

ORIGINAL ARTICLE

Factors Associated with Breast-self Examination Practice and Mammogram Breast Density among Malaysian Women

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ABSTRACT

Introduction: Breast cancer is globally known to be the commonest cause of cancer-related deaths among women. Screening tools which include breast-self examination (BSE), clinical breast examination and mammography are well-recognised to aid the detection of breast cancer among high risk women. Thus, our study was aimed to evaluate breast cancer and BSE awareness and practice, and to perform mammography screening among women who attended community breast cancer awareness and screening programme. **Methods:** Data was collected cross-sectionally from 2,021 women during community services from September 2013 until December 2015. **Results:** Majority of the women had previously attended health education on breast cancer (56.3%) and had been taught BSE techniques (61.4%), but only 38.6% performed BSE monthly. Factors associated with regular BSE practice were older age, higher education level, being married, higher monthly income, had attended health education on breast cancer, and had been taught BSE techniques. A subset of 130 high-risk women had undergone mammography screening and majority had heterogeneously dense and normal mammogram findings. **Conclusion:** These findings suggested that regular breast cancer awareness campaigns is needed to strengthen breast cancer knowledge and to emphasise BSE techniques. Such campaigns should target younger women and those with low socioeconomic status.

Keywords: Breast cancer, Breast-self examination, Awareness, Mammography, Community

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INTRODUCTION

Breast cancer is globally known to be the commonest cause of cancer-related deaths among women (1). An increasing trend of breast cancer incidence involving the Asia Pacific region has been observed and it has become an increasing public health problem (2). In Malaysia, the breast cancer incidence rate among women was approximately 31.3%, contributing to 10.3% of medically certified death due to cancer (3,4). Indeed, it is essential to detect the disease early to reduce mortality and subsequently, improve patients' prognosis (5,6).

Breast-self examination (BSE) is an important and economical screening techniques for early breast cancer detection. Regular inspection and examination allows women to detect any changes that occur in the breast (5,6). Previous study reported that 46.8% breast cancer cases in Malaysia were detected by BSE, 31.1% by clinicians, and 3.1% by mammography examinations (7). The BSE procedure, although appears to be simple, non-invasive and less time consuming, can only be

performed with the right method to achieve and maintain the desired goal. Although BSE is important, it is still not regularly practised among women in Malaysia (8-12). Hence, identifying factors associated with BSE practice is important in order to plan an effective breast cancer awareness campaigns that could improve BSE practice among women.

Besides BSE and clinical breast examination, mammography is considered as the first line screening tool to detect breast cancer among high-risk women. Mammography is a low-dose radiographic examination that allows visualisation of the internal structure of the breast (13,14). Annual screening with mammography is recommended for women, starting at the age of 40 years old for general population, at age 25 to 30 years old for BRCA carriers, and at age 25 to 30 years or ten years earlier on the basis of family history for those with a first-degree relative having premenopausal breast cancer or for women with a lifetime risk of breast cancer $\geq 20\%$ (13,14). However, not all women have easy access to mammogram facilities especially those with low socioeconomic status and those living in rural areas.

One way to bridge the gap between lack of facilities and delivering health care is through community services in which health personnels will be able to reach out to the

community to deliver health intervention, education or screening. Several community services were conducted to deliver breast cancer awareness and screening in Seberang Perai district, Pulau Pinang, Malaysia. During the community services, data was collected to evaluate breast cancer and BSE awareness and practice, and mammography screening was performed via mobile mammography machine, to detect early breast cancer among high-risk women.

MATERIALS AND METHODS

Study Population

Data in this study was collected cross-sectionally during community services of breast cancer awareness and screening at Seberang Perai district, Pulau Pinang, Malaysia from September 2013 to December 2015. Women who attended the breast cancer awareness and screening programmes were informed and invited to participate in the study on a voluntary basis. After obtaining participants' consent, self-administered validated questionnaires were distributed which comprised of three sections: Section A covering the aspect of respondents' demographic information, Section B on the breast cancer and BSE awareness, and Section C on BSE practice. After completing the questionnaires, talks regarding breast cancer and BSE were delivered to the women. A demonstration session on BSE techniques was shown and a mammography screening was performed for women who were identified as high-risk group.

Mammography Screening and Interpretation

The mammography screening was performed inside a medical coach fixed with a mobile mammography machine and other facilities used for community services by our institution. Information on breast cancer risk factors was collected prior to screening examination. The risk factors include family history of breast cancer or ovarian cancer, previous history of atypia on breast biopsy (e.g. lobular carcinoma in situ and atypical hyperplasia), personal history of breast cancer or ovarian cancer, consumption of hormone replacement therapy, exposure to previous radiation therapy (on breast/chest area), history of nulliparous or delivery after the age of 30, history of first menarche before the age of 12, body mass index of more than 30, and smoking. Dedicated radiographers were present to perform mammography examinations.

All acquired images were interpreted independently by two blinded experts (radiologists). Consensus was obtained by joint reading in cases of discrepancy between both experts who have more than five years of experience in reporting mammogram. The mammogram findings in this study was reported using the Breast Imaging Reporting and Data System (BI-RADS) breast density as well as final assessment categories. The BI-RADS category was the standard measurement of imaging modalities. Breast density was categorised into

almost entirely fatty, fibroglandular, heterogeneously or extremely dense. For final assessment reporting, BI-RADS 0 represents incomplete and need additional evaluation using other imaging modality, 1 represents normal, 2 represents benign finding(s), 3 represents possible benign abnormality, 4 represents suspicious finding(s), 5 for highly suspicion of malignancy, and 6 for known biopsy-proven cancer. Further management was recommended based on this assessment category.

Statistical Analysis

Stata/SE version 14 was used for data interpretation and analysis (15). The mean and its standard deviation was reported for numerical variables. For categorical variables, the frequency and its percentage was listed. Factors associated with the BSE practice was identified using univariable and multivariable logistic regression analysis (No BSE practice vs monthly BSE practice), and for identification of factors associated with mammogram breast density, univariable linear regression analysis was conducted. The level of significance was set at P-value of <0.05 (two-tailed). Ethical approval to conduct this study was obtained from the Human Research Ethics Committee, Universiti Sains Malaysia. All subjects provided written informed consent prior to participation in the study.

RESULTS

Participants' Demography

A total of 2,021 women participated in the study during these breast cancer awareness and screening programmes. Their mean age (\pm standard deviation) was 36.4 (\pm 14.1) years old, ranged from 18 to 64 years old. The majority of the study subjects were younger than 30 years old (36%), were predominantly Malays (98.1%), had formal education up to secondary school (59.2%), were employed (58.8%), married (62.3%) and received monthly income between Malaysian Ringgit 1001 to 2000 (38.1%). Table I shows the participants' demographic characteristics.

Breast cancer and BSE awareness

Table II shows the breast cancer and BSE awareness among the study participants. Approximately 55.8% of the women had attended health education on breast cancer. The majority were aware that breast cancer is the commonest cancer to occur among women (68.8%), and early treatment is able to treat breast cancer (87.1%). On BSE practice, majority (69.3%) had heard about BSE and also aware that BSE can detect early breast cancer (91%). The most popular source of information regarding BSE for the women in this study was from health fair or campaign (49.5%) and reading materials such as magazines and newspapers (49.7%). The majority (61.6%) had been taught on BSE techniques.

Practice of BSE

Table III shows the practice of BSE among the

Table I: Socio-demographic characteristics of study participants (n=2,021)

Variables	n (%)
Age (Year)	36.4 (14.1) ^a
18 – 30	727 (36.0)
31 – 40	524 (26.0)
41 – 50	492 (24.3)
≥50	278 (13.8)
Race	
Malay	1982 (98.1)
Chinese	26 (1.3)
Others	13 (0.6)
Highest educational level	
None	38 (1.9)
Primary	113 (5.6)
Secondary	1197 (59.2)
Tertiary	673 (33.3)
Employment status	
Employed	1188 (58.8)
Unemployed	833 (41.2)
Marital status	
Single	700 (34.6)
Married	1258 (62.3)
Divorced	63 (3.1)
Monthly income	
< MYR 1000	268 (13.3)
MYR 1001-RM2000	769 (38.1)
MYR 2001-RM3000	740 (36.6)
>MYR 3000	244 (12.1)

^aMean (standard deviation)

MYR, Malaysian ringgit

Table II: Breast cancer and BSE awareness (n=2,021)

Variables	n (%)
Had attended health education on breast cancer	
Yes	1128 (55.8)
No	893 (44.2)
Aware that breast cancer is the commonest cancer among women	
Yes	1390 (68.8)
No	295 (14.6)
Don't know	336 (16.6)
Aware that early treatment can cure breast cancer	
Yes	1761 (87.1)
No	26 (1.3)
Don't know	234 (11.6)
Had heard about BSE	
Yes	1401 (69.3)
No	620(30.7)
Aware that BSE can detect early breast cancer	
Yes	1839 (91.0)
No	13 (0.6)
Don't know	169 (8.4)
Information source of BSE	
Health fair/campaign	1001(49.5)
Magazine/newspaper	1004 (49.7)
Health personnel	510 (25.2)
Friends	296 (14.7)
Family members	128 (6.3)
Had been taught on BSE technique	
Yes	1245 (61.6)
No	776 (38.4)

BSE, Breast-self examination

participants. Only 38.2% of the women in this study reported to perform monthly BSE. Approximately 62% of the women reported that they knew what to look for while performing BSE. Most of the women (60.8%) agreed that they should perform BSE on day seven to ten after menstruation. Most of the women reported that they knew the three positions to perform BSE (52.5%), knew BSE can be performed using vertical strip and circular technique (70.9%), and palpate with palm and minimum of three fingers during BSE. Most of the

Table III: Practice of BSE (n=2,021)

	Agree n (%)	Not Agree n (%)
I perform BSE monthly	38.2	61.8
Know what to look for while performing BSE	62.0	38.0
Perform BSE routinely can detect early breast cancer	70.3	29.7
Perform BSE on day 7-10 after menstruation	60.8	39.2
Know the three positions to perform BSE (lying down, standing in front of mirror, showering)	52.5	47.5
BSE can be done by vertical strip and circular technique	70.9	29.1
I palpate with palm and minimum of three fingers during BSE	62.6	37.4
I encouraged other people to practice BSE	57.6	42.4
I can find breast lump by myself	47.3	52.7

BSE, Breast-self examination

women also encouraged other people to practise BSE (57.6%). Only 47.3% reported that they were able to detect breast lump by themselves. However, when assessed on the BSE techniques, only 11.5% of the women correctly performed the vertical strip or circular technique, and only 11.1% correctly palpated with

Table IV: BSE techniques (n=2,021)

	Correct n (%)	Incorrect n (%)
Perform vertical strip or circular technique	11.5	88.5
Palpate with palm and three fingers	11.1	88.9

BSE, Breast-self examination

palm and three fingers (Table IV).

Factors associated with performing monthly BSE

Table V shows the factors associated with performing monthly BSE using logistic regression analysis. In univariable analysis, all factors (age, highest education level, marital status, employment status, monthly income, had attended health education on breast cancer, and had been taught BSE technique) were significantly associated with monthly BSE practice at 5% level of significance. In multivariable, all factors remained associated with BSE except employment status.

Mammography screening

A total of 130 women that were categorised as having high risk for breast cancer development underwent mammography screening. Majority of the women (98.5%) were married with mean age (\pm standard deviation) of 49.5 (\pm 6.5) years old.

Risk Factors for Breast Cancer

Of the 130 women, about 35% (n=46) had at least one risk factor in getting breast cancer. Table VI shows the frequency and percentage of the risk factors for breast cancer. It has been shown that the most frequent risk factors for the women in this study were body mass index more than 30 (14.6%) and family history of breast cancer (12.3%).

BI-RADS classification of breast density and final assessment of mammography

Table V: Factors associated with performing BSE monthly (n=2,021)

Variables	Simple logistic regression		Multiple logistic regression	
	OR (95% CI)	P-value	OR (95% CI)	P-value
Age group				
< 40	-	-	-	-
≥ 40	4.69 (3.86, 5.69)	2.0 x 10 ⁻¹⁶	2.74 (2.13, 3.54)	2.0 x 10 ⁻¹⁶
Highest education level				
Tertiary	-	-	-	-
Secondary	1.63 (1.34, 1.99)	1.5 x 10 ⁻⁶	1.76 (1.32, 2.34)	6.5 x 10 ⁻⁵
Primary	1.79 (1.19, 2.68)	6.1 x 10 ⁻³	1.55 (0.92, 2.64)	0.14
None	1.04 (0.51, 2.10)	0.92	1.65 (0.52, 5.27)	0.64
Marital status				
Married	-	-	-	-
Single	0.19 (0.15, 0.25)	2.0 x 10 ⁻⁶	0.40 (0.29, 0.54)	1.8 x 10 ⁻⁹
Divorce	0.61 (0.36, 1.03)	0.04	0.35 (0.15, 0.83)	0.02
Employment status				
Employed	-	-	-	-
Unemployed	0.83 (0.69, 0.99)	0.04	1.27 (0.98, 1.63)	0.12
Monthly income				
>MYR 3000	-	-	-	-
MYR 2001- RM3000	0.73 (0.54, 0.97)	0.023	0.69 (0.49, 0.99)	0.05
MYR 1001- RM2000	0.30 (0.22, 0.40)	1.9 x 10 ⁻¹⁵	0.27 (0.18, 0.40)	1.3 x 10 ⁻¹¹
< MYR 1000	0.80 (0.59, 1.14)	0.19	1.01 (0.65, 1.58)	0.72
Had attended health education on breast cancer				
Yes	-	-	-	-
No	0.54 (0.45, 0.64)	2.4 x 10 ⁻¹¹	2.91 (2.19, 3.87)	6.2 x 10 ⁻¹⁴
Had been taught on BSE technique				
Yes	-	-	-	-
No	0.22 (0.17, 0.27)	2.0 x 10 ⁻¹⁶	0.19 (0.14, 0.26)	2.0 x 10 ⁻¹⁶

BSE, Breast-self examination

Table VI: Frequency and percentage of risk factors of breast cancer (n=130)

Risk factors	n (%)
Had family history of breast cancer	16 (12.3)
Had family history of ovarian cancer	4 (3.0)
Previous history of atypia	0
Previous history of breast or ovarian cancer	1 (0.8)
Hormone replacement therapy	6 (4.6)
Previous exposure to radiation (breast or chest area)	2 (1.5)
Nulliparity	9 (6.9)
Menarchy at age less than 12 years old	4 (3.0)
Body mass index more than 30	19 (14.6)
Smoking	0

Table VII: The breast density and final assessment of mammography classified using Breast Imaging Reporting and Data System (BI-RADS) (n=130)

BI-RADS	n (%)
Breast density	
Almost entirely fatty	15 (11.6)
Fibroglandular density	41 (31.5)
Heterogenously dense	65 (50.0)
Extremely dense	9 (6.9)
Final assessment category	
0 = incomplete and need additional imaging evaluation	4 (3.1)
1 = normal finding(s)	77 (59.2)
2 = benign finding(s)	48 (36.9)
3 = probably benign	1 (0.8)
4 = suspicious finding(s)	0
5 = highly suggestive of malignanc	0
6 = known biopsy-proven cancer	0

Table VII shows the BI-RADS classification of breast density and final assessment category of mammography. The majority of the women had heterogenously dense findings (50%), followed by fibroglandular density (31.5%), almost entirely fatty (11.6%), and extremely dense breast (6.9%). For final assessment category, 3.1% had category 0 and needed further additional imaging evaluation, 59.2% had category 1 of normal finding(s), 36.9% had category 2 of benign finding(s), and only 1% had category 3 of possible benign finding(s) which requires short-term follow-up. Following BI-RADS assessment, 23 (17.7%) were suggested for further ultrasound examination, ten (7.7%) were suggested for further MRI examination, and four (3%) were recommended for both ultrasound and MRI examinations. However, all subjects did not turn up for imaging follow-up.

Simple linear regression analysis was performed to determine the association of age, use of hormonal therapy, previous history of breast or ovarian cancer, and obesity with breast density. However, only age showed significant association with breast density ($\beta = -0.30$, 95% confidence interval = $-0.04, -0.01$, P-value = 0.013) while others showed null association.

DISCUSSION

This study assessed the awareness and practice of BSE, and performed mammography screening on selected high-risk women during community service breast cancer screening. In this study, while most of the women had attended health education on breast cancer (56.3%) and had been taught on BSE techniques, only a small proportion (38.6%) reported to performed monthly BSE. Other studies conducted in urban areas in Malaysia reported 19% regular BSE practice among teachers in Shah Alam (11), 35.1% regular BSE practice among nurses in two tertiary hospitals (12), 19.6% regular BSE practice among female university students in Klang Valley (4), and in Bangi, 37.1% regular BSE practice was seen among female university students (10). Overall, our findings were consistent with other studies performed locally that reported low BSE practice among women in

Malaysia including women in younger age and those in the health care profession.

The factors associated with regular BSE practice that were identified in our study were older age, higher education level, being married, higher monthly income, had attended health education on breast cancer and had been taught on BSE techniques. These findings were consistent with other studies in urban areas whereby women with older age, being married and having higher education level were likely observed to practise BSE (9). Significant predictors for practising BSE that were seen among teachers include higher knowledge about breast cancer, greater confidence in performing BSE and regular visits to a physician. Among nurses, BSE taught during undergraduate programmes was associated with the practice of BSE but not age, working experience and marital status (12). Similar observations were also reported among Korean nurses whereby better level of knowledge for the practice of BSE was seen in women who were taught to perform BSE (16). Among young women, factors associated with BSE practice were having medical checkups with their doctor, having family history of breast cancer, having good knowledge of BSE, and using the internet and pamphlet as sources of information (8,10). Hence, women with younger age and lower socioeconomic status should be the target audiences when planning for breast cancer awareness campaigns to promote BSE practice.

The most common sources of obtaining knowledge on BSE in this study were from health fair or campaign and information from magazine or newspaper. This shows that health campaigns and social media play an essential role in educating and encouraging women to practise BSE. Since only a small percentage of women performed BSE techniques correctly in this study, this indicates that regular breast cancer awareness campaigns are needed to strengthen knowledge and emphasise correct BSE techniques. Similar observations were reported in other studies whereby less than 20% women performed BSE techniques correctly (17,18).

Of the 130 women who had mammography examination, about 35% (n=46) had at least one risk factor in developing breast cancer. The most common high risk factors for women in this study were body mass index of more than 30 (14.6%) and family history of breast cancer (12.3%). For Malaysian women, those with family history of breast cancer had an increased odds of getting breast cancer by five times compared to those without family history (Adjusted OR = 4.9, P-value = 0.012) (19).

Mammographic breast density was observed to be higher among younger and premenopausal women, and in those using hormone replacement therapy (20-23). However, only age was found to be significantly associated with breast density in this study. Based on

the BI-RADS classification of breast density, most of the women in our study were classified as heterogeneously dense and had normal mammogram findings. As breast density increases, there is higher chance that the cancer will not be detected by mammographic examination (24-26). Hence, 17.7% were consulted to go for further ultrasound examination, 7.7% for further MRI examination, and 3.0% were recommended for both ultrasound and MRI examinations at our centre. However, all subjects did not turn up for further imaging follow-up and we speculated that this could be due to far distance between their home and our clinical centre. Several strengths of our study were observed which include large number of samples in the study and the inclusion of potential sociodemographic confounders in the multivariable regression model to determine factors associated with BSE practice. However, study subjects were mostly from a single district in Pulau Pinang in which majority of the residents were of Malay ethnicity. Hence, the generalisability of the study findings was limited. In addition, there was a possible recall bias in this study as the practice of BSE was self-reported.

CONCLUSION

Although majority of subjects in this study were aware about breast cancer and BSE practice, only a small proportion practised BSE regularly. Breast cancer awareness campaigns should be conducted in the community regularly to improve women's awareness about this disease and to emphasise correct BSE techniques to promote early breast cancer detection. Such campaigns should target younger women and those with low socioeconomic status.

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