

# Knowledge and Practice of Breast Cancer Screening Amongst Public Health Nurses in Singapore

P N Chong, M Krishnan, CY Hong, T S Swah

## ABSTRACT

**Aim of study:** The study aimed to examine the knowledge and practice of breast cancer screening amongst Public Health nurses who are patient educators.

**Method:** A self-administered questionnaire was sent to all 447 nurses in the Public Health Service to assess their knowledge and practice of breast cancer screening. Response rate was 96.4%. Knowledge scores ranged from 0-17 with one point given to a correct knowledge question, zero for wrong answer.

**Results:** Median knowledge score was nine and 58.3% of nurses scored  $\geq 9$ . Statistically significant factors influencing knowledge scores were related to the nursing profession, namely nursing qualifications, current nursing post and current workplace. 76.2% of Nursing Officers/Higher Nursing Officers and 74.5% of midwives had knowledge scores  $\geq 9$  compared with 57.3% of staff nurses and 40.8% of assistant nurses ( $p < 0.01$ ). 60.1% of nurses who were taught breast-self examination scored  $\geq 9$  ( $p < 0.05$ ). As for practice, 93.7% of nurses did breast-self-examination, 54.1% had clinical breast examination in the past one year and 50.2% had mammogram done. On multivariate analysis, significant factors affecting practice of clinical breast examination were marital status (Prevalence Rate Ratio 1.94, 95% Confidence Interval 1.20-3.15), doctor's gender (PRR 1.35, CI 1.04-1.75) and those affecting mammogram were age group (PRR 1.78, CI 1.27-2.48), marital status (PRR 1.63, CI 1.03-2.59), history of breast disease (PRR 1.51, CI 1.06-2.16).

**Conclusions:** The majority of nurses had certain misconceptions in the knowledge of breast cancer and breast cancer screening. A higher proportion of nurses in the Family Health Service had higher knowledge scores than

other nurses in the Public Health Service. Most of the nurses did breast-self-examination. Having ever married and the availability of a female doctor influenced the nurses attending clinical breast examination. Nurses who were  $\geq 50$  years old, ever married and those with a positive history of breast disease were more likely to have mammography done.

**Keywords:** breast-self-examination, clinical breast examination, mammogram, public health, nurses

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## INTRODUCTION

Breast cancer has become the most common cancer amongst women in Singapore resulting in increased morbidity and mortality. Its incidence in Singapore has risen significantly over the last two decades<sup>(1-3)</sup> and is expected to continue to rise sharply through the years. In fact, breast cancer rates in Singapore have risen to amongst the highest in Asia<sup>(4)</sup> over the years. As detection of breast cancer in its early stages is amenable to almost complete cure, it is thus important to educate the public on the need for early detection of breast cancer by breast cancer screening. Breast cancer screening comprises breast-self-examination, clinical breast examination and mammography.

Being on the frontline of patient care, nurses are in a unique position as they have a supportive role in educating and motivating patients on breast cancer screening in the primary health care setting. Due to their key role in patient education, it would be interesting to explore these nurses' knowledge and practice on breast cancer screening which may indirectly influence their patients' understanding and practice of breast cancer and screening.

However there is currently no local study done and little study is done on the other breast cancer screening practices such as clinical breast examination and mammography. Thus this

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**Table I. Descriptive profile of respondents (N=431).**

Variable		Number (%)
<b>Demographic profile</b>		
Age (years)	Median	51
	Mean	49
	Range	23-64
Ethnic group	Chinese	348 (80.7)
	Malay	51 (11.8)
	Indian	24 (5.6)
	Others	8 (1.9)
Marital status	Never married	59 (13.8)
	Ever married	369 (86.2)
<b>Nursing experience</b>		
No. of years in nursing	<10 years	21 (5.6)
	10 to <20 years	21 (5.6)
	20 to <30	128 (34.0)
	≥30 years	208 (55.0)
Nursing post	Assistant nurse	79 (18.4)
	Midwife	54 (12.6)
	Staff nurse	254 (59.0)
	Nursing officer and higher	43 (10.0)
Place of work	Family health service	305 (70.8)
	School health service	81 (18.8)
	Home nursing foundation	37 (8.6)
	National health education	5 (1.1)
	Nursing administration	3 (0.7)
<b>Medical history</b>		
History of breast disease	Yes	50 (11.6)
Family history of cancer	Yes	131 (30.4)

study aimed to examine both the knowledge and practice of nurses in the Public Health Service in Singapore on breast cancer screening.

## MATERIALS AND METHODS

### Study Population

A survey was conducted in September 1999 amongst all 447 nurses, namely assistant nurses, midwives, staff nurses, nursing officers and principal nursing officers, working in the Public Health Service (Family Health Service, National Health Education and School Health Service). Nurses from Home Nursing Foundation and the

administrative office in the Institute of Health were also included. There was no sampling done.

### Survey Instrument

The questionnaire collected information on a) their knowledge of the epidemiology of breast cancer in Singapore including its incidence and the risk factors; b) their practice of breast cancer screening such as the frequency of breast-self-examination, clinical breast examination and mammography; and c) whether the gender of the doctor mattered to them during clinical breast examination.

This was done in the form of a self-administered questionnaire (in English) which was distributed to them through their departments. Student nurses attached to the department or polyclinics and nursing investigators, were excluded from the study. The nurses upon receiving the questionnaires were instructed not to discuss the questions among themselves and preferably to complete the questionnaire within a day. Names were not required to be written on the questionnaire to ensure confidentiality and to prevent likely bias in their response to the questions.

The questionnaire was then handed back to the nursing officer-in-charge immediately upon completion who would then ensure that all questions were answered. After all the nurses in the department or polyclinic had completed the questionnaire, the nursing officer would then return the questionnaire in an envelope with the clinic name marked on it. In the returns, the nursing officer of the respective polyclinic or department would also indicate the number of responders and nonresponders (the non-contactables i.e. those who were unable to complete the questionnaire after three weeks – long leave, medical leave, etc, as well as the refusals).

There were altogether 17 questions designed to measure the nurses' knowledge on breast cancer and screening practices. It consisted of multiple choice and dichotomous responses (yes/no). One point was awarded to a correct answer and zero for a wrong answer. A knowledge score was computed by totalling the number of correct answers for all 17 questions. The possible score range was 0-17. The nurses were also asked about their practice of breast cancer screening on themselves and reasons if they did not practice at all or infrequently. They were also asked whether the gender of the doctor affected their decision to have clinical breast examination done.

Fig. 1 Distribution of knowledge scores.

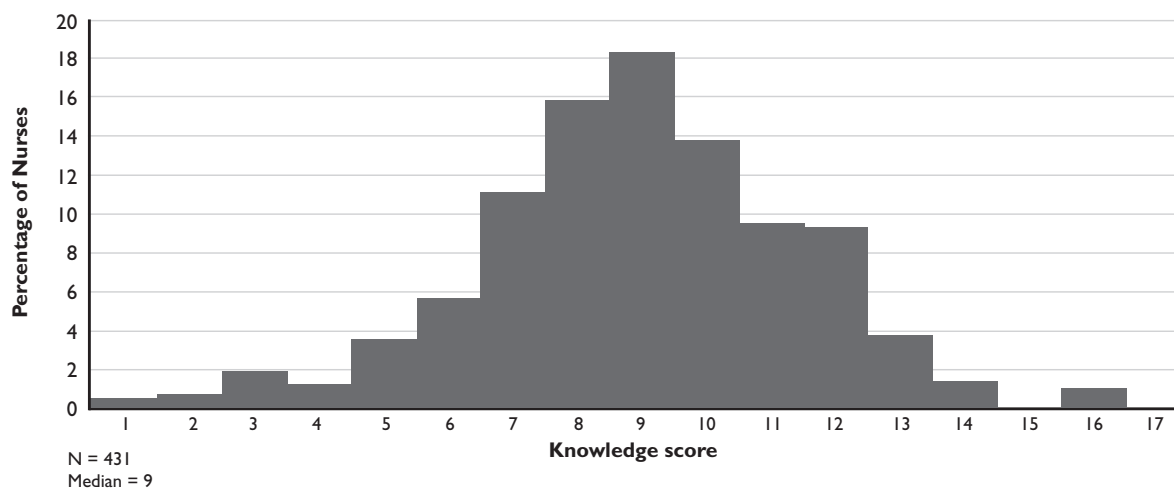


Fig. 2 Knowledge of breast cancer (I).

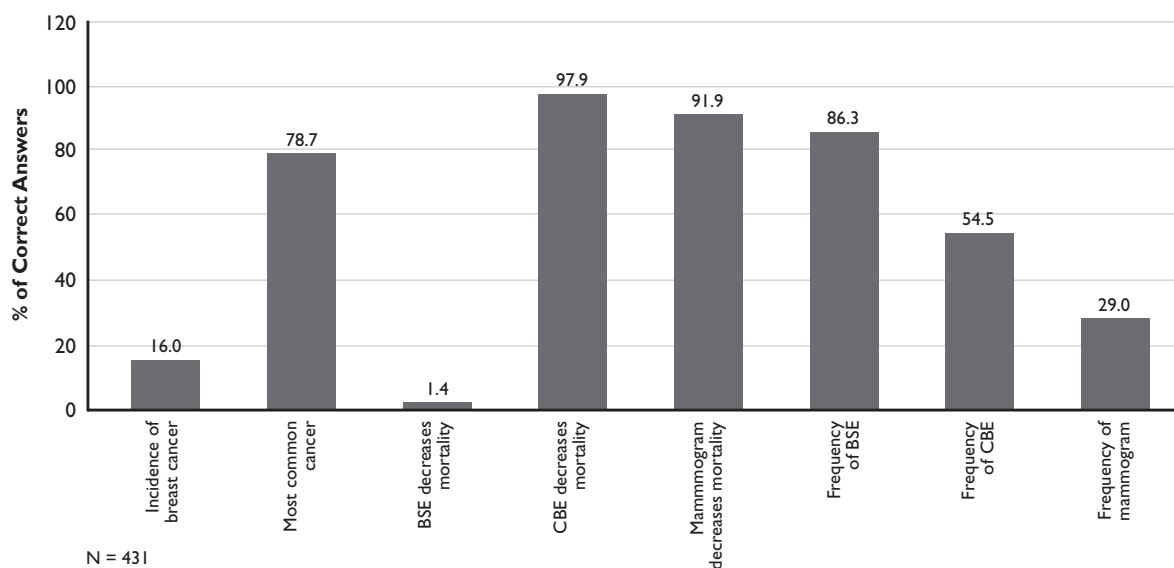
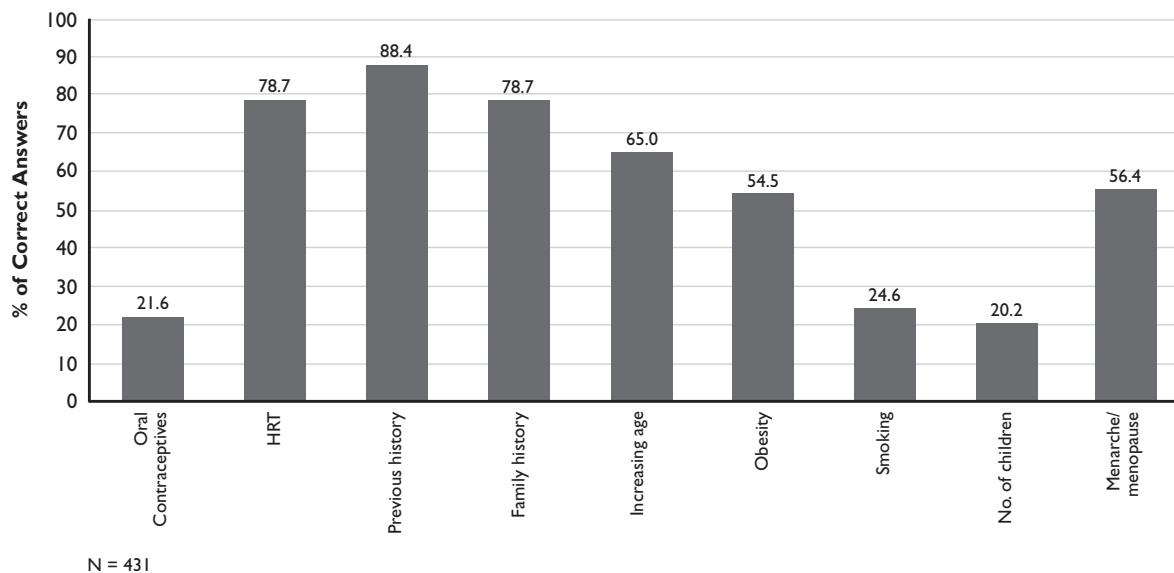


Fig. 3 Knowledge of breast cancer (II) – risk factors.



**Table II. Factors influencing knowledge score.**

Variables		Knowledge scores		Statistical Sig
		≥9 Number (%)	<9 Number (%)	
Age	<50 years	100 (58.8)	70 (41.2)	N.S.
	≥50 years	139 (58.4)	99 (41.6)	
No. of years in nursing	<30 years	101 (59.4)	69 (40.6)	N.S.
	≥30 years	118 (56.7)	90 (43.3)	
Nursing qualifications	Enrolled nursing Certificate	30 (39.0)	47 (61.0)	P<0.01
	Registered midwifery	41 (73.2)	15 (26.8)	
	Registered nursing certificate	154 (59.7)	104 (40.3)	
	Diploma/degree in nursing	17 (70.8)	7 (29.2)	
Current nursing post	Assistant nurse	31 (40.8)	45 (59.2)	P<0.01
	Midwife	38 (74.5)	13 (25.5)	
	Staff nurse	141 (57.3)	105 (42.7)	
	Nursing officer and higher nursing officer	32 (76.2)	10 (23.8)	
Current workplace	Family health service	181 (61.6)	113 (38.4)	P<0.05
	Others	61 (50.4)	60 (49.6)	
History of breast disease	Yes	30 (61.2)	19 (38.8)	N.S.
	No	211 (57.8)	154 (42.2)	
Family history of cancer	Yes	74 (58.3)	53 (41.7)	N.S.
	No	168 (59.2)	116 (40.8)	

**Table III. Regression analysis of factors influencing practice of clinical breast examination and mammogram.**

	Factors influencing practice	Prevalence rate ratio (PRR)	95% confidence interval (CI)
CBE	Marital status	1.94	1.20 - 3.15
	Breast disease	1.31	0.91 - 1.88
	Gender of doctor	1.35	1.04 - 1.75
Mammogram	Age group	1.77	1.27 - 2.46
	Nursing post	1.27	0.89 - 1.81
	Marital status	1.64	1.03 - 2.59
	Breast disease	1.56	1.10 - 2.20

### Statistical Analysis

The data collected were entered and analysed using SPSS-10.0 software. Statistical significance for the differences between proportions was determined using the Chi-square test. Adjustment for potential confounding factors was done by stepwise regression using the proportional hazards model<sup>(5)</sup> to obtain the prevalence rate ratios for the independent predictors.

### RESULTS

Out of 447 nurses, 431 participated in this study giving a response rate of 96.4%. The demographic profile, nursing experience and medical history of these participants are shown in Table I. The majority of the nurses in the Public Health Service who took part in the survey were Chinese (80.7%) and their ages ranged from 23 to 64 years with the median age of the nurses being 51 years old.

#### Knowledge in Breast Cancer and Screening

Fig. 1 shows the distribution of the knowledge scores amongst the nurses in the Public Health Service. The median score was nine with 58 % of the nurses scoring  $\geq 9$ . In the area of knowledge in breast cancer (refer to Fig. 2), the majority of nurses had correct answers for most questions except those on whether BSE decreases mortality (1.4%), the incidence of breast cancer (16.0%) and the recommended frequency of mammogram in women  $\geq 50$  years (29.0%).

Fig. 3 shows that the nurses knew the answers to most questions on the risk factors of breast cancer except for smoking (24.6%), number of children (20.2%) and oral contraceptives (21.6%). Nursing qualifications, current nursing post and current workplace are significant factors affecting the knowledge scores of the participants, as shown in Table II. The midwives or those with midwifery certificate scored better than the staff nurses and the assistant nurses. 60.7% of nurses who were taught breast-self-examination previously scored  $\geq 9$  ( $p < 0.05$ ).

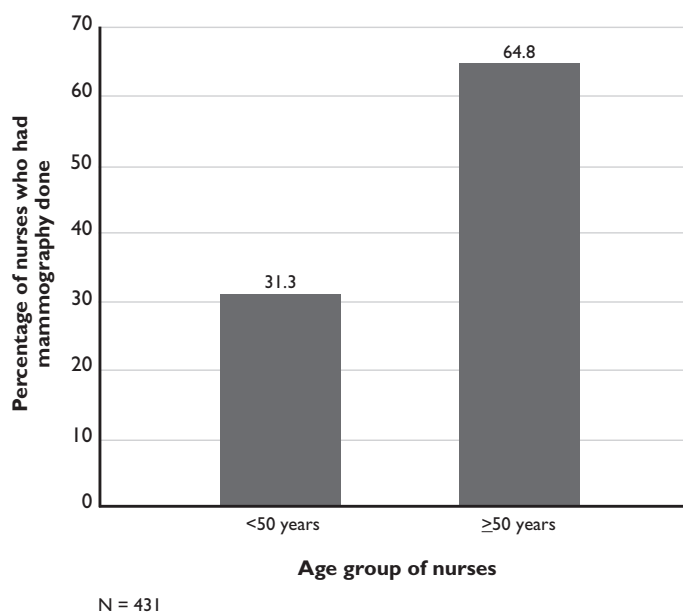
There was no significant association between knowledge score and age of the nurses, number of years in nursing, history of breast disease or family history of cancer.

#### Practice of Breast Cancer Screening Amongst the Nurses

##### Breast-Self-Examination (BSE)

Out of the 431 participants, 401 (93.0%) nurses did BSE. For the 20 (7.0%) nurses who never did BSE,

Fig. 4 Percentage of nurses who had mammography done by age group.



the most common reasons given were “too busy” and “forgot”. Of all the nurses who did BSE (401), 92% did BSE regularly but only 67.2% were doing it monthly. Of the remaining 32 (8.0%) nurses who did not do BSE regularly, the most common reasons were “forgot” followed by “not necessary”.

##### Clinical Breast Examination (CBE)

Two hundred and thirty-one (53.6%) nurses had their breasts examined by a doctor in the past one year: 161 (69.7%) by a specialist and 70 (30.3%) by their family physician. The most common reason given by the nurses who did not have their breasts examined by a doctor in the past one year was “never thought it was necessary”, followed by “too shy” and “too busy”.

The gender of the doctor mattered to 253 (58.7%) nurses with the majority 249 (98.4%) preferring a female to a male doctor. The most common as well as the most important reason given by these nurses is “able to relate” to the doctor. This is followed by “embarrassed” if they were examined by a male doctor. The significant factors affecting clinical breast examination were: marital status of the nurses and gender of the doctor performing the clinical breast examination.

Table III shows that more than half of the 213 (58.2%) nurses who were married had clinical breast examination done in the last one year compared to only 18 (31.0%) nurses who had never married ( $p < 0.01$ ). Thirty-four (69.4%) participants with a history of breast disease did clinical breast examination in the past one year ( $p < 0.05$ ). However, after accounting for confounders (namely age, ethnic

group, current workplace, nursing post and family history of cancer), history of breast disease was not a significant factor affecting CBE.

There is no association between having had clinical breast examination in the past one year with the nurses' age, ethnic group, nursing post, current workplace, family history of cancer or knowledge score.

#### *Mammogram*

As for mammogram (refer to Fig. 4), 160 (64.8%) nurses who were  $\geq 50$  years old and 55 (31.1%) of those  $< 50$  years old had mammogram done before. The majority of 214 (49.7%) nurses who did not have mammography done cited "not necessary" as the most common reason followed by "expensive".

One hundred and forty-seven (68.1%) nurses had mammogram done  $\leq 2$  years ago. One hundred and fifty-two (70.3%) nurses who had mammogram before, indicated that they will be arranging for a mammogram in the next two years whereas 52 (24.1%) will not. The most common reason cited by the latter group was that it was "painful" followed by "expensive".

On univariate analysis, significant factors affecting the nurses' decision to have a mammogram are: age group  $\geq 50$  years (64.8%,  $p < 0.01$ ), Chinese ethnic group (56.3%,  $p < 0.01$ ), having ever been married (53.3%,  $p < 0.01$ ), midwives (70.4%,  $p < 0.01$ ), history of breast disease (78.0%,  $p < 0.01$ ) and family history of cancer (58.8%,  $p < 0.05$ ).

On regression analysis (refer to Table IV), significant factors influencing their decision on mammogram are: age group  $\geq 50$  years (PRR = 1.78, CI = 1.27-2.48), having ever been married (PRR = 1.63, CI = 1.03-2.59) and history of breast disease (PRR = 1.51, CI = 1.06-2.16).

There is no association between having been taught breast-self-examination and practice of breast cancer screening.

#### **DISCUSSION**

In this study, we found that midwives had higher knowledge scores than staff nurses and more Family Health Service (FHS) nurses had knowledge scores  $\geq 9$  than nurses from other primary health care departments. Most of the nurses surveyed practised breast-self-examination. Being ever married, having a history of breast disease and the availability of a female doctor to do clinical breast examination were significant factors influencing the nurses' decision to have clinical breast examination. Nurses who were  $\geq 50$  years old, ever married, those who were midwives, having had a positive history of breast disease were more likely to have mammography.

#### **Knowledge**

Midwives had higher knowledge scores than staff nurses and this is likely to be due to the nature of their work which is more specialised: mainly advising patients, who are attending the well women clinic, on mammography and teaching them breast-self-examination. The midwives also tend to attend seminars and talks on topics related to breast cancer and gynaecology problems to update themselves. On the other hand, the staff nurses' jobs are more diverse and most of them do other nursing or administrative work in the clinics and were not involved in the well women's clinic. Hence their medical information update will tend to be more wide-ranging compared to the midwives. This also has important implications since staff nurses are currently being trained to take over the midwives' work in the polyclinics. Thus there is a need for the staff nurses to undergo training in breast awareness and breast cancer screening.

With regard to the current workplace, Family Health Service (FHS) had more nurses with knowledge scores  $\geq 9$  than the other departments. Perhaps this could be due to the fact that the majority of the midwives work in FHS. Another reason could be that the nurses in the other departments have less opportunity for patient education on breast cancer screening which may not be relevant to their line of work.

Most of the nurses who were ever taught how to do breast-self-examination were also more knowledgeable about breast cancer and screening practices. This could be due to the fact that they had to undergo some training course which would have emphasised the importance of breast cancer and breast cancer screening procedures.

#### **Practice of Breast Cancer Screening**

Most of the nurses in the Public Health Service practised breast-self-examination, a similar finding which was also shown in another study<sup>(6)</sup>. Although BSE does not decrease the mortality of breast cancer per se, the main advantage of BSE is to decrease the size of clinically detectable breast cancers at presentation and this will have direct impact on mortality in the local context. It also has the advantage of being performed by the woman herself and is a simple, low-cost, noninvasive and non-hazardous means of detecting breast cancer at an early stage. Hence the nurses were taught BSE technique so that they could in turn teach patients how to do it properly.

There were significantly more married nurses who had clinical breast examination done one year



ago and mammogram than those who were never married. This may be due to the fact that the former group of nurses are less embarrassed about having clinical breast examination or mammogram. These married nurses could also be attending the clinic for their pap smear regularly and would have had clinical breast examination done by their doctors as well. They were also more likely to be offered mammogram at the same setting.

This study also highlighted the importance of the doctor's gender in a nurse's decision on having CBE. The gender of the doctor doing CBE largely influenced the decision of nurses who never had CBE in the past one year to have their breasts examined, with the majority preferring a female doctor to examine them. In contrast, gender of the doctor did not matter to those who had CBE done in the past one year. Hence the availability of a female doctor is important in order for more nurses to attend CBE. Such a preference amongst most female patients was similarly reflected in another study<sup>(7)</sup>.

More nurses who were  $\geq 50$  years old had mammogram than those  $< 50$  years old in accordance with the recommended guidelines for mammography. Those who did not have mammogram before cited "not necessary" as the most common reason followed by "expensive". Whilst it is true that mammogram may not be necessary for those who were  $< 50$  years old and not at increased risk for breast cancer, it is worrying that some of the 87 (35.2%) nurses who were  $\geq 50$  years old also thought likewise. Perhaps these nurses were more complacent, placing the wrong emphasis on BSE in the detection of early breast cancer than mammography. This was reflected in Fig. 2 which showed that only 1.4% of the nurses gave the correct answer that BSE does not decrease the mortality of breast cancer. Hence it may be useful to regularly encourage the nurses to attend seminars or talks as part of their Continuous Nursing Education to update themselves on breast cancer and the screening procedures.

It was interesting to note that 52 (24.1 %) nurses who had mammogram done before were not keen to have another mammogram in two years' time. The most common reasons were "painful" followed by "expensive" and "not necessary". Whilst it may be "painful" and uncomfortable to some of the nurses, mammography may be made less "painful" by first having the radiographers to explain to patients what to expect before carrying out the procedure as gently as possible.

Those who were deterred by the price of mammogram should no longer be as those 50 years

and older would be given 50% subsidy by the Ministry of Health in a bid to encourage more women in that age group to have mammography.

More nurses with a history of breast disease had mammogram done before. This was expected as mammography could have been done as part of the workup for the management of their breast disease. These nurses were more likely to be more aware of breast cancer and screening.

There were more midwives within the subset who had mammograms done before. The reason could be due to their specialised work in the well women's clinic where they play a vital role in encouraging patients  $\geq 50$  years old on the need to go for mammography.

Table III shows the significant factors which influenced the nurses' practice of CBE: marital status, history of breast disease and the gender of the doctor examining them while those affecting mammography were age group, current nursing post, marital status and breast disease.

## CONCLUSIONS

This study highlights the need for the Public Health nurses in Singapore, who are frontline medical professionals, to undergo more training in the area of breast cancer and screening. They should be informed that although BSE does not decrease mortality of breast cancer, it enhances breast cancer awareness which encourages patients to take charge of their well-being in breast matters. BSE, though statistically not proven, is likely to allow smaller, clinically detectable cancers to be treated earlier than at present. In this study, the knowledge of breast cancer and its screening amongst the nurses does not affect their practice but by keeping them updated on breast cancer and screening, it will enable them to be effective patient educators on breast cancer screening. The availability of a female doctor is also important in encouraging a greater attendance for clinical breast examination amongst nurses who did not attend one in the last one year.

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