

RESEARCH ARTICLE

Predictors of Breast Cancer Screening Uptake: A Pre Intervention Community Survey in Malaysia

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Abstract

Introduction: Despite health education efforts to educate women on breast cancer and breast cancer screening modalities, the incidence of breast cancer and presentation at an advanced stage are still a problem in Malaysia. **Objectives:** To determine factors associated with the uptake of breast cancer screening among women in the general population. **Methods:** This pre-intervention survey was conducted in a suburban district. All households were approached and women aged 20 to 60 years old were interviewed with pre-tested guided questionnaires. Variables collected included socio-demographic characteristics, knowledge on breast cancer and screening practice of breast cancer. Univariate and multivariate analysis were performed. **Results:** 41.5% of a total of 381 respondents scored above average; the mean knowledge score on causes and risks factors of breast cancer was 3.41 out of 5 (SD1.609). 58.5% had ever practiced BSE with half of them performing it at regular monthly intervals. Uptake of CBE by nurses and by doctors was 40.7% and 37.3%, respectively. Mammogram uptake was 14.6%. Significant predictors of BSE were good knowledge of breast cancer (OR=2.654, 95% CI: 1.033-6.816), being married (OR=2.213, 95% CI: 1.201-4.076) and attending CBE (OR=1.729, 95% CI: 1.122-2.665). Significant predictors for CBE included being married (OR=2.161, 95% CI: 1.174-3.979), good knowledge of breast cancer (OR=2.286, 95% CI: 1.012-5.161), and social support for breast cancer screening (OR=2.312, 95% CI: 1.245-4.293). Women who had CBE were more likely to undergo mammographic screening of the breast (OR=5.744, 95% CI: 2.112-15.623), $p < 0.005$. **Conclusion:** CBE attendance is a strong factor in promoting BSE and mammography, educating women on the importance of breast cancer screening and on how to conduct BSE. The currently opportunistic conduct of CBE should be extended to active calling of women for CBE.

Keywords: Breast cancer - BSE - CBE - mammogram - predictors of breast cancer screening

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Introduction

Breast cancer is the most common cancer among women in Malaysia and the world (Ferlay et al., 2010; National Cancer Registry Report, 2011). Incidence of breast cancer on a global scale has increased from 641 000 in 1980 to 1 643 000 in 2010 with an annual increment of 3.1% (Forouzanfar et al., 2011). The age standardized ratio (ASR) of breast cancer incidence is much higher in countries in Western Europe, Australia and North America as compared to that in the South East Asian and African region (Ferlay et al., 2010). Since 1980, the mortality of breast cancer has also increased from 250 000 to 425 000 in 2010 with an annual increment of 1.8% (Forouzanfar et al., 2011). About 60% of the breast cancer deaths are occurring in developing countries (Jemal et al., 2011).

Breast cancer is known to present at a younger age among women in India, Taiwan, Malaysia and Singapore (Agarwal et al., 2007; Pathy et al., 2011) as compared to American (Jemal et al., 2010) and Dutch (Bastiaannet et al., 2010) women. Just over 50% of Malaysian breast

cancer cases are diagnosed in women aged under 50 years old (Yip et al., 2006) with those of Chinese ethnicity having the highest ASR (38.1 per 100 000 population) followed by those of Indian ethnicity (33.7 per 100 000) and those of Malay ethnicity (25.4 per 100 000 population) (National Cancer Registry Report, 2011). The cumulative probability of breast cancer incidence among Malaysian women has been increasing steadily from 3.9 in 1980 to 7.3 in 2010, but the cumulative probability of dying from breast cancer remains fairly constant at 1.5 (Forouzanfar et al., 2011). Around 40% of Malaysian breast cancer cases are of stage 3 or stage 4 (National Cancer Registry Report, 2011). A rise in the 5 year survival rate of breast cancer from 58.4% to 75.7% was observed in a two time period analysis in one centre in Kuala Lumpur (Taib et al., 2011).

Awareness and education on breast health issues have been identified as a key component of early detection, down staging symptomatic disease and initiation of early intervention of breast cancer (Yip et al., 2008). In a developing country of wide socio-cultural differences,

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women tend to have a lack of understanding and various misconceptions on breast cancer and its treatment (Leong et al., 2007) which contributes to late presentation. A lack of knowledge among Malaysian women with regards to breast issues have been studied among teachers (Parsa et al., 2008), sub-urban (Rosmawati, 2010) and urban (Abdul Hadi et al., 2010) population which creates a need to identify the areas in which the lack of knowledge is present, the factors which are related to this lack and how does it interact with the uptake of screening by women.

Despite health education efforts to educate women on breast health awareness including the awareness on the different screening modalities available, the incidence of breast cancer and presentation at an advanced stage is still a problem in Malaysia. Previous studies have shown that Malaysian women presents at an advanced stage at diagnosis of breast cancer with a larger tumour size as compared to other countries in the western region. In a study by Hisham and Yip (2004), involving two hospitals in an urban area namely Hospital Kuala Lumpur and University Malaya Medical Centre (UMMC), there were 50% to 60% and 30% to 40% of women respectively, whom presented at late stage at diagnosis (stage 3 and stage 4) whereby the median duration of symptoms before presenting was 3 months (Hisham and Yip, 2004). They also described that majority of the late stages was seen among the Malays and the average tumour size was reported to be 4.2 cm (Stage 3) and 5.4 cm (stage 4).

The delay in presentation of breast cancer can be attributed to many reasons where mostly they are related to the socio-cultural issues. According to Leong et al. (2007), in Sabah, presentation at advanced disease were associated with being a non-Chinese race, patients from rural area, those with income of less than RM1000 per month and the non-educated (Leong et al., 2007). It was also reported that the majority of those who defaulted treatment opted for traditional or alternative treatments (Yip et al., 2008; Taib et al., 2011).

Among other reasons documented in a study for the late presentation of breast cancer by Taib et al. (2007) was having fatalistic view of cancer and also opting alternative treatment for these patients are fear of surgery, influenced by their friends, thought that alternative treatment works, previous bad experience in hospital, financial problems, was afraid that she cannot work after the mastectomy, no time, have young children, prayer was sufficient, thought it was not a cancer and was shy to see the doctor (Taib et al., 2007).

According to the 2006 National Health and Morbidity Survey (NHMS III), the uptake of breast cancer screening for the 3 modalities available in Malaysia were 57% for breast self examination (BSE), 51% for clinical breast examination (CBE) and 7.5% for mammography. (Institute for Public Health (IPH), 2008) However, it was not specified as to whether those performing BSE did it regularly on a monthly basis and neither was it specified as to whether the CBE were done on an annual basis following local guidelines (Ministry of Health Malaysia, 2010). BSE is still recommended in Malaysia as a means of increasing awareness among women rather than as a screening tool (Ministry of Health Malaysia, 2010) as landmark studies

such as the Shanghai BSE trial has rejected the ability of BSE to reduce breast cancer mortality. Unlike women in the trial who are able to detect lumps of 2cm in size, BSE is still required in Malaysia to reduce the average lump size which stands at 4 cm (Taib et al., 2007; Yip et al., 2008). A previous study among a population of school teachers in Malaysia has found that only 19% performed BSE regularly, 25% attended CBE and 13.6% had mammography screening (Parsa et al., 2008) while another study among female staff in a tertiary academic institution reported 41% performing regular BSE, 26% attending CBE in the past 3 years and 23% having a previous mammogram screen (Dahlui et al., 2011). A study among Malaysian factory workers revealed that 24.4% of the studied population performed BSE on a monthly basis (Chee et al., 2003).

Women who are more confident in performing BSE, have greater knowledge of breast cancer, perceive greater benefits from BSE and have fewer barriers to BSE were more likely to perform BSE regularly in a study among Turkish women (Dundar et al., 2006). Others are motivated to do so if they feel convinced that it provides a sense of self-security (Yang et al., 2010). A trial on CBE in India with excellent participation, worker training, compliance to diagnostic confirmation and treatment completion has found significant down-staging and improving breast cancer fatality ratios (Mitra et al., 2010). In areas with limited resources such as Malaysia, CBE is encouraged for age groups at high risk to detect tumors at less advanced stages (Yip et al., 2008). This is supported by findings from a local study which found CBE to be associated with regular practice of BSE which enables women to notice changes to their breasts earlier (Dahlui et al., 2011). In view of the low attendance of mammography screening and other screening modalities even among Malaysian urban (Parsa et al., 2008; Dahlui et al., 2011) population, investigation on factors which influence their uptake is required.

Although marital status have been commonly identified by various studies (Goodwin et al., 1987; Osborne et al., 2005; Kravdal and Syse, 2011) as a positive factor in earlier cancer diagnosis and better survival, local studies (Parsa and Kandiah, 2010; Rosmawati, 2010) to date have not established any significant link between marriage and uptake of breast cancer screening. Attention should be given as the role of social support in improving screening behaviour needs to be further clarified.

Objectives

This study was conducted to determine the level of knowledge of breast cancer and the practice of breast cancer screening among women at the sub urban area. Factors associated with the practice of breast cancer screening were also investigated.

Materials and Methods

This was a cross sectional study, conducted to measure the level of knowledge and practice of breast cancer screening among women at the sub urban area. The data collected will be used as the baseline data

before the intervention on providing breast health education/promotion activities, including the training on breast self examination and community screening of breast abnormality by clinical breast examination are implemented; Mobile Unit for Health Education on Breast Cancer (MURNI), which is the collaborative project between the University of Malaya and the Breast Cancer Welfare Association of Malaysia (BCWA).

Women aged 20 to 60 years old were approached at their house and interviewed by a group of volunteered health professionals consisted of postgraduate doctors and nurses, guided by questionnaires that had been used in the study by Dahlui et al. (2011). Since this was a pre intervention study, a sub district which has several housing estates was conveniently selected. All the houses were visited at day time, after working hours and during the weekend to get as many women as possible. The variables collected were the socio-demographic characteristics, knowledge on breast cancer, practice of breast cancer screening, perception on whether the woman thinks that they could have breast cancer and the support that they think they would need should they have breast cancer.

Data Analysis

All data was entered into SPSS version 17. Questions to indicate knowledge of breast cancer were scored and the total score obtained was categorized into poor, moderate and good knowledge. Chi square test was performed to show whether the differences in the socio-demographic variables and knowledge were significant or otherwise, with the significant level set at $p < 0.05$. Student t test had been used to show the mean score of knowledge of the various groups (age, ethnic, marital status, etc). Univariate and multivariate analysis was also performed to look for predictors of breast cancer screening practice.

Table 1. Socio-demographic Variables

Characteristic	Frequency Percentage	
		(%)
Age Group	below 20	14 3.7
	20-29	64 16.8
	30-39	91 23.9
	40-49	88 23.1
	50-59	77 20.2
	60-69	30 7.9
	above 70	17 4.5
Ethnicity	Malay	210 55.1
	Chinese	112 29.4
	India	49 12.9
	Others	10 2.6
Educational Level	No formal education	25 6.6
	Primary School	120 31.5
	Secondary School	178 46.5
	Diploma	37 9.7
	Degree	20 5.2
	Post graduate	1 0.3
Occupational Status	Not working	228 59.8
	Working	153 40.2
Marital Status	Married	327 85.8
	Widowed	20 5.2
	Single/Never married	33 8.7
	Divorced	1 0.3

Results

A total of 381 women had been interviewed with the mean age of 42.7 years old (SD=14.2). The women were mostly those in the thirties and forties, of ethnic group Malay, had education up to secondary level, were married and currently having spouse living with them, and were housewives. The socio-demographic characteristics of the respondents are showed in Table 1.

Level Of Breast Cancer Knowledge

Generally the level of knowledge on common problems of the breast, causes and risks factors of breast cancer among the female respondents in the study was above average; 41.5% (158 out of 381). 13.1% and 36.7% of the respondents had poor and below average level of knowledge of breast cancer, respectively. Only 8.7% have good knowledge of breast cancer. The mean score for knowledge of breast cancer was 3.41 (SD1.609).

Table 2 shows that the mean score of breast cancer knowledge among the Chinese (2.79±1.502) were significantly lower than that of the Malay (3.80±1.573) ethnic group, ($p < 0.001$). Respondents in the twenties (3.81±1.489) and thirties (3.86±1.465) had high scores compared to other age groups, while women older than 70 years old had the lowest score (2.00±1.541), $p < 0.001$. There was an increasing trends of knowledge score as the level of education increases; respondents who received education at secondary up to university level were observed to have significantly better knowledge scores as compared to those who had primary education or none ($p < 0.001$). Women who were married and have a spouse did not have significantly better knowledge scores as compared to those who were never married or widowed.

Table 2. Distribution of Knowledge Scores

Variables	Knowledge score		p-value
	Mean ± SD	(95 % CI)	
Ethnic			
Malay	3.80±1.573	3.59-4.02	
Chinese	2.79±1.502	2.51-3.08	<0.001
Indian	3.16±1.637	2.69-3.63	
Others	3.20±1.033	2.46-3.94	
Age Groups			
Below 20	3.43±1.399	2.62-4.24	
20-29	3.81±1.489	3.44-4.18	<0.001
30-39	3.86±1.465	3.55-4.16	
40-49	3.40±1.608	3.06-3.74	
50-59	3.21±1.584	2.85-3.57	
60-69	2.53±1.697	1.90-3.17	
70 and above	2.00±1.541	1.21-2.79	
Highest Level of Education			
No formal education	2.40±1.780	1.67-3.13	
Primary education	2.68±1.450	2.41-2.94	<0.001
Secondary education	3.71±1.500	3.49-3.94	
Diploma	4.35±1.252	3.93-4.77	
Degree	4.70±1.218	4.13-5.27	
Marital Status			
Married	3.40±1.621	3.22-3.57	0.396
Single/never married	3.67±1.429	3.16-4.17	
Widowed	3.05±1.638	2.28-3.82	

Table 3. Factors associated with various screening practices

Variables	Screening practices		
	Never	Ever	p-value
BSE (n=381)			
Knowledge of breast cancer			
Average or poor	152 (43.7)	196 (56.3)	0.004
Good	6 (18.2)	27 (81.8)	
Marital status			
Not married/without partner	32 (59.3)	22 (40.7)	0.004
Married with partner	126 (38.5)	201 (61.5)	
CBE			
No	90 (50.8)	87 (49.2)	0.001
Yes	68 (33.3)	136 (66.7)	
Education level			
Primary and below	71 (49.0)	74 (51.0)	0.02
Secondary and higher	87 (36.9)	149 (63.1)	
Employment			
Not working	93 (40.8)	135 (59.2)	0.742
Working	65 (42.5)	88 (57.5)	
Social support			
No	31 (56.4)	24 (43.6)	0.015
Yes	127 (39.0)	199 (61.0)	
CBE (n=381)			
Knowledge of breast cancer			
Average or poor	168 (48.3)	180 (51.7)	0.021
Good	9 (27.3)	24 (72.7)	
Marital status			
Not married/without partner	34 (63.0)	20 (37.0)	0.009
Married with partner	143 (43.7)	184 (56.3)	
Education level			
Primary and below	72 (49.7)	73 (50.3)	0.326
Secondary and higher	105 (44.5)	131 (55.5)	
Employment			
Not working	107 (46.9)	121 (53.1)	0.821
Working	70 (45.8)	83 (54.2)	
Social support			
No	37 (67.3)	18 (32.7)	0.001
Yes	140 (42.9)	186 (57.1)	
Reluctant to consult Dr due to fear of breast cancer			
No	126 (43.0)	167 (57.0)	0.014
Yes	51 (58.0)	37 (42.0)	
Mammography (n=212)			
Knowledge of breast cancer			
Average or poor	168 (85.3)	29 (14.7)	0.883
Good	13 (86.7)	2 (13.3)	
Marital status			
Not married/without partner	18 (94.7)	1 (5.3)	0.226
Married with partner	163 (84.5)	30 (15.5)	
CBE			
No	95 (95.0)	5 (5.0)	<0.001
Yes	86 (76.8)	26 (23.2)	
Education level			
Primary and below	98 (84.5)	18 (15.5)	0.685
Secondary and higher	83 (86.5)	13 (13.5)	
Employment			
Not working	121 (83.4)	24 (16.6)	0.242
Working	60 (89.6)	7 (10.4)	
Social support			
No	25 (92.6)	2 (7.4)	0.256
Yes	156 (84.3)	29 (15.7)	

Symptom and Risk Factor Recognition

The most common symptom of breast cancer given by the respondents was having a painless lump (27.6%), a painful lump (17.6%) and pain in the breast (11.5%). A large proportion of respondents (37%) were not able to name any possible symptoms of breast cancer. However, 26% would go for check up if experiencing a painless lump, 17% if having a painful lump and 22% if having breast pain. Fewer respondents (23.6%) do not know any breast symptoms that would prompt them to go for a check up.

Table 5. Knowledge and screening practices

		Frequency Percentage (%)	
		Frequency	Percentage (%)
Knowledge scores	Poor (0-1)	50	13.1
	Below average (2-3)	140	36.7
	Above average (4-5)	158	41.5
	Good (6-7)	33	8.7
Screening	BSE	223	58.5
	Regular BSE	124	32.5
	CBE	204	53.5
	Mammography (>40 years)	31	14.6
Perceived susceptibility	Don't know	198	52
	No	109	28.6
Symptoms of breast cancer	Yes	74	19.4
	Painless lump	105	27.6
	Change in breast shape	13	3.4
	Nipple discharge	6	1.6
	Painful lump	67	17.6
	Breast pain	44	11.5
	Others	5	1.3
Problem that prompts to go for check up	Don't know	141	37
	Painless lump	99	26
	Change in breast shape	18	4.7
	Nipple discharge	13	3.4
	Painful lump	64	16.8
	Breast pain	84	22.1
	Others	13	3.4
Risk factors of breast cancer	Don't know	90	23.6
	Family history	87	22.8
	Ageing	63	16.5
	Obesity	13	3.4
	Smoking	18	4.7
	OCP	3	0.8
	Nulliparity	9	2.4
	Non-breastfeeding	36	9.4
	Others	36	9.4
	Don't know	116	30.4
Sources of information on breast cancer	Government health personnel	36	9.4
	Private health personnel	23	6
	Health campaign	30	7.9
	Health pamphlets	22	5.8
	Relatives	22	5.8
	Friends	41	10.8
	TV	56	14.7
	Radio	6	1.6
	Newspaper	12	3.1
	Never had information	133	34.9

Most of the women, 30.4% (116 out of 381 respondents) did not know any risk factor for breast cancer. Having family history of breast cancer is the most commonly identified risk factor for breast cancer (22.8%) followed by ageing (16.5%) and non-breastfeeding (9.4%). In this study, only 19% of women think that they are susceptible to breast cancer whereas the rest either disagree or are unsure. The common sources of information on breast cancer were from television (14.7%) and friends (10.8%). Government or private health personnel make up 9.4% and 6.0% of women's sources of breast cancer information respectively. However, also about 35% of the women claimed that they had never received information on breast cancer.

Uptake of Breast Cancer Screening

58.5% of the respondents (223 of 381 respondents) practiced BSE while the remaining 41.5% did not practice BSE. Among the women who practiced BSE, 55.6% (124) performed it at regular monthly intervals, 5% (19) performed at least once every 2 months and 21% (80) performed at least once in every 3 months. Uptake of CBE by nurse and CBE by a doctor among the respondents were

Table 4. Predictors of BSE, Regular BSE, CBE and Mammography

Variables	Univariate analysis		Multivariate analysis	
	OR (95 % CI)	p-value	OR (95 % CI)	p-value
Predictors of BSE				
Good knowledge of breast cancer	3.490 (1.405-8.666)	0.007	2.654 (1.033-6.816)	0.043
Married	2.320 (1.290-4.172)	0.005	2.213 (1.201-4.076)	0.011
Attended CBE	2.069 (1.367-3.131)	0.001	1.729 (1.122-2.665)	0.013
Education above primary	1.643 (1.080-2.500)	0.02	1.535 (0.989-2.383)	0.056
Working	0.933 (0.616-1.413)	0.742		
Social support	2.024 (1.136-3.606)	0.017	1.621 (0.889-2.955)	0.115
Age above 60	0.642 (0.348-1.184)	0.156		
Predictor of regular BSE				
Attended CBE	1.854 (1.194-2.879)	0.006		
Good knowledge of breast cancer	1.594 (0.771-3.296)	0.208		
Married	1.448 (0.756-2.775)	0.264		
Education above primary	1.062 (0.683-1.654)	0.788		
Working	1.010 (0.653-1.564)	0.964		
Social support	1.339 (0.709-2.531)	0.368		
Age above 60 years old	0.864 (0.444-1.681)	0.667		
Predictors of CBE				
Married	2.187 (1.208-3.962)	0.01	2.161 (1.174-3.979)	0.013
Good knowledge of breast cancer	2.489 (1.125-5.508)	0.024	2.286 (1.012-5.161)	0.047
Social support for BC screening	2.731 (1.492-4.998)	0.001	2.312 (1.245-4.293)	0.008
Reluctance to consult Dr due to fear	0.547 (0.338-0.887)	0.014	0.599 (0.363-0.986)	0.044
Education above primary	1.231 (0.813-1.863)	0.327		
Working	1.049 (0.695-1.581)	0.821		
Age above 60 years old	0.893 (0.485-1.645)	0.716		
Predictors of mammography				
Attended CBE	5.744 (2.112-15.623)	0.001		
Good knowledge of breast cancer	0.891 (0.191-4.157)	0.884		
Married	3.313 (0.426-25.759)	0.252		
Education above primary	0.853 (0.394-1.844)	0.686		
Working	0.588 (0.240-1.442)	0.588		
Social support	2.324 (0.522-10.350)	0.269		
Age above 60 years old	1.266 (0.526-3.050)	0.598		

40.7% (155 respondents) and 37.3% (142 respondents) respectively. Among the women who recalled their last CBE by a nurse, 58.6% had it in the past 1 year and 15.2% had it in the past 2 years. Among those who had CBE by a doctor, 54.3% had it in the past 1 year and 13.0% had it in the past 2 years. Overall uptake of CBE was 53.5% (204 respondents). Only 14.6% (31 respondents out of 212 aged 40 and above) ever had a mammogram screen.

The women were assessed on their timing of performing BSE in relation to their menses; majority (62.3%) of them performed BSE at anytime while 6.7% performed BSE during menses, 6.7% just before menses and 24.2% did BSE two weeks after menses. Most common reasons for doing BSE in those who did so was due to self awareness (74.0%), as advised by health professionals (10.8%), and influenced from health campaigns (7.2%). However, 85% (326 respondents) claimed to receive social support (encouragements) from their husbands to have their breasts screened.

A total of 158 respondents did not practice BSE, of which 37% stated that they did not perform BSE since there was no need because they practice healthy lifestyle, 20% said they did not have a family history of breast cancer so there is no need to do BSE, 17% had no confidence to perform BSE, 14% were too busy, 5% said they feel embarrassed to do BSE, while 4% blamed

forgetfulness.

Factors associated with the practice of breast cancer screening (BSE, CBE and mammogram)

Table 3 shows the predictors of regular BSE, CBE and mammography. Significant predictors of BSE were good knowledge of breast cancer (OR=2.654, 95% CI: 1.033-6.816, p=0.043), married (OR=2.213, 95% CI: 1.201-4.076, p=0.011) and attending CBE (OR=1.729, 95% CI: 1.122-2.665, p=0.013). The only predictor of regular BSE practice was attending CBE (OR=1.854, 95% CI: 1.194-2.879, p=0.006). Marital status, age and social support from husbands for breast cancer screening were not predictors of regular BSE practice. Predictors for CBE include being in a marriage (OR=2.161, 95% CI: 1.174-3.979, p=0.013), good knowledge of breast cancer (OR=2.286, 95% CI: 1.012-5.161, p=0.047), social support for breast cancer screening (OR=2.312, 95% CI: 1.245-4.293, p=0.008). However, women who were reluctant to consult doctors due to fear of breast cancer diagnosis were less likely do CBE; OR=0.599 (95% CI: 0.363-0.986), p<0.05. On performing mammography, having attended CBE was the only factor that was strongly associated with it; women who had done CBE were more likely to do mammographic screening of the breast (OR=5.744, 95% CI: 2.112-15.623), p<0.005.

Discussion

The ethnic distribution among respondents is more or less similar to the ethnic distribution in Selangor (Department of Statistics Malaysia, 2010). From this study, it was observed that majority of the respondents had average knowledge of breast cancer. Nevertheless, the percentage of women with good knowledge of breast cancer in this study was still larger than the percentage of women in other local studies (Parsa et al., 2008; Abdul Hadi et al., 2010). Similar to previous studies, most women knew that having a positive family history of breast cancer and age factor are risk factors of breast cancer (Akhigbe and Omuemu, 2009; Rosmawati, 2010). On the source of information regarding breast cancer, the mass media was found to be the main source of breast cancer information for women and this is common at other places either locally, (Parsa et al., 2008) or at overseas such in Saudi and Iran (Dandash and Al-Mohaimed, 2007; Montazeri et al., 2008). In view of this, the government should take advantage of the mass media to provide more information to women regarding breast health and cancer awareness. Effort should also be taken to reach out to the large proportion of women who did not have any specific means of obtaining information regarding breast cancer through opportunistic education on breast health issues and screening during routine consultations.

The levels of knowledge regarding breast cancer of the Chinese women were found to be the lowest among all ethnics, and about two thirds of the Chinese women had education below secondary level. It has also been shown that those with low education level had poor score on breast cancer knowledge, hence the lower score of breast cancer knowledge was poor among the Chinese women was most probably due to low educational level, rather than due to ethnic differences. Also, the lower score among the elderly (women age 60 years old and above) could be due to lower education level among them with 85% had only primary or no educational background at all. It had been reported by other local study that women who had education up to primary level or no education at all had significantly lower scores regarding knowledge of breast cancer as compared to those with secondary education and above (Abdul Hadi et al., 2010). These findings indicated that to increase the uptake of breast cancer screening among the women, first we need to provide or enhance their knowledge on breast cancer. Thus, the health education or promotion regarding educating women on breast cancer should be targeted among elderly women and a special approach should be given to the Chinese such as providing breast cancer education materials in Chinese language other than in Malay language only.

The proportion of women in this study performing BSE regularly was higher as compared to those in previous studies among local (Chee et al., 2003; Parsa et al., 2008) and other populations (Dundar et al., 2006; Montazeri et al., 2008). More women were found to have attended CBE and mammography compared to reports from previous studies (Dundar et al., 2006; Parsa et al., 2008). The uptake of each modality of screening was just slightly higher compared to the NHMS III. Recommendation from nurses

and doctors were the most commonly stated reason for women to perform BSE besides self awareness. Therefore, healthcare providers have to play a more active role in educating women about breast awareness and screening as this would lead to higher uptake of breast cancer screening practices (Dundar et al., 2006; Parsa et al., 2008). From this study, we observed that CBE attendance is a strong factor in promoting positive screening behaviour for the utilization of all other screening modalities. Through this study, we can also observe that women with social support from their husbands are more than two times more likely to attend CBE as compared to those who do not. This supports findings from previous studies which found marriage as a factor for earlier diagnosis of breast cancer (Goodwin et al., 1987; Osborne et al., 2005). It is therefore important to ensure that health promotion campaigns are able to address the need for increasing the awareness of breast cancer of not only the females but also their spouses.

In conclusion, CBE attendance is a strong factor in promoting BSE and mammogram of the breast. CBE educates women on the importance of breast cancer screening and on how to conduct BSE. The currently opportunistic conduct of CBE should be extended to active calling of women for CBE.

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