

# Survey on mammographic screening among women aged 40 to 65 years old at polyclinics

Leong HSS, Heng R, Emmanuel SC

## ABSTRACT

**Introduction:** Breast cancer is the commonest female cancer in Singapore. It is steadily rising with an incidence of 53.1 cases per 100,000 persons per year among women. Screening for detection of early lesions which are highly curable helps to reduce mortality.

**Methods:** Over three afternoon sessions in December 2003, 224 female patients aged 40–65 years, participated in interviews conducted by the National Healthcare Group Polyclinics, Singapore. The survey sought information on mammographic screening history, the time interval since the previous mammographic screening, and the reasons for not going for the screening.

**Results:** The survey found that only 26.4 percent (28 out of 106) among those aged 40 to 49 years had mammographic screening done within the past one year, and 43.2 percent (51 out of 118) among those aged 50 to 65 years had screening done within the last two years. Chinese women were twice more likely than Malay women to have a mammogram done. The commonest reasons for not wanting to have mammographic screening among women who did not have a mammogram done or had mammogram done more than two years ago, were lack of time (42.5 percent), fear of pain during the procedure (26.9 percent), and the belief that cancer would not happen to them (24.6 percent).

**Conclusion:** Despite publicity on breast cancer being the commonest cancer among women in Singapore and cure being possible if the malignancy was detected early, close to half of the women aged 40 – 65 years old who attended the National Healthcare Group

**Polyclinics did not have mammographic screening done. One-quarter of the women who did not have mammogram screening did not do so as they did not think cancer would happen to them.**

**Keywords:** breast cancer, cancer screening, mammographic screening, mammography

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## INTRODUCTION

Breast cancer is the commonest female cancer in Singapore, and its occurrence is steadily rising. The incidence currently is 53.1 cases per 100,000 per persons per year among women<sup>(1)</sup>. With breast cancer being curable when detected early, screening is a very important way of reducing mortality from breast cancer. The Ministry of Health (MOH) Clinical Practice Guidelines on Health Screening recommends yearly screening for women in the age group 40–49 years old and screening once in two years for women in the age group 50–65 years if there is no strong family history of breast cancer<sup>(2)</sup>. Screening is made available through Breast Screen Singapore at a subsidised cost of \$50 by the government at mammographic services located at polyclinics, nine of which are sited in the National Healthcare Group (NHG) Polyclinics at Ang Mo Kio, Bukit Batok, Choa Chu Kang, Clementi, Hougang, Jurong, Toa Payoh, Woodlands and Yishun.

Regular audits were done within NHG Polyclinics to assess the rate of mammographic screening among female patients aged 40–65 years at the polyclinics. The screening rates were 12.4%, 19.2% and 19.4% in 2001, 2002 and 2003, respectively<sup>(3)</sup>. Even if cessation of mammographic screening services were taken into account during the five months of the severe acute respiratory syndrome (SARS) outbreak in 2003, the rates were still lower than the estimated 41.7% compliance rate among women invited by the Singapore Breast Screening Project<sup>(4)</sup>. It was also lower than the 75% take-up rate among women who attended the National Health Service (NHS) in the United Kingdom (UK)<sup>(5)</sup>. A survey was conducted among 224 female patients aged 40–65 years at the NHG Polyclinics, with

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**Table I. Study population by selected demographical characteristics.**

Demographics	Age group (years)		
	40–49 [n = 106]	50–65 [n = 118]	Total
Race			
Chinese	68 (64.2%)	80 (67.8%)	148 (66.1%)
Malay	22 (20.8%)	22 (18.6%)	44 (19.6%)
Indian	16 (15.1%)	16 (13.6%)	32 (14.3%)
Occupation			
Housewife	50 (47.2%)	66 (55.9%)	116 (51.8%)
Factory operator	11 (10.4%)	16 (13.6%)	27 (12.1%)
Sales / clerk	24 (22.6%)	12 (10.2%)	36 (16.1%)
Managers / professional	9 (8.5%)	4 (3.4%)	13 (5.8%)
Retiree	0 (0.0%)	5 (4.2%)	5 (2.3%)
Others	1 (0.9%)	2 (1.7%)	3 (1.3%)
Unknown	11 (10.4%)	13 (11.0%)	24 (10.7%)

the aim of assessing their knowledge, belief and practice on mammographic screening. The findings would help healthcare givers in polyclinics to develop health education messages and programmes to improve the uptake in mammographic screening.

## METHODS

345 female patients aged 40–65 years were selected by convenience sampling for interview by nurses in the NHG Polyclinics over three afternoons in December 2003 in the waiting area of the clinics. A total of 224 respondents agreed to participate in the survey. The total attendance of women aged 40–65 years in the nine polyclinics was 4,245 for the three afternoons. The number of respondents represented 5.3% of the female patients in the eligible age group who attended the polyclinics during the survey. The non-response rate was 35%.

A face-to-face interview was conducted for about 20 minutes for each participant. The interview was conducted in English or mother tongue of the patient, such as Mandarin or Malay. For Tamil-speaking patients, translation was done through Tamil-speaking nurses. The patients were asked whether they had mammograms done previously and the year of the last mammogram done. Women who had never had a mammogram or who had their mammogram done more than two years ago were requested to provide reasons. The participants had eight reasons to select from: (1) mammogram screening was painful; (2) no time; (3) prefer not to know if they had cancer; (4) cancer would not happen to them; (5) not aware of availability of mammographic service; (6) too expensive; (7) none of the doctors or nurses in the clinic advised the participant to have regular mammogram

screening; and (8) others. The reasons were coded for data analysis. Each person could give more than one reason. In addition, knowledge of the recommended screening interval for women aged 40–49 years and those aged 50–65 years, was also asked of all participants: whether the screening interval was yearly, once in 2–3 years, or once in 4–5 years.

Age, ethnic group and occupational status were included in the analysis as demographical characteristics. Age was categorised into two groups: 40–49 years old and 50–65 years old. Analyses were done using chi-square test and Fisher exact test with the Statistical Package for Social Sciences (SPSS) version 11.0 (Chicago, IL, USA). Logistic regression analysis in predicting the likelihood of presenting for mammograms adjusted for age and ethnic groups was carried out. Similar analysis in predicting the likelihood of providing the correct answer for the knowledge on the screening intervals was also performed. Statistical significance was set at a p-value  $\leq 0.05$ .

## RESULTS

The mean age of the study population was 53 years old (standard deviation [SD] 9.06) (Table I). The ethnic distribution of the respondents was similar to the profile of patients seen in NHG Polyclinics (67.2% Chinese, 16.4% Malay, 12.1% Indians, 4.4% Others)<sup>(6)</sup> (Table I). However, when compared with the ethnic distribution of women in Singapore (80.5% Chinese, 11.3% Malay and 6.9% Indian and 1.4% Others)<sup>(7)</sup>, Malay and Indian women were over-represented in the survey.

In terms of mammographic screening, 44.3% among those aged 40–49 years had had a mammogram done before, out of which 59.6% had the screening within

**Table II. Number (%) of respondents who reported ever having had a mammogram done.**

	Done (%)	Not done (%)	Total (%)	p-value	OR (95% CI)
Age group (years)					
40–49	47 (44.3)	59 (55.7)	106 (47.3)		
50–65	70 (59.3)	48 (40.7)	118 (52.7)	0.030	1.82 (1.06 to 3.12)
Total	117 (52.2)	107 (47.8)	224 (100)		
Race				0.040	
Chinese*	86 (58.1)	62 (41.9)	148		
Malay	16 (36.4)	28 (63.6)	44	0.014	0.41 (0.21 to 0.84)
Indian	15 (46.9)	17 (53.1)	32	0.269	0.645 (0.30 to 1.40)

\* Reference group used in adjusted analysis

**Table III. Time interval from last mammogram among women who had had a mammogram done.**

	≤1 year (%)	1–2 years (%)	2–3 years (%)	>3 years (%)	Missing values (%)	Total	p-value <sup>#</sup>	OR (95% CI) <sup>#</sup>
Age group (years)								
40–49	28 (59.6)	7 (14.9)	5 (10.6)	5 (10.6)	2 (4.3)	47 (40.2)		
50–65	30 (42.9)	21 (30.0)	7 (10.0)	10 (14.3)	2 (2.9)	70 (59.8)	0.011	2.11 (1.19 to 3.73)
Total	58 (49.6)	28 (23.9)	12 (10.3)	15 (12.8)	4 (3.4)	117 (100)		
Race								
Chinese*	43 (50.0)	20 (23.3)	7 (8.1)	12 (14.0)	4 (4.7)	86 (73.5)	0.076	
Malay	9 (56.3)	1 (6.3)	3 (18.8)	3 (18.8)	0 (0.0)	16 (13.7)	0.038	0.43 (0.20 to 0.95)
Indian	6 (40.0)	7 (46.7)	2 (13.3)	0 (0)	0 (0.0)	15 (12.8)	0.211	0.58 (0.25 to 1.36)
Total	58 (49.6)	28 (23.9)	12 (10.3)	15 (12.8)	4 (3.4)	117 (100)		

\* Reference group used in adjusted analysis.

<sup>#</sup> Response in the logistic regression is defined as mammogram done within recommended interval for respective age groups (i.e. once a year for women aged 40–49 years and once in two years for women aged 50–65 years).

the recommended period of one year (Tables II and III). For women aged 50–65 years old, 59.3% had had a mammogram done before, 72.9% of whom had the screening done within the recommended period of the last two years (Tables II and III). Women aged 50–65 years were 1.8 times more likely to have a mammogram done compared to those aged 40–49 years ( $p = 0.030$ , logistic regression analysis, odds-ratio [OR] 1.82, 95% confidence interval [CI] 1.06 to 3.12) (Table II). Chinese women were more likely than Malay women to have a mammogram done ( $p = 0.014$ , logistic regression analysis, OR 2.42, 95% CI 1.20 to 4.88). However, no significant difference was found between Chinese and Indians ( $p = 0.269$ ) (Table II).

In terms of having a mammogram done within the recommended screening intervals, women aged 50–65 years were 2.1 times more likely to do so (i.e. mammographic screening within two years) compared to those aged 40–49 years (i.e. mammogram done within one year) ( $p = 0.011$ , logistic regression analysis, OR 2.11, 95% CI 1.19 to 3.73) (Table III). There was no

significant difference between Chinese, Malay or Indian women ( $p = 0.079$ ) (Table III).

In terms of knowledge on how frequently the mammographic screening should be done for those aged 40–49 years (Table IV), 50.9% patients in this age group and 48.3% of those aged 50–65 years cited a need for yearly screening. For mammographic screening among women aged 50–65 years (Table V), 54.2% patients of the same age group and 50.9% of those aged 40–49 years cited a need for screening every 2–3 years. Performing a logistic regression analysis on the correct screening interval for women aged 40–49 years, adjusted for age groups ( $p = 0.584$ ) and ethnic groups ( $p = 0.054$ ), revealed no significant difference between the groups. Similarly, performing a logistic regression analysis on the correct screening interval for women aged 50–65 years adjusted for age groups ( $p = 0.958$ ) and ethnic groups ( $p = 0.143$ ), also showed no significant difference between the groups.

The commonest reason cited by patients for not doing mammographic screening (42.5%) was lack of

**Table IV. Knowledge of frequency of mammogram to be done by women aged 40–49 years.**

	1 year	2–3 years	4–5 years	Not sure	Missing values	Total	p-value
Age group (years)							0.584
40–49	54 (50.9%)	37 (34.9%)	6 (5.7%)	4 (3.8%)	5 (4.7%)	106	
50–65	57 (48.3%)	36 (30.5%)	9 (7.6%)	11 (9.3%)	5 (4.2%)	118	
Total	111 (49.6%)	73 (32.6%)	15 (6.7%)	15 (6.7%)	10 (4.5%)	224	
Race							0.054
Chinese	81 (54.7%)	41 (27.7%)	9 (6.1%)	9 (6.1%)	8 (5.4%)	148	
Malay	18 (40.9%)	20 (45.5%)	1 (2.3%)	5 (11.4%)	0 (0.0%)	44	
Indian	12 (37.5%)	12 (37.5%)	5 (15.6%)	1 (3.1%)	2 (6.3%)	32	

**Table V. Knowledge of frequency of mammogram that should be done by women aged 50–65 years.**

	1 year	2–3 years	4–5 years	Not sure	Missing values	Total	p-value
Age group (years)							0.958
40–49	33 (31.3%)	54 (50.9%)	5 (4.7%)	6 (5.7%)	8 (7.5%)	106	
50–65	27 (22.9%)	64 (54.2%)	8 (6.8%)	15 (12.7%)	4 (3.4%)	118	
Total	60 (26.8%)	118 (52.7%)	13 (5.8%)	21 (9.4%)	12 (5.4%)	224	
Race							0.143
Chinese	38 (25.7%)	83 (56.1%)	7 (4.7%)	10 (6.8%)	10 (6.8%)	148	
Malay	14 (31.8%)	19 (43.2%)	1 (2.3%)	10 (22.7%)	0 (0.0%)	44	
Indian	8 (25.0%)	16 (50.0%)	5 (15.6%)	1 (3.1%)	2 (6.3%)	32	

**Table VI. Reasons for not doing a mammogram.**

Reasons	No. (%)								
	No time	Procedure is painful	Cancer will not happen to me	Too costly	Not aware of mammographic service	Not advised by healthcare givers	Prefer not to know of cancer	Others	Missing value
Age group									
40–49 years	32 (46.3)	16 (23.1)	13 (18.8)	18 (26.1)	15 (21.7)	5 (7.2)	1 (1.4)	3 (4.3)	2 (2.9)
50–65 years	25 (38.5)	20 (30.8)	20 (30.8)	13 (20.0)	9 (13.8)	3 (4.6)	6 (9.2)	0 (1.5)	2 (3.1)
Total	57 (42.5)	36 (26.9)	33 (24.6)	31 (23.1)	24 (17.9)	8 (6.0)	7 (5.2)	3 (2.2)	4 (3.0)
Race									
Chinese	33 (40.7)	24 (29.6)	18 (22.2)	19 (23.5)	15 (18.5)	4 (4.9)	5 (6.2)	1 (1.2)	1 (1.2)
Malay	15 (44.1)	7 (20.6)	11 (32.4)	6 (17.6)	4 (11.8)	2 (5.9)	1 (2.9)	0 (0.0)	2 (5.9)
Indian	9 (47.4)	5 (26.3)	4 (21.1)	6 (31.5)	5 (26.3)	2 (10.5)	1 (5.3)	2 (10.5)	1 (5.3)

time (Table VI). However, 23 of the 57 women also cited additional reasons for not having gone for a mammogram, namely, procedure being painful (9), cancer not likely to happen to them (3), not being aware of mammographic service (3), screening being costly (10), not advised by healthcare givers (2) and others (2). Of the 33 women who thought that cancer would not happen to them, 12 stated that they believed so as they were asymptomatic.

Among the women who found the cost of mammographic screening at a subsidised rate of \$50 to be expensive, most gave a range of \$20–\$30 to be a reasonable price for the service. For the 36 women who did not have a mammogram done within the stipulated interval based on clinical practice guidelines, 26.9% cited that the procedure was painful. On further analysis, 14 of the 36 women who thought the procedure was painful

had previous experience of a mammogram done while 22 women never had a mammogram before.

Among the rest of women who gave "other reasons" for not having a mammogram done, a few stated that they felt shy about having their breasts examined.

## DISCUSSION

Breast cancer is the commonest cancer among women in Singapore. In the Singapore Breast Screening Project, despite numerous publicity efforts and invitation letters, only 41.7% of all women invited went for mammographic screening<sup>(4)</sup>. In the year 2002, the Health Promotion Board embarked on Breast Screen Singapore (BSS) which is a national screening programme for breast cancer. The NHG Polyclinics which started its first mammographic screening service within one of its polyclinics in year 2000 and gradually established mammographic screening in all nine polyclinics by year 2004, leveraged on the BSS. We found that only 19.4% of women (aged 40–65 years old) who attended NHG Polyclinics in 2003 had mammograms done at least once in two years<sup>(5)</sup>. In a study by Juon et al<sup>(6)</sup> on Korean American women in Maryland, it was reported that 65% had had a mammogram and 45.3% (i.e. 69.7% of those who had a mammogram) had it done within the past two years. The rates of women who had had mammographic screening in our survey and in the study by Juon et al were lower than the 75% screening rate among women who attended the NHS in the UK<sup>(5)</sup>. This might be reflective of the different cultural and health beliefs and knowledge level between Asian women and predominantly-white women who attended NHS.

With an estimated headcount of approximately 125,000 among women aged 40–65 years attending NHG Polyclinics<sup>(6)</sup>, to ensure all eligible women to be screened at least once in two years, each clinic needs to screen about 25 women a day. The current appointment waiting time varies from one day to three weeks. If lack of time is a main factor for not having a mammogram done, arrangement could be made for women to have the screening on the same day as the consultation/recruitment to minimise the need for another attendance. However, we found that among the women who stated time being a factor for not having a mammogram done, 23 out of 57 of them also mentioned other reasons such as fear of pain during the procedure and screening being too costly. Of the women surveyed, 13.8% considered \$20–\$30 to be a more reasonable price for the screening. The rest of the women did not consider the price of \$50 to be an inhibitory factor in their decision-making process of whether to go for mammographic screening. In a survey by Seow et al in 1998<sup>(9)</sup>, there was greater acceptance among patients in having to pay for mammographic screening as compared to 16% of women who felt they should not be charged for the service and 72% who considered

anything up to \$50 to be a reasonable amount to pay for the mammographic screening.

With respect to knowledge and beliefs of women who did not have a mammogram or had a mammogram done more than two years ago, one worrisome finding was that 24.6% of women felt they were unlikely to have cancer. More of the older women had this attitude. Of the 33 women who held such beliefs, 12 thought so because they were asymptomatic. Hence in the publicity and education process, it is important to highlight that breast cancer in its early stages can be asymptomatic and it is particularly beneficial to detect it at a very early stages in order to achieve complete cure. Where fatalistic views were concerned, 5.2% of the women, who did not have a mammogram done or had a mammogram done more than two years ago, preferred not to have screening in order not to have to deal with the issue of cancer. Fatalistic views, perception on potential cure and preventive health measures were extensively discussed by Straughan and Seow<sup>(9,10)</sup>. Friends and family members play an important role in encouraging patients to go for screening. Encouragement via human to human contact is necessary in modifying the patients' belief system as they go through the various stages of change as illustrated by Prochaska: pre-contemplation (when patient has never heard of or considered doing mammogram), contemplation (when patient plans to have mammographic screening), action (decision made and action taken to have mammographic screening), maintenance (when patient goes for regular mammographic screening) and relapse (when patient fails to continue having regular mammograms)<sup>(11)</sup>. The immediate family plays an important role in the process of facilitating behavioural change.

Where advice provided by healthcare givers (doctors and nurses) was concerned, 6% of the patients cited that they had never been told to go for mammographic screening and 17.9% of the patients were not aware of the existence of mammographic screening services within the polyclinics. In addition to use of pamphlets and posters, more diversified means of outreach need to be made to the public on the availability of screening services within the polyclinics. Publicity delivered to relatives will be helpful in getting them to bring along their female family members for mammogram screening. With respect to screening intervals for women aged 40–49 years and 50–65 years, recommendations based on MOH Clinical Practice Guidelines on Health Screening (2003) need to be emphasised to the public, as only half of women surveyed managed to give the correct answers. Not doing a mammogram due to lack of awareness of the screening interval, however, can partly be circumvented by the reminder system provided by the BSS programme which generates invitation letters to women when mammographic screening is due.

A literature search was done to review the barriers to mammographic screening. In a study by Juon et al<sup>(8)</sup>, among Korean American women who had not had a regular mammogram, reasons given were: belief of low risk of getting breast cancer (37.5%), lack of time (19.4%), cost (15.2%), fear of finding out breast cancer (9.4%), language barrier (8.7%) and not knowing where to go for a mammogram (6.5%). In a study on Chinese Americans in Seattle<sup>(12)</sup>, women who reported that mammography was the best way to detect breast carcinoma were more likely to have a mammogram, and those who believed that some malignancies were curable if they were detected early or if they had a close friend or relative with cancer, were more likely to have had a recent mammogram. Finally, in a sample of Tamil women who migrated to Canada, barriers to mammographic screening were: the procedure engendering worry about breast cancer, the embarrassing nature of the test, the time-consuming aspect of mammography, fear of pain during the test, and cost<sup>(13)</sup>.

With the above findings in mind, in the year 2004, the NHG Polyclinics embarked on an outreach programme called the "Bring Your Mother and Your Aunt" programme which encouraged young women and men (aged 30–40 years) who utilised the polyclinics, to bring along their older female relatives for mammographic screening. Emphasis was made during health education that breast cancer in the early stage was usually asymptomatic. However, early detection was possible though mammographic screening and a cure could be achieved with early treatment. To diversify the publicity efforts, other than doctors and nurses motivating their patients to have mammograms, staff from laboratory services that was situated next to the radiological section also promoted mammographic services to patients while they waited for laboratory tests to be performed. To add to the convenience of patients, they were allowed to "walk-in" to have their mammograms done on the same day whenever possible, should they be in the polyclinic for other services. By the end of year 2004, 47.7% of women who attended NHG Polyclinics had had mammographic screening done<sup>(3)</sup>.

Certainly, the next steps to be taken by NHG Polyclinics will be to focus on how to develop counselling techniques that can be used to help women overcome fear of detection of cancer. Where cost is of concern for some patients, one possibility is to consider allowing these patients to pay by installment. It remains to be seen whether the additional outreach measures can help sustain a higher uptake of mammographic screening among female patients in NHG Polyclinics for subsequent years. Finally, this study also showed that Chinese women who utilised the polyclinics were twice

as likely to have had mammograms done than Malay women. The sample size of the survey was however small and the population studied involved patients who attended the polyclinics. It would be helpful to evaluate the mammographic screening rate among a larger female population within the community, and if the same conclusion was derived, community efforts to involve higher participation among Malay women will be useful.

To some extent, the objectives of this survey on the evaluation of knowledge, beliefs and practices of women aged 40–65 years on mammographic screening for the purpose of development of effective health education messages and strategies on increasing mammographic uptake were met. The limitation in this study was that the sample size was small and the context in which the survey was done would prevent generalisation of the findings to the female population in Singapore. Nevertheless, this survey was helpful in unraveling the reasons given by women for not having any mammograms done or for having mammogram done more than two years ago. It is important to emphasise the need for mammographic screening as breast cancers are asymptomatic in the early stages and a cure is possible with early treatment. A multi-pronged approach to publicise mammographic services through use of posters and pamphlets, counselling by healthcare givers, and encouragement by relatives (as demonstrated by other studies)<sup>(9,10)</sup> will help to increase the outreach to eligible women. Counselling techniques need to be developed to help patients overcome the fear of perceived pain due to the mammographic screening procedure. Accessibility to the mammographic services in terms of availability of appointment slots and accommodating, as far as possible, patients who request for mammograms to be done on the same day of visit to the polyclinic for other services, will facilitate the process of screening for women who have a busy schedule.

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