family history (73.8% vs 64.6%), the effect was non-significant ($p=0.07$).

Taking any exercise compared to no exercise was strongly associated with BSE ($p=0.005$) and CBE ($p<0.001$). Obese women (21.7%) were less likely to have CBE than overweight (42.9%) or normal / underweight women (34.1%), $p=0.03$. BMI and BSE were not associated (ns). Having a medical checkup in the past year was strongly associated with both BSE ($p<0.001$) and CBE ($p<0.001$).

Table 2 shows the percentage of correct answers within each knowledge category. While 4 out of 5 women were aware that obesity is the commonest cause of death in Malaysian women and of the increased risk with age, 3 in 4 considered that

it only occurred in women and 9 out of 10 women thought it was transmissible.

While the level of knowledge around symptoms was high, in excess of 80%, knowledge around risk factors was mixed. Correct knowledge of risk factors

Table 2. Knowledge of Malaysian female secondary school teachers about breast cancer and risk factors (n= 431).

Variable	Total N	% correct	Practice BSE N	% correct	Practice CBE N	% correct
General Knowledge						
Only females have breast cancer	126	24.3	73	19.5	42	23.7
Breast cancer is transmittable	37	7.1	18	4.8	12	6.8
Breast cancer is the leading cause of death in Malaysian women	432	83.2	306	81.8	147	83.1
Risk of having breast cancer is >35 years old	434	83.6	315	84.2	160	36.9
Knowledge of Risk Factors						
Old age is a risk factor	212	40.8	138	36.9	56	31.6
Family history of breast cancer is a risk factor	493	95.0	356	95.2	172	97.2
Cigarette smoking is a risk factor	392	75.5	286	76.5	140	79.1
Low fat diet	91	17.5	69	18.4	31	17.5
Having first child after 30 years old	211	40.7	154	41.2	69	39.0
Early menses	188	36.2	151	40.4	71	40.1
Late menopause	203	39.1	145	38.8	67	37.9
Use oral contraceptive	133	25.6	96	25.7	47	26.6
Large breasts	76	14.6	42	11.2	21	11.9
Breast feeding	33	6.4	23	6.1	9	5.1
Knowledge of Symptoms						
Painless breast lump	440	84.8	316	84.5	147	83.1
Lump under armpit	468	90.2	343	91.7	168	94.9
Nipple discharge	427	82.3	319	85.3	160	90.4
Change in breast shape	413	79.6	302	80.7	149	84.2
Pain in breast region	412	79.4	300	80.2	146	82.5
Dimpling of breast skin	356	68.6	269	71.9	135	76.3
Knowledge of BSE and CBE						
Breast Self-Examination (BSE) is recommended for females once in 6 months	375	72.3	293	78.3	141	79.7
Clinical Breast Examination (CBE) is recommended for females once a year	412	79.4	317	84.8	157	88.7
Knowledge of mammography						
There is a potential risk of developing breast cancer from mammography	133	25.6	96	25.7	55	31.1
The most appropriate age for a first mammogram is age 35-45 years	357	68.8	268	71.7	131	74.0
Mammography should be carried out once a year	314	60.5	245	65.5	119	67.2

was <50% except for family history and cigarette smoking. Correct knowledge around the protective effect of breastfeeding was particularly poor. Predictably, correct knowledge of the recommended frequency of BSE and CBE was associated with BSE ($p<0.001$) and CBE practice ($p<0.001$). Three out of four women were unaware of the link between cumulative exposure to radiation from repeat mammography and potential cancer risk.

Correct knowledge of the lifetime risk of breast cancer was associated with CBE ($p=0.003$). Correct knowledge of symptoms and BSE and/CBE practice was significantly associated with early menses (BSE, $p=0.002$), large breasts (BSE $p<0.001$), lump under the armpit (CBE, $p=0.009$), nipple discharge (BSE $p=0.004$, CBE $p<0.001$), change in breast shape (CBE $p=0.06$) and dimpling (BSE $p=0.009$, CBE $p=0.007$).

Correct knowledge of the risks due to mammography was significant for CBE only ($p=0.04$), recommended age of first mammogram for BSE $p=0.02$, and recommended frequency of mammography for BSE ($p<0.001$) and CBE ($p<0.001$).

Incorrect knowledge around breast cancer occurrence by gender and transmission was associated with BSE ($p<0.001$) but not CBE (ns). Incorrect knowledge around older age being a risk factor for breast cancer was significantly associated with practice of BSE ($p<0.001$) and CBE ($p<0.001$).

Table 3 shows the univariate logistic model for the socio-demographic and lifestyle factors associated with self-reported practice of BSE and CBE. Criteria for entry set the significance level at 0.01. Co-variables associated with CBE practice but not BSE were: being Malay ($p=0.08$), living in an urban area ($p=0.05$) and being single, widowed or divorced (0.03).

Having an income in the second highest category (3,001-4,000) was associated with BSE (0.04) and CBE (0.06).

Level of exercise was associated with BSE ($p=0.03$) and CBE ($p=0.04$), with exercise twice a week showing the strongest association compared to ne-

ver exercising Unadj. OR=3.06 (95% CI=1.39-6.77, $p=0.004$) for BSE, OR=2.63 (95% CI=1.25-5.56, $p=0.006$) for CBE. Self-report of having an annual medical check up was associated with BSE, UnadjOR=1.97, (95% CI=1.09-3.54, $p=0.02$) and CBE, OR=1.99, (95% CI=1.21-3.28, $p=0.007$).

Table 4 shows the total and individual knowledge scores associated with BSE and CBE adjusted for the significant socio-demographic and lifestyle co-variables and age (multivariable analysis). Likelihood of practicing BSE improved with increasing total knowledge score (quartiles) in a dose dependent manner {Q2, OR =1.78 (95% CI 0.97-3.27), $p=0.06$ }, {Q3, OR =1.89 (95% CI 1.06-3.36, $p=0.03$), Q4, OR =2.12 (95% CI 1.15-3.91, $p=0.02$) compared to the lowest quartile Q1 when adjusted for age, income range, exercise and annual check up. Total knowledge score and CBE were not associated (ns). A higher knowledge of symptoms score was associated with BSE practice, OR =1.25 (95% CI 1.06-1.47, $p=0.009$) and CBE, OR =1.31 (95% CI 1.09-1.59, $p=0.004$) having adjusted for exercise and annual check up (BSE and CBE) and age and marital status (CBE). A higher general knowledge score was also positively associated with BSE, OR=1.39 (95% CI 1.07-1.81, $p=0.01$) after adjustment though not with CBE ($p=0.41$). Greater knowledge of mammography was inversely associated with BSE however the association was not statistically significant OR =0.76 (95% CI 0.56-1.05, $p=0.09$).

The best predictors of BSE were increasing overall Knowledge Score in a dose dependent manner, exercise particularly twice a week or more and having an annual check up. When separate scores are considered higher symptom scores/general knowledge scores with exercise and annual check up were the best predictors.

Only a high symptom score with exercise particularly twice or more per week increased the likelihood of CBE practice

Table 3. Socio-demographic and lifestyle factors associated with BSE and CBE.

Variable	N	BSE			CBE		
		\$OR	95% CI	p-value	\$OR	95% CI	p-value
Age	519	0.98	0.93-1.03	0.47	1.02	0.98-1.07	0.38
Race							
Malay	347	2.50	0.85-7.36	0.97	2.26	0.92-5.56	0.08
Non-Malay	31	1			1.00		
Residency							
Urban	371	2.52	0.26-24.8	0.43	11.92	0.97-146.8	0.05
Rural	7	1			1		
Marital status							
Single/Divorced/Widowed	30	1.04	0.38-2.79	0.95	5.05	1.22-20.94	*0.03
Married/Engaged	348	1			1		
Education							
SPM/Diploma	12	1			1		
Degree	455	1.57	0.31-8.01	0.59	0.52	0.10-2.77	0.44
Master	52	1.41	0.24-8.48	0.71	0.41	0.07-2.50	0.34
Specialty							
Science	132	1			1		0.58
Religion	37	1.18	0.48-2.88	0.72	1.62	0.70-3.78	0.26
Languages	95	0.89	0.44-1.81	0.74	0.86	0.44-1.67	0.66
Social Studies	114	1.03	0.48-1.67	0.73	1.03	0.57-1.86	0.92
Monthly income							
1000-2000	28	1			1		
2001-3000	147	1.77	0.66-4.77	0.26	3.86	0.76-19.73	0.11
3001-4000	119	3.21	1.04-9.93	*0.04	5.08	0.94-27.54	0.06
4001+	84	2.53	0.66-9.71	0.18	4.45	0.72-27.44	0.11
Positive family history							
Yes	68	1.03			0.89	0.47-1.68	0.71
No/ Don't Know	310	1	0.54-1.98	0.92	1		
BMI							
Under/ Normal weight	219	1			1		
Overweight /Obese	159	1.26	0.73-2.16	0.40	1.19	0.72-1.95	0.50
Exercise/week							
Never	85	1			1		
Once	146	2.01	1.09-3.71	*0.03	1.96	1.01-3.81	*0.047
Twice	79	3.06	1.39-6.77	*0.006	2.63	1.25-5.56	*0.01
Three times or more	68	1.67	0.79-3.49	0.18	2.71	1.26-5.87	*0.01
Alcohol consumption							
Yes	3	3.06	0.23-40.50	0.40	1.13E+9		0.99
No	516	1			1		
Annual Medical check-up							
Yes	123	1.97	1.09-3.54	*0.02	1.99	1.21-3.28	*0.007
No	255	1			1		

\$Unadjusted odds ratio. * p<0.05

Table 4. Total and individual knowledge scores associated with BSE and CBE.

Variable	N	BSE			CBE		
		^{\$} OR	95% CI	p-value	^{\$} OR	95% CI	p-value
Total Knowledge Score		1.09	1.00-1.18	0.06	1.07	0.98-1.16	0.12
Total Knowledge Score (Quartiles)							
Quartile (1) 8-13	98	1			1		
Quartile (2) 14-15	137	1.78	0.97-3.27	0.06	1.24	0.66-2.34	0.52
Quartile (3) 16-17	153	1.86	1.06-3.36	*0.03	1.47	0.80-2.71	0.22
Quartile (4) 18+	131	2.12	1.15-3.91	*0.01	1.63	0.89-3.03	0.12
Individual Knowledge Scores							
General Knowledge Score	467	1.39	1.07-1.81	*0.01	1.13	0.86-1.48	0.41
Risk Factor Score	467	1.06	0.92-1.21	0.42	0.98	0.85-1.11	0.70
Symptom Score	467	1.25	1.06-1.47	*0.009	1.31	1.09-1.59	*0.004
BSE, CBE Knowledge Score	467	0.73	0.44-1.23	0.24	1.03	0.62-1.69	0.919
Mammography Knowledge Score	467	0.76	0.56-1.05	0.09	1.09	0.8-1.49	0.58
^{\$} Adjusted for age, income range, exercise, annual check-up. ^{\$\$} Adjusted for age, marital status, race, residency, income range, exercise, annual check-up. *p<0.05							

Discussion

Breast cancer if detected early, is curable in 90% of the cases, but the tragedy is that most patients do not come to a doctor till there is very little that can be done. Breast self-examination has been recommended as an important method for early detection of breast cancer as in 85% cases there is five year survival rate when it is detected and treated early at the localized stage and the survival rate decreased to 56% once breast cancer is detected later with the involvement of regional lymph nodes [15].

Breast self-examination (BSE) is a simple, cost-free, and easily applicable method. BSE, although not having been shown to be effective in reducing mortality, is remarkably effective in increasing self-responsibility about health, encouraging adoption of preventive health behaviors, and creating awareness about breast cancer among women [16-17]. However, several studies conducted in Malaysia demonstrated lack of BSE practices [17].

This study reported that marital status significantly influenced the CBE practice. These may be due to the fact that married women were more

exposed to health care facilities and health care professionals during follow up at pregnancy and delivery. Several studies have indicated that marital status is a consistent correlate of breast cancer screening behavior [18-19]. A similar finding was indicated that performing BSE was significantly related to marital status and breast cancer screening programme [20].

Physical activity in breast cancer prevention may not have been disseminated widely enough, even if individuals had high knowledge about breast cancer risk. Exercise was associated with BSE and CBE. Similar studies reported that exercise is significantly influenced the practice of BSE [21-22]. Previous studies showed a low level of awareness about the role of physical activity in cancer prevention regardless of country or type of cancer [23-24]. In Japan, the Cancer Control Act which indicates the need to inform individuals about the effect of lifestyle including physical activity on health and cancer prevention [25] was implemented in 2007. Awareness is considered an essential first step in changing physical activity behavior [26]. Therefore, it may be especially important to make an effort to

increase women's awareness of the role of physical activity in breast cancer prevention. In addition, it would be necessary to design segmented information campaigns for people who respond differently to information. Regular physical activity and exercise habits are effective not only for breast cancer prevention but also for the prevention of other diseases. Thus there may be women, for example, without awareness of the effective role of physical activity in breast cancer prevention, but who take regular physical activity or exercise.

In current study, self-report of having an annual medical checkup was associated with BSE, (95% CI=1.29-3.52, $p<0.01$) and CBE (95% CI=1.57-3.70, $p<0.01$). Similarly, a study showed that women who previously had early screening had better knowledge scores, which indicates an effective interaction between awareness and screening [27]. This result also implies that well-conducted health education programs lead to better health practices [28].

Practicing BSE improves with increasing total knowledge score. Similarly Kaur and Walia, 2007 [29], observed that the students with higher qualification had better knowledge regarding BSE and their practices corresponded to their levels of knowledge. Thus an inference can be drawn that a need for continuing medical education for nursing professionals cannot be overemphasized. Levels of awareness have a definite binding on appropriate behavioural changes. Teachers as the main source of information regarding BSE has also been reported by the majority of the students (76.6%) in the present study followed by other sources such as friends, mother and media [29].

General knowledge was also positively associated with BSE, OR=1.39 (95% CI 1.07-1.81, $p=0.01$) and correct knowledge of symptoms and signs of breast cancer is the most important factor associated with BSE and CBE in Malaysian women after adjustment for other positive health behaviours. Breast cancer is preventable if detected early enough [30]. Symptom detection was the initial

step in the help seeking process. In this study, Knowledge of symptoms and signs was associated with BSE practice, and CBE. Lack of knowledge, not having any symptoms and being scared of getting diagnosed with breast cancer were the main barriers to practicing BSE [21- 22].

Although there is no clear evidence to support the efficacy of BSE in decreasing breast cancer mortality [31], "breast awareness is still important" [32]. Studies reported that self-awareness is more effective than BSE [32] and it appears that BSE training could provide an opportunity to increase women's knowledge about breast cancer in developing countries [33-34].

In this study 84.8% reported that Painless breast lump is one of the symptoms of breast cancer. Lower percentage was reported by Uche, 1999 [35] that only 32% of the women having knowledge of breast lump as a warning sign for breast cancer. More recent study found that only 21.4% women were aware of a painless breast lump as a common presentation of breast cancer [36]. However, another study reported that over 70% of the surveyed women were able to identify painless breast lump as symptoms of breast cancer [37].

Conclusions

Correct knowledge of symptoms and signs of breast cancer is the most important factor associated with BSE and CBE in Malaysian women after adjustment for other positive health behaviours. Knowledge of risk factors, mammography and recommended frequency of BSE and CBE were not associated with practice of BSE and CBE.

Conflict of Interests

The authors declare that there is no conflict of interests regarding the publication of this paper.

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