

## Observational Study

## Hong Kong female's breast cancer awareness measure: Cross-sectional survey

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**Abstract****BACKGROUND**

In women worldwide, breast cancer is the most common cancer. Breast cancer accounted for 26.6% of all new cancers in females diagnosed in 2015 in Hong Kong.

**AIM**

To examine women's awareness, perception, knowledge, and screening practice of breast cancer in Hong Kong.

**METHODS**

We carried out a population-based survey using random telephone interviews to women aged 18 or above using the United Kingdom Cancer Research Breast Cancer Awareness Measure (United Kingdom CAM). The data was analysed using proportions, chi-square test ( $\chi^2$ -test) and adjusted odds ratios (ORs).

**RESULTS**

A total of 1000 participants completed the CAM questionnaire from 1,731 responses (response rate = 57.8%) from September to October 2017. One in five and one in four respondents recalled  $\geq 3$  early warning signs and  $\geq 2$  risk factors of breast cancer respectively. The majority (62.6%) reported they were not confident that they would notice a change in their breasts. Among the respondents, 16.8% would have regular mammography at least every two years.

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In general, 4 in 10 women had tried practices on preventing breast cancer. Respondents with better result in recalling breast cancer signs and symptoms were more likely to seek immediate medical help when noticed a change in their breasts ( $\chi^2$ -test  $P = 0.038$ ), and more likely had tried prevention practice ( $\chi^2$ -test  $P < 0.001$ ). Respondents received higher education (secondary school or above) had higher breast cancer awareness (OR = 2.83, CI: 1.61-4.97), more frequent screening (OR = 2.64, CI: 1.63-4.26) and more had tried prevention practices (OR = 2.80, CI: 1.96-4.02) when compared to those with lower education. Those in age groups 31-45 and 46-60 had higher percentages in performing breast self-exam and mammography when compared to the 18-30 and 61 or above age groups.

### CONCLUSION

Population-wide public health initiatives should emphasize on prevention and early detection of breast cancer in women, with targeted strategy for those with low education level and advance in age.

**Key words:** Breast cancer; Cancer Awareness Measure; Awareness; Screening practice; Behaviour; Attitude

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**Core tip:** Breast cancer is the top cancer in women worldwide. In this study, we used the United Kingdom Cancer Research Breast Cancer Awareness Measure to assess the awareness, perception, knowledge, and screening practice of this cancer among the female population in Hong Kong, China. In general, women with higher education and in age groups 31-45 and 46-60 had better breast cancer awareness and more frequent screening tests. Respondents recalled more breast cancer signs and symptoms were more likely to seek immediate medical help when noticed a change in their breasts, and more likely had tried prevention practice.

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## INTRODUCTION

Breast cancer is the most common cancer in women worldwide<sup>[1]</sup>. In Hong Kong, breast cancer accounted for 26.6% of all new cancers in females diagnosed in 2016<sup>[2]</sup>. In the same year, 4,108 new cases of female breast cancer were diagnosed and the crude incidence rate was 103.7 per 100000 in the female population. The age-standardised incidence rate of female breast cancer had an upward trend between 1983 and 2016. In adults aged 20 to 74 years, the most common cancer was breast cancer for females, with a lifetime risk of 1:15<sup>[2]</sup>.

Epidemiological studies reveal that lifestyle factors such as increased body mass index and weight gain in postmenopausal women and drinking play an important role in the development of breast cancer<sup>[3]</sup>. Therefore, lifestyle modification and early detection through screening is considerably important to reduce mortality and morbidity. Several local surveys had been conducted in the past two decades exploring the knowledge, perception and behaviours related to breast cancer and screening practices<sup>[4-8]</sup>. These surveys used self-constructed or modified questionnaires.

The emphasis of previous research conducted in Hong Kong focused a lot on knowledge, perception and behavior on screening tests, rather than disease awareness. It was found that 29%-58% of women respondents never heard of mammography (MMG)<sup>[4,6]</sup>. The percentage of women with regular Breast Self-examination (BSE), Clinical Breast Examination (CBE) and MMG were 29%-33.3%, 37.8%-44.0% and 18.0%-32.7% respectively<sup>[4,8]</sup>.

In addition to screening practices, this survey aims to examine women's awareness about breast cancer. Breast cancer awareness would include awareness of breast

cancer being the most frequent cancer in women, knowledge on signs and symptoms of breast cancer, knowledge on risk factors of breast cancer and primary prevention practices, and knowledge on early detection method which MMG is considered the most effective in shifting of earlier staging and mortality reduction.

There is no territory-wide breast cancer screening in Hong Kong. The Cancer Expert Working Group on Cancer Prevention and Screening formulates local recommendations for breast cancer prevention and screening. The Cancer Expert Working Group recommended women classified with high and moderate risk of breast cancer to have a MMG screening every year and every 2-3 years respectively<sup>[9]</sup>. It did not recommend breast screening for general female population at average risk<sup>[9]</sup>.

Online search of validated questionnaires on awareness of breast cancer yielded three validated tools: The Cancer Awareness Measure (CAM) of the Cancer Research United Kingdom<sup>[10]</sup>, The Chinese Breast Cancer Screening Beliefs Questionnaire developed (CBCSB) by the University of Sydney in Australia<sup>[11]</sup>, and the Breast Cancer Awareness Scale tool Thai Women (B-CAS) developed by Khon Kaen University in Thailand<sup>[12]</sup>. The United Kingdom CAM has been validated to Indonesian version<sup>[13]</sup>, and translated to be used in China<sup>[14]</sup>, Egypt<sup>[15]</sup>, Indonesia<sup>[16]</sup>, Oman<sup>[17]</sup> and United Arab Emirates<sup>[18]</sup>.

Studies have demonstrated that beliefs about causation of breast cancer is associated with age, socioeconomic status, and education level<sup>[19,20]</sup>. For women who are more knowledgeable about breast cancer risk factors and screening recommendations, they may be more likely to be screened<sup>[21]</sup>. Early cancer detection and diagnosis saves lives, because treatments are most likely to be effective in people who are diagnosed at an earlier stage. It is of interest to know how women of different age vary in awareness of the risks of breast cancer, so that public health promotion intervention would be customized to distinct subpopulations.

The aim of this study is to examine Hong Kong women's awareness, perception, knowledge, and screening practice of breast cancer.

## MATERIALS AND METHODS

### *Ethical considerations*

This research had been approved by the Survey and Behavioural Research Ethics Committee of the Chinese University of Hong Kong. Before each interview, the interviewer would inform the respondent about the nature and purpose of the study and invited her voluntary participation. Interviewee was asked to respond only after informed consent was obtained. No incentive was given.

### *Survey tool*

The United Kingdom Breast-Cancer Awareness Measure (Breast-CAM) Toolkit (version 2) (referred as United Kingdom CAM below)<sup>[10]</sup> was selected as the survey instrument because it is relatively comprehensive for assessing awareness, knowledge and breast checking behaviour, when compared with other validated questionnaires. It was developed by Cancer Research United Kingdom, King's College London and University College London in 2009. The original United Kingdom CAM collects data in seven domains, which are listed as 1 to 6 in [Table 1](#). Domains 7 and 8 were additional domains not in the original United Kingdom CAM. There were a total of 11 questions and 10 follow-up questions.

### *Modification of survey tool*

The original questions in the United Kingdom CAM asked about the National Health Service (NHS)'s breast cancer screening programme, questions in this domain were modified according to the local context as there is no national breast cancer screening in Hong Kong. The demographic questions were also modified. Items on gender, language spoken at home, marital status, living arrangement, how many years living in United Kingdom, and family or close friends who had cancer were not included. We replaced items "postcode" by "residential district", and "car or van ownership" by "household income". We invited females who speak Chinese as participants so questions on gender and language spoken at home were unnecessary.

### *Sampling method*

The target population was Chinese women in Hong Kong, aged 18 years or above, who were able to speak Chinese. This sampling method constituted a randomly sampled telephone survey of the general population in Hong Kong.

Interviews were carried out by experienced interviewers, between 10:00 and 22:00 on weekdays and other periods, including weekends and public holidays. Upon successful contact with a target household, one qualified member of the household

**Table 1 Domains of the survey compared to United Kingdom breast-CAM**

	This survey	United Kingdom CAM
Awareness of signs and symptoms of cancer	Q9+Q10	Q1+Q2
Awareness of age-related risk	Q3	Q5
Awareness of risk factors for cancer	Q6+Q7	Q7+Q8
Confidence and behaviour in detecting a breast change	Q1	Q3
Perception and Practice of examination and screening	Q4, Q5	Q6*
Delay in seeking medical help	Q2	Q4
Prevention practices on breast cancer <sup>1</sup>	Q8	NA
Access to information on breast cancer <sup>1</sup>	Q11	NA

<sup>1</sup>Questions that are not in the United Kingdom CAM questionnaire. CAM: Cancer Awareness Measure.

was selected among those family members using the last-birthday random selection method.

### Sample size

We calculated the sample size using an online calculator (<http://www.raosoft.com/samplesize.html>) with a confidence interval of 99%, margin of error 5% and response distribution of 50% for the population of 3438200 adult females. An additional 40% sample was added as non-response rate and the final sample size of 930 respondents was calculated.

### Pilot

A pilot with 20 successfully interviewed respondents was performed from 1 to 6 September 2017. The response rate for pilot was 58%. After the pilot, there was a discussion on the questionnaire design and logistics arrangements. The sequence of the survey questions were rearranged. There was also fine adjustments to the Chinese translation of the questions.

### Statistics analysis

Categorical demographic data and variables were compared using the “N-1” chi-square test ( $\chi^2$ -test) for categorical variable as recommended by Campbell<sup>[22]</sup> and Richardson<sup>[23]</sup>. Multiple logistic regression analysis was performed, and demographic data on age, education level, employment status and family income were adjusted. The regression model is a built-in formula in the SPSS software. The participants were divided into groups aged 18 to 30, 31 to 45, 46 to 60 and 61 or above. These age groups were compared by percentages and adjusted odds ratios (ORs) with corresponding 95% confidence intervals (CIs). The Bonferroni correction was applied to counteract the problem of multiple comparisons. There were 11 questions in the questionnaire and assuming  $\alpha = 0.05/11$ , then each corrected hypothesis was  $\alpha = 0.0045$ . All statistical tests were two-tailed and variables were considered significant at a significance level of  $P \leq 0.0045$ .

## RESULTS

The interview was carried out from 8 September to 13 October 2017. The response rate was 57.8%. A total of 1731 numbers were sampled and among these 1000 subjects were successfully interviewed. The interview time ranged from 10 to 12 min.

### Demography

The age distribution and socioeconomic indicators of the 1,000 respondents are shown in Table 2. The vast majority of respondents (99.4%) stated that they were ethnically Chinese, 0.1% were from other ethnics and 0.5% refused to answer. Except for 12 respondents, the majority had no previous history of breast cancer.

The groups aged 18 to 30, 31 to 45, 46 to 60, and 61 or above were distinct groups which differed in education level, occupation and monthly household income. In general the younger the age group, the larger the proportion with higher education of secondary school or above ( $\chi^2 = 386$ ,  $P < 0.001$ ) and being employed ( $\chi^2 = 492$ ,  $P < 0.001$ ). The age group 31 to 45 was the highest proportion with monthly income higher than HKD\$30,000 (USD\$3822).

Respondents aged above 60 constituted nearly half (47.9%) of the total and 70

**Table 2 Demographic data of all participants**

	Total(n = 1000)	Percentage (%)
Age (median age group)	56-60	-
18 - 30	67	6.7
31-45	179	17.9
46-60	272	27.2
61 or above	479	47.9
Education		
Primary school or below	379	37.9
Secondary school	472	47.2
Diploma or above	119	11.9
Occupation		
Housewife	354	35.4
Employed	241	24.1
Retired or unemployed	361	36.1
Monthly household income		
HKD\$10000 or below	231	23.1
HKD\$10001-20000	164	16.4
HKD\$20001-30000	108	10.8
HKD\$30001 or above	190	19.0
District		
Reside in 5 districts with lowest domestic household monthly income <sup>1</sup>	281	28.1

<sup>1</sup>Sham Shui Po, Kwun Tong, Kwai Tsing, North and Wong Tai Sin District.

constituted a quarter (25.8%). When comparing with the mid-2017 census female population by age group which was 23.5% in the population, there was double in proportion of female respondents > 60 or above in this survey<sup>[24]</sup>. Respondents below 35 year-old were half of the female population distribution, it was 10.5% compared to 21.0% in the population. The highest proportion (35.5%) of the respondents was retirees, which cohered with the age distribution that nearly half of them were aged 60 or above. Around one-third (35.4%) were full-time housewives.

More than one quarter (28.1%) of the respondents resided in five districts with the lowest domestic household monthly income among all 18 districts in Hong Kong. Half (50.3%) of all respondents had a monthly household income less than HKD\$30000. The median monthly household income in Hong Kong was HK\$24900 in 2016<sup>[25]</sup>. The low median domestic household income of the respondents could be explained by the high proportion of retirees (35.5%) and above age 60 (47.9%) among our respondents.

### **Awareness of signs and symptoms**

A paired question on awareness of signs and symptoms of breast cancer was asked. The respondents was first asked an open question aiming to find out how many early warning signs the respondent could think of without specific prompting. Afterwards respondents were asked about 11 different symptoms. All may be early warning signs of breast cancer, although most may also indicate other less serious conditions (Table 3).

When asked openly, 80.5% of the respondents recalled at least one symptom and half (49.4%) listed two or more. The majority (75%) of respondents can tell “a lump or thickening in breast” could be a sign of breast cancer. Around one-fifth of respondents named “lump or thickening under armpit” (22.7%), “pain in one of breasts or armpit” (21.2%), or “discharge or bleeding from nipple” (20.5%) as other symptoms.

When asked about different symptoms, the majority of respondents chose “yes” (correct answer) when asked the above four signs and symptoms of breast cancer. This cohered with the results in the open question. Comparatively many respondents did not know “nipple rash” (48.4% answered correctly), “redness of breast skin” (41.2%), “change in the position of nipple” (35.6%), and “changes in the size of breast or nipple” (34.1%) were possible signs of breast cancer.

Those with higher education and in the 31 to 45 age group recalled most signs and symptoms of breast cancer without prompting when compared to those with lower

Table 3 Breast cancer awareness

	Awareness of signs and symptoms of breast cancer <sup>1</sup>		Awareness of age-related lifetime risk		Awareness of risk factor for breast cancer <sup>2</sup>	
	Yes %	OR <sub>adj</sub> (95%CI)	Yes %	OR <sub>adj</sub> (95%CI)	Yes %	OR <sub>adj</sub> (95%CI)
Total (n = 1000)	20.3	--	26.5	--	25.7	--
Age						
18 - 30 (n = 67)	10.4	0.46 (0.19-1.11)	15.2	0.45 (0.21-0.98)	38.8	2.18 (1.15-4.14)
31 - 45 (n = 179)	40.8	2.83 (1.61-4.97)	19.8	0.66 (0.38-1.15)	41.3	2.38 (1.39-4.08)
46 - 60 (n = 272)	23.9	1.44 (0.85-2.41)	30.9	1.20 (0.77-1.89)	34.6	2.10 (1.30-3.37)
61 or above (n = 479)	11.9	1.00	28.1	1.00	25.8	1.00
Education						
Secondary school or above (n = 262)	27.9	2.80 (1.77-4.44)	24.8	0.91 (0.60-1.32)	34.5	1.76 (1.16-2.66)
Below secondary school (n = 641)	9.3	1.00	29.4	1.00	13.0	1.00

<sup>1</sup>Can recall three or more early warning signs of breast cancer;

<sup>2</sup>Can recall two or more risk factors for breast cancer.

education (OR = 2.80, 1.77-4.44) and other age groups (OR = 2.83, 1.61-4.97). Besides, these groups recognised more signs and symptoms when they were mentioned. There was no significant difference in odds ratio when comparing employment status, district one resided and family income.

#### Awareness of risk factors

Again, we asked risk factors for breast cancer in paired questions. First, an open question and afterwards about 10 different risk factors that were risk factors of breast cancer, in which all were the correct answers (Table 3).

When asked openly, 58.5% of the respondents could name at least one risk factor and 25.7% could list two. "Having a close relative with breast cancer" was the most commonly listed risk factor of breast cancer and 45.3% of respondents named this without prompting. The listing of other risk factors remained low, and 4.8% of respondents answered "smoking".

When prompt, the three answers with highest number of respondents who answered "strongly agree" were: "having a close relative with breast cancer" (48.1%); "a past history of breast cancer" (23.2%); and "feeling stressful (> 50% of time)" (18.7%). These three risk factors were "agreed" or "strongly agreed" by > 70% of the respondents as factors that increase the chance of breast cancer.

Those in the 31 to 45 and 46 to 60 age groups recalled most risk factors without prompting when compared to those in the 61 or above age groups (OR = 2.38, 1.39-4.08) and (OR = 2.10, 1.30-3.37). Those in the 18 to 30 age group and with higher education also performed better in recalling risk factors, but the result was not statistically significant using  $P < 0.0045$ . Again, there was no significant difference in odds ratio when comparing employment status, district one resided and family income.

#### Awareness of age-related risk

On women's awareness of how age relates to breast cancer, the majority (76.1%) got a wrong answer. The suggested correct answer to the question "In the next year, who is most likely to develop breast cancer?" is "a 70 year old woman". As the median age of breast cancer patients was 56 in Hong Kong, the answer "a 50 year old woman" was also considered correct. The majority of all respondents (56.4%) answered "A woman of any age". In fact, the risk of breast cancer usually increases with increasing age. Most women who get breast cancer are past their menopause (Table 3).

#### Perception and practice of regular breast examination and MMG screening

The original United Kingdom CAM in this section is about the NHS breast cancer screening programme. Therefore questions in this survey were modified to those related to breast examination and MMG screening. There was 78.8% of respondents opined that regular breast examination was required by those even without a family history. The highest percentage (22.6%) of respondents suggested that age group 30 to 34 would be a good age to start regular breast exams (Table 4).

A large proportion of female (42%) rarely or never perform BSE, 10% did it once every 6 months, 21% once every month, and 27% at least once a week. A total of 48%

**Table 4 Breast cancer screening and perception**

	Monthly or more frequent breast self-exam		Have mammography at least once every 2 yr		Agree that breast exam is needed for those without family history	
	Yes %	OR <sub>adj</sub> (95%CI)	Yes %	OR <sub>adj</sub> (95%CI)	Yes %	OR <sub>adj</sub> (95%CI)
Total (n=1000)	48.0	--	16.8	--	78.5	--
Age						
18 - 30 (n = 67)	35.8	0.36 (0.20-0.67)	6.0	0.22 (0.07-0.65)	94.0	2.96 (1.00-8.82)
31 - 45 (n = 179)	58.7	0.86 (0.53-1.39)	23.5	1.02 (0.55-1.89)	93.9	2.20 (1.04-4.65)
46 - 60 (n = 272)	60.7	1.19 (0.80-1.79)	24.6	1.35 (0.79-2.31)	85.3	1.05 (0.63-1.73)
61 or above (n = 479)	38.6	1.00	11.3	1.00	67.2	1.00
Education						
Secondary school or above (n = 262)	58.2	2.38 (1.71-3.31)	22.5	2.64 (1.63-4.26)	88.5	2.17 (1.47-3.12)
Below secondary school (n = 641)	33.3	1.00	8.3	1.00	64.8	1.00

All three questions in this table are not in the United Kingdom CAM questionnaire. CAM: Cancer awareness measure.

of the respondents reported BSE at least once a month. There was no difference in BSE compared by age, district, employment status and family income, but those with higher education had more monthly or frequent BSE (OR = 2.39, 1.71-3.31) (Table 4).

MMG examination was known by 73.5% of the respondents, while 26.5% had never heard of it before. In all respondents, 16.8% would have regular MMG at least every two years, while 61.8% of respondents never had an MMG. There was a 2.7 times by proportion of those with higher education had 2-yearly or more frequent MMG than those with lower education (OR = 2.64, CI: 1.63-4.26).

There was no association of the frequency of BSE with the residing districts ( $\chi^2$ -test  $P < 0.686$ ). However, there was a statistical significant association of having a less frequent MMG with residing in low-income districts. The proportion of women having a two yearly or more frequent MMG living in lower-income districts was 4.7%, compared to 23.4% in higher-income districts ( $\chi^2$ -test  $P < 0.0001$ ).

We asked the 61.8% of the respondents who never had an MMG for their reasons. "I am healthy, do not see the need" (31.3%) and "Have not heard of MMG" (18.9%) were the most common reasons, constituting a half of this group of respondents. "Expensive", "do not have time", "doctor does not see the need" and "I am still young" were some of the other reasons. "To prevent getting breast cancer" (16.9%), "I am not young, see the need" (16.3%) and "It is included in my body checkup" (11.3%) were the top reasons for going for an MMG in this survey.

In all, 62.6% of respondents reported that they were "not at all confident" or "not very confident" that they would notice a change in their breasts, whereas only 37.4% expressed they were fairly or very confident.

### Seeking medical help

There is no right or wrong answer to this question. The majority (78.4%) would go to consult a doctor immediately about a change they noticed in their breasts. However, the remaining (19.2%) expressed "do not know" if they would consult a doctor or not. Multiple choices were given to those who answered "do not know". Around half (49.5%) said they would visit a doctor within one week, while nearly half (46.7%) still expressed they were uncertain how soon they would visit a doctor.

Respondents with better result in recalling breast cancer signs and symptoms were more likely to seek immediate medical help when noticed a change in their breasts ( $\chi^2$ -test  $P = 0.038$ ).

### Prevention practices

The survey asked an open question aiming to find out what the respondent did to prevent breast cancer without specific prompting. A lot of people (44.2%) did nothing to prevent breast cancer. Respondents with better result in recalling breast cancer signs and symptoms were more likely had tried prevention practice(s) ( $\chi^2$ -test  $P < 0.001$ ). Thirty-one percent (31.2%) stated they had a "regular breast exam" to prevent breast cancer. In fact, breast exam is secondary prevention for early detection of symptom, but in itself does not reduce the chance of having breast cancer. Those with higher education level were more proactive in prevention practices, and more had tried prevention practices (OR = 2.80, 1.96-4.02).

### Access to information

The last 4 questions were related to access to information on breast cancer. These are additional questions which were not in the United Kingdom CAM. They were asked because we wanted to know what the preferred ways of receiving breast cancer information were.

Half of the respondents (49.2%) said there was sufficient information on breast cancer, but the other half answered “no” (28.0%) or “don’t know” (22.8%). The younger age groups of 18 to 30 and 31 to 45 had a lower proportion opined that there was sufficient information on breast cancer, when compared to the 61 or above age group (OR 0.17, 0.09-0.32; OR 0.42, 0.26-0.69).

When asked about where the respondents obtained information related to breast health, cancer and problems, many of them said they got their information from media (71.3%), general practitioners (31.3%), internet (23.4%), friends (18.1%), gynaecologist (17.3%), and others. When asked about respondents’ preferred way of receiving information on breast cancer related information, TV (79.9%) and internet (25.4%) were the chosen ways of receiving information by the majority.

Lastly we asked how the respondents would like to receive reminder messages for breast check-ups. Telephone or SMS (70.8%) were the most popular methods; followed by letter invitation (22.7%) and email with educational information (9.2%).

## DISCUSSION

This survey is a territory-wide representative sample of 1000 Chinese women aged above 18 years. In reviewing the literature we found no other study using a validated measure to assess cancer awareness in a population based sample in Hong Kong.

### Breast cancer awareness

The recall rates of breast cancer signs/symptoms and risk factors was unsatisfactory. The recall rate of cancer warning signs using an open question was < 25% for all signs and symptoms, except “lump or thickening in breast”, which was mentioned by 75.0% of respondents. A 58.5% of the respondents could name at least one risk factor and 25.7% could list two. The recall of most other risk factors remained low, and each were recalled by < 7% of respondents. This would be contributed by a large number of respondents aged above 60 constituted nearly half (47.9%) of the total and 70 constituted a quarter (25.8%). In addition, one-third (37.9%) of the respondents had education level Primary school or below. The recognition scores were higher than the recall scores for both the cancer warning signs/symptoms and risk factors. It is difficult to determine which better captures the concept, but both are good indicators of cancer awareness. Those can recall three or more signs and symptoms were more likely to seek immediate medical help when noticed a change in their breasts ( $\chi^2$ -test  $P = 0.038$ ), and had tried prevention practice ( $\chi^2$ -test  $P < 0.001$ ). This suggest awareness of breast cancer may predict better behaviour in terms of disease prevention and early detection.

It was perceived by more than one-fifth of the respondents that a lot of women developed breast cancer in age around 50s. In fact, the older the age, the higher the risk in incidence and death from breast cancer. The pattern of age-specific incidence rate and the age-specific death rate due to female breast cancer increased with age. It is noteworthy that the incidence rate for age group 45 to 54 has a marked increasing trend from 1983 to 2000 from 77.5 to 123.9 per 100000<sup>[26]</sup>. In the Hong Kong Breast Cancer Registry, 66% of breast cancer patients were aged between 40 and 59<sup>[27]</sup>. The median age of breast cancer patients was 56 in Hong Kong, which is younger when compared with 62 in the US and 61 in Australia, but similar to 53 in Singapore<sup>[27-30]</sup>.

It is recognised that the demography of the young and old respondents were different. The less than 61 year-old age groups had higher education level, more proportion being employed and with higher monthly household income than the 61 year-old or above age group. The odds ratios of the two groups in many variables were statistically significant even after adjustment of demography. These findings are coherent with previous evidence that women in higher socio-economic status and education were better knowledgeable on cancer risks and more likely to have breast screening<sup>[31]</sup>. In fact, these finding may also reflect memory loss or cognitive impairments in the older age group.

### Perception and Practice of breast examination and screening

Evidence has showed that BSE screening has no clear benefit on mortality or detection of carcinoma in situ and may increase unnecessary surgical biopsies<sup>[32,33]</sup>. Breast cancers that are detected clinically or by BSE are typically of more advanced stage. A



Shanghai study on Chinese participants conducted earlier showed BSE has no benefit in mortality reduction after follow up of 5 years<sup>[34]</sup>. Therefore BSE is not recommended as an early detection tool.

However, BSE is part of breast cancer awareness and there are a lot of women detect breast cancer by BSE. As shown in the annual report of the Hong Kong Breast Cancer Foundation, the primary method of first breast cancer detection in the patient cohort was self-detection by chance (83.3%)<sup>[35]</sup>. The Department of Health in Hong Kong does not provide any firm recommendations on the frequency with which women should check their breasts<sup>[36]</sup>. The percentage of monthly or more frequent BSE among women in Hong Kong (48%) was higher when compared with ethnic groups South Asian (12.6%), Black (17.8%) and White (27.6%) in the 2010 United Kingdom Breast-CAM survey in London<sup>[37]</sup>. The reason why in United Kingdom women conducted less frequent BSE may be because they have population-based screening. Women are invited and reminded to national screening by MMG.

The proportion of women having a two yearly or more frequent MMG living in high-income districts was 5 times higher when compared to low-income districts ( $\chi^2$ -test  $P < 0.0001$ ). Unlike United Kingdom, United States and Australia, Hong Kong has no population-based breast cancer MMG screening. This leads to a self-reliance on BSE to detect breast cancer early if finance is a barrier. Knowledge and screening practice is obviously skewed towards women from high-income districts. This echoes with a previous local study<sup>[38]</sup> that higher socioeconomic status and a higher educational level were associated with an earlier stage of the disease at the time of diagnosis, as MMG screening every 2 to 3 years were significantly associated with the earlier detection of breast cancer.

When compared to United Kingdom Breast-CAM done from 2009 to 2010<sup>[39]</sup>, there were a much higher percentage of women recognised five or more non-lump symptoms of breast cancer in our surveyed population (79.1% *vs* 17.7%). Women in the United Kingdom survey were more confident to notice a change in breast (51.8% *vs* 37.4%) and fewer people reported breast checking at least once a month (22.6% *vs* 48%) when compared to this survey respondents.

### **Strengths and weaknesses of the study**

We used a validated measure of cancer awareness, and adjusted our analyses for potential confounders with a reasonable large sample size. The response rate was 57.8%, which is acceptable. It is important to note that, while the sample was randomly sampled, there is an element of self-selection bias inherent in this voluntary survey. Besides, it can be assumed that the sample was biased towards those with interest in breast cancer. However, the sample size is sufficiently large to represent Hong Kong Chinese women who are interested in this topic. There were few missing data, and therefore responses are representative of the survey respondents.

There is a higher proportion of respondents at age  $> 60$  or above and fewer in those age  $< 35$  when compared to census population strata. As cancer is strongly related to increasing age, and many respondents were at relatively high risk due to their older age, the results would be applicable to the older and most at-risk group.

There are surveys using United Kingdom CAM reported socio-demographic differences in cancer symptom awareness and barriers to symptomatic presentation<sup>[31,39]</sup>. Further study can be performed to examine breast cancer awareness and disease risk perception in association with socioeconomic status. Besides, other studies to explore whether there are differences in cancer awareness in places with and without national screening programme would provide insights to the impact of territory-wide initiatives.

In conclusion, Women with higher education were better knowledgeable on breast cancer warning signs, more likely had breast screening and tried cancer prevention practices. The awareness of breast cancer was lower in age group 61 or above than the younger age groups. These results indicated a government-led public health initiatives should raise awareness on prevention and early detection of breast cancer in women, with targeted promotion strategy for those with low education level and advance in age.

## **ARTICLE HIGHLIGHTS**

### **Research background**

Breast cancer is the most common cancer in women worldwide. In Hong Kong, breast cancer accounted for 26.6% of all new cancers in females diagnosed in 2015. The median age of breast cancer patients was 51.0 in Hong Kong, which is younger, when compared with 62 in the United States and 61 in Australia.

**Research motivation**

The emphasis of previous research conducted in Hong Kong focused mainly on knowledge, perception and behavior on screening tests, rather than disease awareness. In reviewing the literature we found no other study using a validated measure to assess cancer awareness in a population based sample in Hong Kong. In addition to screening practices, this survey aims to examine women's awareness and knowledge about breast cancer. Online search of validated questionnaires on awareness of breast cancer yielded three validated tools. The Cancer Awareness Measure (CAM) of the Cancer Research United Kingdom was chosen.

**Research objectives**

The aim of this study is to examine Hong Kong women's awareness, perception, knowledge, and screening practice of breast cancer. Early cancer detection and diagnosis saves lives, because treatments are most likely to be effective in people who are diagnosed at an earlier stage. It is of interest to know how women of different age vary in awareness of the risks of breast cancer, so that public health promotion intervention would be customized to distinct subpopulations.

**Research methods**

We carried out a population-based cross-sectional survey using random telephone interviews to women aged 18 or above. The original United Kingdom CAM was modified according to the local context as there is no national breast cancer screening in Hong Kong. The data was analysed using proportions, chi-square test and adjusted odds ratios (ORs).

**Research results**

A total of 1000 participants completed the CAM questionnaire from 1731 responses (response rate = 57.8%) from September to October 2017. Respondents received higher education (secondary school or above) had better breast cancer awareness, more frequent screening and more had tried prevention practices when compared to those with lower education. Those in age groups 31-45 and 46-60 had higher percentages in performing breast self-exam and mammography when compared to the 18 - 30 and 61 or above age groups.

**Research conclusions**

The survey results indicated a government-led public health initiatives should raise awareness on prevention and early detection of breast cancer in women, with targeted promotion strategy for those with low education level and advance in age.

**Research perspectives**

Further study can be performed to examine breast cancer awareness and disease risk perception in association with socioeconomic status. Besides, other studies to explore whether there are differences in cancer awareness in places with and without national screening programme would provide insights to the impact of territory-wide initiatives.

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