CHAPTER 1

PREVENTION AND EARLY DETECTION OF BREAST CANCER

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This chapter reviews the Hong Kong breast cancer patient demographics, lifestyles and health background to provide an insight into potential risk factors that contribute to breast cancer and in particular to the significantly increased incidence rate. To achieve this, analysis was conducted on a cohort of 7,421 patients enrolled in the HKBCR.

KEY FINDINGS

- The mean age at diagnosis was 50.1 years and the median age at diagnosis was 48.8 years. Most breast cancer cases (84%) were diagnosed after age 40.
- The most common bra cup size was B or smaller, and the most common bra size was 34 inches.
- Among the patients who were working (57%), 8.9% reported that they were required to work night duties.
- The top 10 risk factors for breast cancer among the patients are:
  - Lack of exercise (< 3hrs / week) (74.9%)
  - No breastfeeding (63.4%)
  - High level of stress (> 50% of time) (37.1%)
  - Being overweight / obese (36.1%)
  - No childbirth / First live birth age after 35 (23.5%)
  - Family history of breast cancer (14.9%)
  - Diet rich in meat / dairy products (13.9%)
  - Early menarche (< 12 years old) (13.3%)
  - Use of hormone replacement therapy (11.0%)
  - Frequent night shifts (8.9%)
- 83.2% of the patients had 2 or more risk factors. Only 3.2% did not have known risk factor.
- The rates of regular breast self-examination (21.9%) and mammography screening (24.6%) in the patients were low. The rates of those who had never conducted breast self-examination or clinical breast examination were higher in the 40 and above age group than in the under 40 age group.

1.1 Demographics

Breast cancer age distribution has been shown to differ between population groups. Several studies have highlighted these differences demonstrating the importance of studying age distribution individually in each population group[5-8].

The analysis demonstrated that the peak age at diagnosis was 40-59 (Figure 1.1). Most breast cancer cases (84.9%) were diagnosed after age 40. The mean age at diagnosis was 50.1 years, and the median age at diagnosis was 48.8 years. The range of age at diagnosis was 18.8 – 101.4 years.

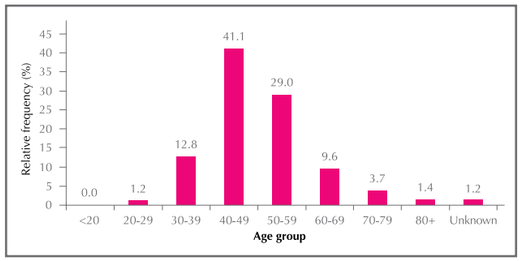

Figure 1.1 Distribution of age at diagnosis (N=7,241)

Note: Only one patient belonged to the <20 age group.

Breast cancer is rare in men[3]; only 0.1% (5) of our patient cohort were male.

The proportion of patients who were working in an occupation (professional/clerical, non-clerical/labour, or self-employed) was higher than the proportion of those not working (housewife, retired, or unemployed). 34.4% of the patients were professionals or clerical workers, and 30.9% were housewives (Figure 1.2).

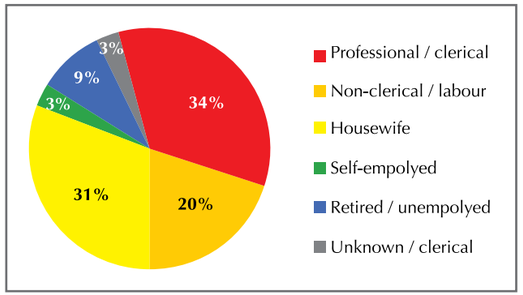

Figure 1.2 Occupation of the patients (N=7,241)

Among those who worked in an occupation before diagnosis, the mean working hours was 46.1 hours per week with a standard deviation of 14.3 hours per week. The working hours per week reported ranged from 1.0 to 126.0 hours.

A recent Danish study demonstrated that women who frequently worked night shifts were more likely to have breast cancer, and suggested that the risk increased with longer duration of intense night shifts[9].

Within the patient cohort, 8.9% (369) reported they were required to carry out night duties before diagnosis. The median frequency of night duties was 84 nights per year.

Around half of the patients were educated to secondary school level (48.4%) (Figure 1.3). Around half of the patients lived in the New Territories (53%) (Figure 1.4).

The most common bra size among the patients was 34 inches or less; and the most common bra cup size was cup B or smaller (Figures 1.6 & 1.7).

CHAPTER 1

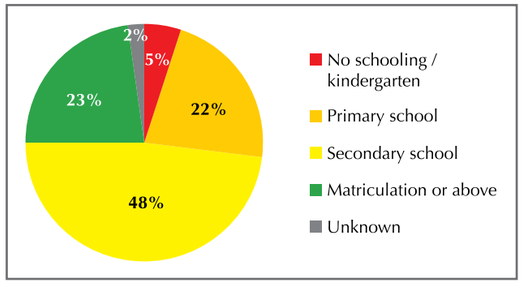

Figure 1.3 Education level of the patients (N=7,241)

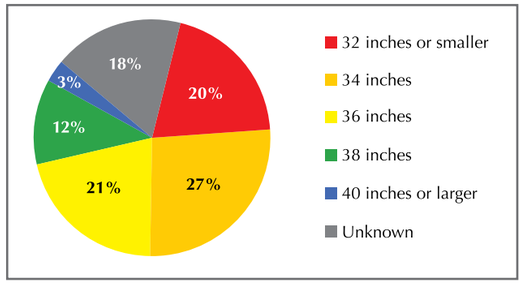

Figure 1.6 Bra size of the patients (N=7,241)

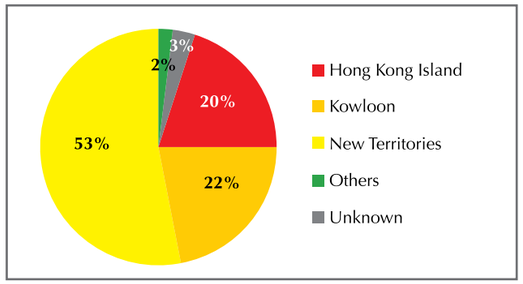

Figure 1.4 Distribution of residential districts of the patients (N=7,241)

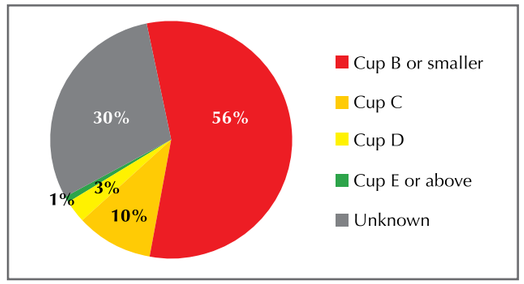

Figure 1.7 Bra cup size of the patients (N=7,241)

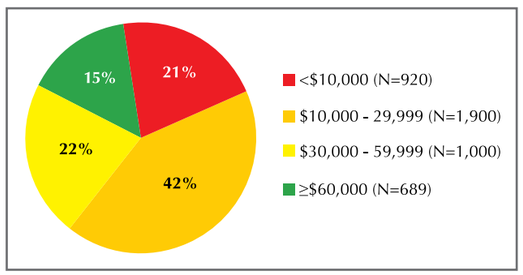

Figure 1.5 Monthly household income of the patients (N=4,509)

Note: 2,732 (37.7%) patients did not specify their household monthly incomes

1.2 Risk factors and health background

Smoking and alcohol drinking are known risk factors for breast cancer.

1.2.1 Smoking

Of the 7,241 patients, 334 (4.6%) smoked for an average duration of 18.6 years at the rate of 3.8 cigarette packs per week. Among those who had ever smoked, 170 (50.9%) had quit smoking for 6.6 years at the time of diagnosis.

1.2.2 Alcohol drinking

Of all patients, 401 (5.5%) were alcohol drinkers who, on average, drank for a mean duration of 15.1 years with approximate consumption of 4 glasses of alcoholic beverages per week. Common types of alcoholic beverages consumed were red wine (26.9%), beer (22.9%) and mixed types of wine (13.0%). Of those who drank alcohol, 9.7% had stopped drinking at the time of diagnosis.

1.2.3 Dietary habits, exercise and stress level

Unhealthy diet, stress and lack of exercise are also considered risk factors for breast cancer.

Two-thirds of the breast cancer patients took a balanced diet (67.1%) (Table 1.1). However 37.3% of patients never exercised; 37.6% exercised less than 3 hours per week; 66.5% suffered from moderate to high level of stress (Table 1.1).

Table 1.1 Dietary habits, exercise habits and stress levels at the time of diagnosis (N=7,241)

	Number	(%)
Dietary habit		
Meat rich / dairy product rich	1,010	(13.9)
Vegetable rich / Vegetarian	975	(13.5)
Balanced diet	4,856	(67.1)
Unknown	400	(5.5)
Exercise		
Never	2,702	(37.3)
< 3 hours per week	2,720	(37.6)
≥ 3 hours per week	1,740	(24.0)
Unknown	79	(1.1)
Stress level		
High level*	2,685	(37.1)
Moderate level**	2,127	(29.4)
Low level	2,301	(31.8)
Unknown	128	(1.8)

* High level: defined as more than 50% of the time

** Moderate level: defined as 25-50% of the time

1.2.4 Body mass index

Diet, exercise and stress all affect patient weight. Body Mass Index (BMI) is a heuristic method of estimating human body fat based on an individual's height and weight.

It has been shown that increased BMI is associated with increased risk of breast cancer in postmenopausal women[10,11]. For Asian adults, a BMI of 23-24.9 is considered overweight, and a BMI of 25 and over is considered obese (WHO classification)[12]. 19.5% of the patients were obese, while 14.0% were underweight (Table 1.2).

Table 1.2 Body mass index at the time of diagnosis (N=7,241)

	Number	(%)
BMI		
≥ 25.0 (Obese)	1,412	(19.5)
23.0-24.9 (Overweight)	1,203	(16.6)
18.5-22.9 (Normal weight)	3,233	(44.6)
< 18.5 (Underweight)	1,011	(14.0)
Unknown	382	(5.3)

The average height and weight of the patient cohort were 157.9cm (SD: 5.7cm; median: 157.5cm) and 56.7kg (SD: 9.9kg; median: 55.0kg) respectively.

1.2.5 Family history of breast cancer

Familial breast cancer refers to the increased risk of breast cancer in adult women with family history of breast cancer. The majority (83.4%) in the patient cohort had no family history of breast cancer; only 14.9% had a family history of breast cancer (Table 1.3).

Table 1.3 Family history of breast cancer at the time of diagnosis (N=7,241)

	Number	(%)
No	**6,041**	**(83.4)**
Yes		
First-degree relative(s)	721	(10.0)
Non first-degree relative(s)	332	(4.6)
Details unknown	29	(0.3)
Unknown family history	**118**	**(1.6)**

1.2.6 Personal history of tumours

In the patient cohort, 80% had no history of previous tumours. Among the patients with personal history of tumours, 80.2% had benign tumours while 15.4% had malignant tumours (Table 1.4). The types of malignant tumour history and frequency can be found in Table 1.5.

Table 1.4 Personal history of tumours at the time of diagnosis (N=7,241)

	Number	(%)
No	5,792	(80.0)
Benign tumour	942	(13.0)
Malignant tumour	181	(2.5)
Unknown nature of previous tumours	52	(0.7)
Unknown history of tumours	274	(3.8)

Table 1.5 Types of malignant tumours reported by the patients

	Number	(%)
Thyroid cancer	21	(11.6)
Colorectal cancer	14	(7.7)
Uterus cancer	7	(3.9)
Nasopharyngeal cancer	7	(3.9)
Ovarian cancer	6	(3.3)
Cervical cancer	5	(2.8)
Intestinal cancer	4	(2.2)
Lung cancer	3	(1.7)
Lymphoma	3	(1.7)
Skin cancer	3	(1.7)
Stomach cancer	3	(1.7)
Tongue cancer	2	(1.1)
Others*	12	(6.6)
Unknown	97	(53.6)

* Others include: bone cancer, esophagus cancer, fallopian tube cancer, leukemia, liver cancer, medullary cancer, neck cancer, parotid gland cancer, salivary gland cancer, sigmoid cancer, urological cancer

1.2.7 History of benign breast disease

Benign breast disease is common among women of reproductive age and some conditions such as papillomatosis and atypia are known risk factors for breast cancer, although the magnitude of association varied with the type of lesion[13-15]. Of the patients who had previous breast disease, 1.5% had atypia and 0.3% had papillomatosis.

Table 1.6 History of breast disease at the time of diagnosis

	Number	(%)
History of previous breast disease	1,015	(14.0)
Type of previous breast disease		
Fibroadenoma	422	(41.6)
Fibrocystic disease	113	(11.1)
Papilloma	24	(2.4)
Papillomatosis	3	(0.3)
Atypia	15	(1.5)
Unknown	570	(56.2)

1.2.8 Early menarche, late menopause and reproductive history

A woman's breast cancer risk is linked to several reproductive factors, such as early age at menarche, late menopause, later age at first childbirth, and no experience of childbirth. These factors increase the duration and/or levels of exposure to reproductive hormones produced in her body, which stimulate breast cell growth and thereby increase breast cancer risk. Both pregnancy and breastfeeding may reduce the risk of breast cancer because in these events, breast cells undergo cell differentiation.

Table 1.7 Early menarche, late menopause and reproductive history at the time of diagnosis

	Number	(%)
Menarche (N=7,241)		
Early menarche (<12 years of age)	966	(13.3)
Normal menarche (≥ 12 years of age)	5,797	(80.1)
Unknown	478	(6.6)
Menopause (N=3,523)		
Late menopause (>55 years of age)	138	(3.9)
Normal menopause (≤ 55 years of age)	2,896	(82.2)
Unknown age at menopause	489	(13.9)
Reproductive history (N=6,806)		
No childbirth	1,442	(21.2)
Childbirth at early age (≤ 35 years of age)	4,940	(72.6)
Childbirth at late age (>35 years of age)	262	(3.9)
Unknown age at first live birth	162	(2.3)
Breastfeeding (N=7,241)		
Yes	2,181	(30.1)
No (Had childbirth)	3,087	(42.6)
No (No childbirth)	1,442	(19.9)
No (Unknown reproductive history)	64	(0.9)
Unknown	467	(6.4)

Some researches hypothesised that differentiated breast cells are more resistant to becoming transformed into cancer cells than the cells that have not undergone differentiation[16,17].

13.3% of the patient cohort experienced early menarche, while only 3.9% of the menopausal patients experienced late menopause (Table 1.7).

The reported mean and median ages at menarche were 13.2 years and 13.0 years respectively. The reported mean and median ages at menopause were 49.0 years and 50.0 years respectively.

The mean age at first live birth was 26.9 years and the median number of live births was two. Mean duration of breastfeeding was 14.5 months (SD: 21.1months) (range: 0.1-216.0 months). However, 63.5% did not breastfeed.

Within the cohort, 21.2% of patients had no history of childbirth. Of the patients who experienced childbirth, only 4.9% had late childbirth. 27.5% had only one child; and 44.4% had two children (Table 1.8).

Table 1.8 Number of live births reported by patients (N=5,364)

No. of live births	Number	(%)
1	1,475	(27.5)
2	2,383	(44.4)
3	915	(17.1)
4	319	(5.9)
5	115	(2.1))
6	66	(1.2)
7	24	(0.4)
8	8	(0.1)
10+	4	(0.1)
Unknown	55	(1.0)

1.2.9 Use of oral contraceptives

The role of oral contraceptives as a risk factor is an area of controversy. Some consider it a potential risk factor[5] while others are not convinced. More information is needed before a conclusion is reached. However, data is collected by the BCR for potential future use. A recent study suggested a potential correlation between age of starting oral contraceptive pill and the age at breast cancer diagnosis[18]. Within the patient cohort, 31.5% used oral contraceptives; and among them, 40.1% had used oral contraceptives for over 5 years (Table 1.9).

Table 1.9 Use of oral contraceptives at the time of diagnosis (N=7,241)

OC use	Number	(%)
No	4,568	(63.1)
OC use < 5 years	983	(13.6)
OC use 5-10 years	616	(8.5)
OC use > 10 years	298	(4.1)
Unknown length of OC use	384	(5.3)
Unknown if OC was used	392	(5.4)

OC: Oral contraceptives

1.2.10 Use of hormone replacement therapy

Hormone replacement therapy (HRT) is sometimes used by women to provide relief from the symptoms of menopause. Menopausal patients who use hormone replacement therapy have higher risk of breast cancer in comparison to women who do not use HRT[19,20]. Only 11.1% of the menopausal patients in the cohort used HRT (Table 1.10) .

HRT associated risk of breast cancer is attenuated in women with high BMI[19], and increased risk of breast cancer due to high BMI is not seen in women who use HRT[21].

Table 1.10 Use of hormone replacement therapy (by menopausal patients) at the time of diagnosis (N=3,523)

HRT use	Number	(%)
Non-user	2,921	(82.9)
HRT use < 5 years	200	(5.7)
HRT use 5-10 years	115	(3.3)
HRT use > 10 years	21	(0.6)
Unknown length of HRT use	50	(1.4)
Unknown if HRT was used	216	(6.1)

1.2.11 *The ten most common risk factors in the patient cohort*

Among the risk factors, lack of exercise was the most common within the patient cohort, and no experience of breastfeeding was the second most common risk factor. High level of stress was the third most common risk factor among the patient cohort (Table 1.11).

Table 1.11 The ten most common risk factors in the patient cohort

Risk factor	Number	(%)
Lack of exercise (<3hrs / week)	5,422	(74.9)
No breastfeeding	4,593	(63.4)
High level of stress (>50% of time)	2,685	(37.1)
Being overweight / obese	2,615	(36.1)
No childbirth / First live birth age after 35	1,704	(23.5)
Family history of breast cancer	1,082	(14.9)
Diet rich in meat/ dairy products	1,010	(13.9)
Early menarche (<12 years old)	966	(13.3)
Use of hormone replacement therapy	386	(11.0)
Frequent night shifts	369	(8.9)

Most patients had at least one of the known risk factors, and 83.2% of them had two or more risk factors. 3.2% of patients had no known risk factor (Figure 1.8).

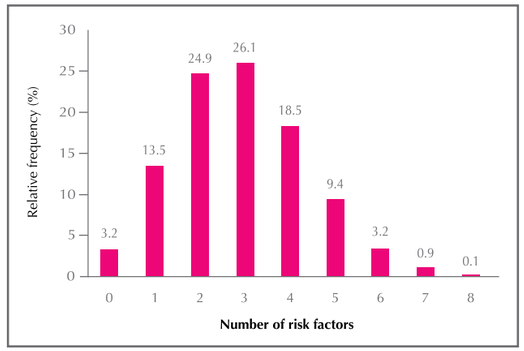

Figure 1.8 Number of risk factors for breast cancer at the time of diagnosis (N=7,241)

1.3 Breast screening habits

Breast screening is currently the recognised best method available for detecting cancer early, leading to reduced mortality in breast cancer. It is generally recommended that women aged over 40 should conduct monthly breast self-examination (BSE), and regularly attend clinical breast examination (CBE) and mammography screening (MMG). Ultrasound breast examination (USG) may be added for women with dense breasts.

More patients aged 40 and above had never conducted breast self-examination and clinical breast examination in comparison to patients under 40 years of age. In general, breast screening habits among patients were poor; only 22.6% of those under 40 and 21.7% of those aged 40 and above conducted regular breast self-examination; less than half (48.1% under 40 and 43.8% aged 40 and above) performed clinical breast examination. Women are advised to conduct mammography and ultrasound examinations starting at the age of 40. However, only 24.6% of the patients aged 40 and above conducted regular mammography and 20.6% of the patients aged 40 and above conducted regular ultrasound examinations (Table 1.12).

Table 1.12 Breast screening habits by age group

Breast examination	Age Group (years), Number (%) <40	40-49	50-59	60-69	70+
BSE					
Never	333 (33.9)	995 (34.4)	804 (39.7)	330 (48.9)	231 (65.8)
Occasional	428 (43.5)	1,225 (42.3)	766 (37.8)	215 (31.9)	90 (25.6)
Monthly	222 (22.6)	673 (23.3)	455 (22.5)	130 (19.3)	30 (8.5)
CBE					
Never	382 (38.6)	1,070 (36.8)	895 (43.9)	398 (59.8)	263 (76.0)
Occasional	132 (13.3)	364 (12.5)	239 (11.7)	83 (12.5)	32 (9.2)
Regular*	476 (48.1)	1,472 (50.7)	903 (44.3)	185 (27.8)	51 (14.7)
MMG					
Never		1,889 (65.3)	1,280 (62.9)	471 (70.2)	290 (83.1)
Occasional		255 (8.8)	206 (10.1)	66 (9.8)	27 (7.7)
Regular*		748 (25.9)	549 (27.0)	134 (20.0)	32 (9.2)
USG					
Never		1,877 (67.4)	1,362 (69.4)	504 (78.1)	287 (84.9)
Occasional		259 (9.3)	186 (9.5)	48 (7.4)	27 (8.0)
Regular*		648 (23.3)	414 (21.1)	93 (14.4)	24 (7.1)

BSE: Breast self-examination, CBE: Clinical breast examination, MMG: Mammography screening, USG: Breast ultrasound screening
* "Regular" is defined as having the screening test every 1-3 years

Overall more patients living in Hong Kong Island conducted regular clinical breast examination, mammography and ultrasound breast examination in comparison to the patients living in Kowloon or in the New Territories (Table 1.13).

Table 1.13 Breast screening habits by residential district

Breast examination	Residential District, Number (%) Hong Kong Island		Kowloon		New Territories	
BSE						
Never	373	(27.8)	695	(44.2)	1,535	(40.8)
Occasional	676	(50.3)	601	(38.3)	1,337	(35.5)
Monthly	294	(21.9)	275	(17.5)	891	(23.7)
CBE						
Never	360	(26.8)	793	(50.4)	1,749	(46.4)
Occasional	170	(12.6)	201	(12.8)	452	(12.0)
Regular*	814	(60.6)	578	(36.8)	1,570	(41.6)
MMG						
Never	635	(47.1)	1,099	(69.9)	2,712	(72.2)
Occasional	161	(12.0)	141	(9.0)	323	(8.6)
Regular*	551	(40.9)	332	(21.1)	719	(19.2)
USG						
Never	664	(53.9)	1,099	(72.2)	2,736	(74.4)
Occasional	150	(12.2)	135	(8.9)	310	(8.4)
Regular*	419	(34.0)	288	(18.9)	629	(17.1)

BSE: Breast self-examination, CBE: Clinical breast examination, MMG: Mammography screening, USG: Breast ultrasound screening

* "Regular" is defined as having the screening test every 1-3 years