CHAPTER 4

BREAST CANCER UNDER COVID-19 PANDEMIC

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I. Introduction

4.1 During the COVID-19 pandemic, on-site recruitment was suspended especially in public hospitals, leading to a skewed public-private distribution of participants. Although the number of registrations from public hospitals has gradually increased in the post-pandemic era, recovery takes time. To partial out the impact of COVID-19, this chapter sets out the patient characteristics, disease pattern and treatment trend of 5,967 patients who were diagnosed with breast cancer since 2019 and recruited in the HKBCR.

HIGHLIGHTS

This chapter sets out the patient characteristics, disease pattern and treatment trend of 5,967 patients who were diagnosed between 2019 and 2025.

Patient characteristics
► About 55% of the patients were aged between 40 and 59, with the median age at 56.4.
► More than 80% attained secondary school level or above.
► The 10 most common risk factors of breast cancer are listed below, with the respective proportions of risk exposure:

	%
Lack of exercise (<3 hours / week)	70.8
No breastfeeding	65.4
Being overweight / obese	44.8
High level of stress (>50% of time)	37.4
No childbirth / first live birth after age 35	37.2
Family history of breast cancer	19.3
Diet rich in meat / dairy products	12.3
Early menarche (<12 years old)	15.5
Habit of drinking alcohol	8.9
Use of hormone replacement therapy	2.9

► In the cohort, 64.7% of the patients had three or more common risk factors, while 32.7% had one to two risk factors. Only 2.5% of the patients had none of the common risk factors studied.

Disease pattern
► The primary method of first breast cancer detection in the patient cohort was self-detection by chance (64.2%), while detection through mammography screening constituted 22.6%.

► The most common cancer stage at diagnosis was stage I (34.9%) followed by stage II (30.3%) and stages III-IV (11.9%). In addition, 16.5% of the patients were diagnosed with stage 0 cancer.

► The mean size of invasive tumours was 2.0 cm, and 66.1% of the patients with invasive breast cancer had no positive axillary lymph nodes.

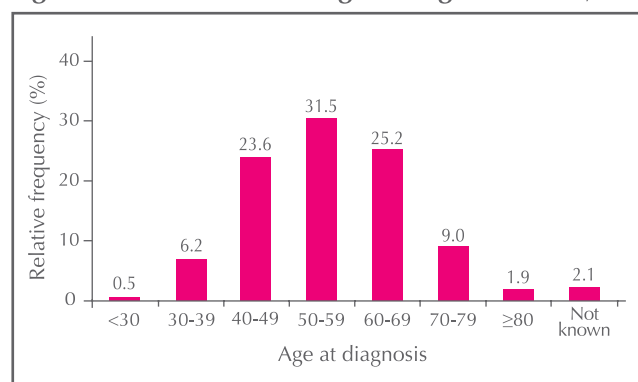► The mean size of in situ tumours was 2.0 cm.

Treatment
► Of the patients, 39.0% received care at private medical services, 26.3% received care at public medical services, and 34.7% received care at both private and public medical services.

► The number of treatment modalities increased with increasing cancer stage.

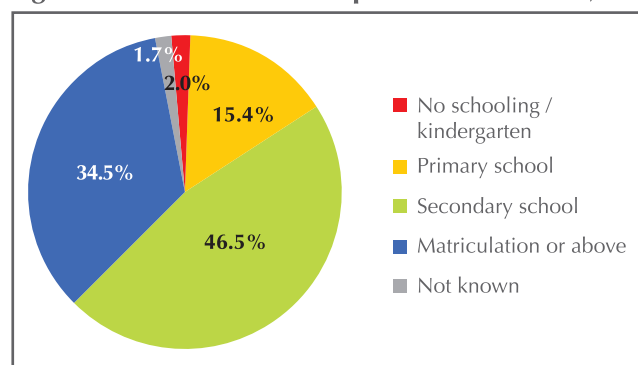## II. Patient characteristics

A. Demographics

4.2 The age at diagnosis ranged from 20 to 99 with about 55% of the patients aged between 40 and 59 (Figure 4.1), and the median was 56.4 years.

Figure 4.1: Distribution of age at diagnosis (N=5,749)

4.3 In this report, 81.0% of the patients attained secondary school level or above, while 17.4% had primary school level or below (Figure 4.2).

Figure 4.2: Education level of patient cohort (N=5,749)
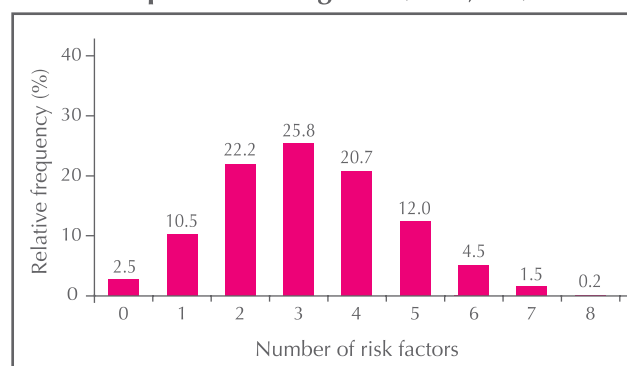

B. Ten most common risk factors associated with breast cancer in Hong Kong

4.4 Among all the risk factors studied, the majority were exposed to the factor of lack of exercise, followed by no breastfeeding experience (Table 4.1). In the cohort, 64.7% of the patients had three or more common risk factors, while 32.7% had one to two risk factors. Only 2.5% of the patients had none of the common risk factors studied (Figure 4.3).

Table 4.1: Ten most common risk factors for breast cancer in patient cohort (N=5,749)

	Number	%
Lack of exercise (<3 hours / week)	4,069	70.8
No breastfeeding	3,759	65.4
Being overweight / obese	2,578	44.8
High level of stress (>50% of time)	2,152	37.4
No childbirth / first live birth after age 35	2,136	37.2
Family history of breast cancer	1,112	19.3
Diet rich in meat / dairy products	707	12.3
Early menarche (<12 years old)	890	15.5
Habit of drinking alcohol	514	8.9
Use of hormone replacement therapy	167	2.9

Figure 4.3: Distribution of risk factors among patients at diagnosis (N=5,749)

C. Breast screening habits

4.5   Of the 5,244 patients aged 40 or above, 25.3% have never undergone any breast screenings, while about half had never undergone MMG or USG. Table 4.2 shows the breast screening habits in the patient cohort.

Table 4.2: Breast screening habits

| | Type of breast screening methods, % | | | |
	BSE (N=5,749)	CBE (N=5,749)	MMG$^{\#}$ (N=5,244)	USG$^{\#}$ (N=5,244)
Never	34.9	45.2	54.7	54.9
Occasional	44.0	20.2	18.9	18.5
Regular*	19.2	32.5	24.3	24.4
Not known	1.9	2.0	2.1	2.2

BSE: breast self-examination; CBE: clinical breast examination; MMG: mammography screening; USG: breast ultrasound screening

* "Regular" is defined as having BSE monthly or having the breast screening test every 1-3 years for CBE, MMG and USG
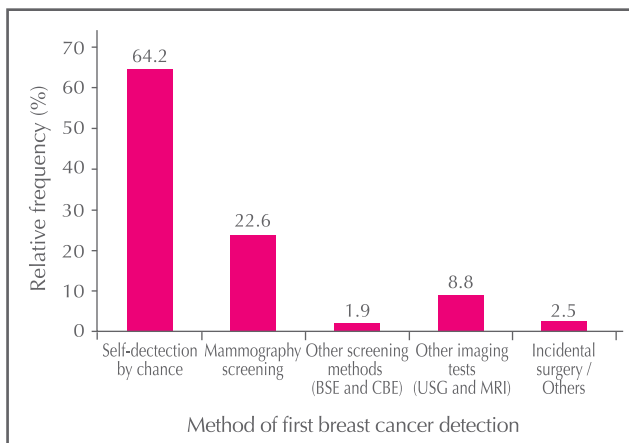
Included patients aged 40 or above only

III. Disease pattern and treatment trend

A. Clinical presentation

4.6   The primary method of first breast cancer detection in the patient cohort was self-detection by chance (64.2%), while detection through mammography screening constituted 22.6% (Figure 4.4).
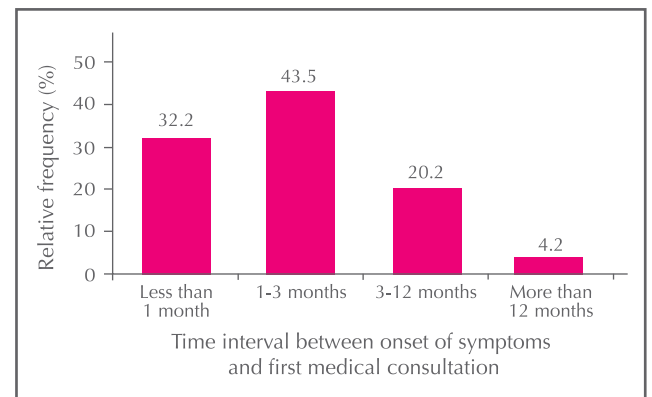
4.7   After the onset of symptoms, 32.2% of the patients who self-detected their cancers by chance sought first medical consultation in less than one month, while 24.4% waited more than three months before seeking first medical consultation (Figure 4.5).

Figure 4.4: Methods of first breast cancer detection in the patient cohort (N=3,460)

BSE: breast self-examination; CBE: clinical breast examination;
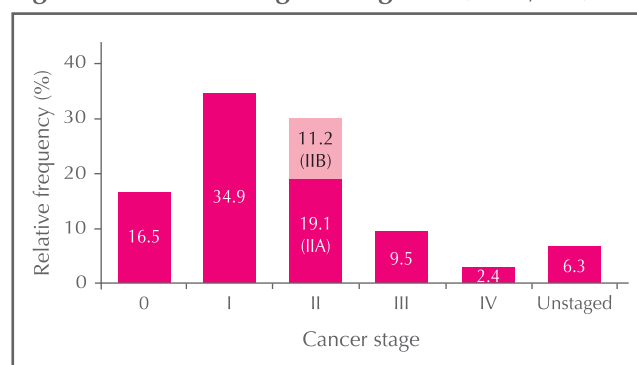USG: breast ultrasound screening; MRI: magnetic resonance imaging

Figure 4.5: Time interval between onset of symptoms and first medical consultation for patients who self-detected their cancer (N=1,645)

B. Cancer characteristics

4.8   The most common cancer stage at diagnosis was stage I (34.9%) followed by stage II (30.3%) and stages III-IV (11.9%). In addition, 16.5% of the patients were diagnosed with in situ cancer (stage 0) (Figure 4.6).

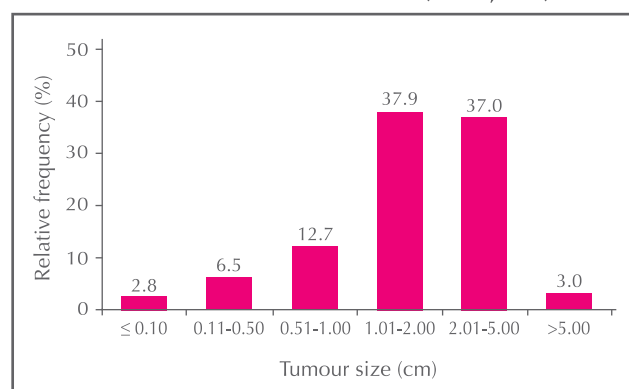### Figure 4.6: Cancer stage at diagnosis (N=3,514)

4.9   Of the 3,514 breast cancer cases analysed, data from 3,465 cases with available pathology data were used for subsequent analyses on cancer characteristics. A total of 2,889 patients were diagnosed with invasive cancer, while 576 patients were diagnosed with in situ cancer.
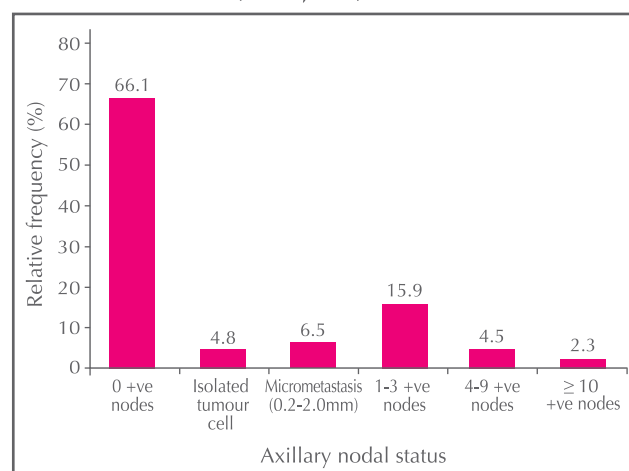
i. Characteristics of invasive breast cancer

4.10   The mean size of tumours of invasive breast cancer was 2.0 cm (standard deviation: ±1.4 cm). Tumours of one cm or less in size were found in 22.0% of the patients, while tumours of sizes 1.01 to 2.00 cm and 2.01 to 5.00 cm were respectively found in about 37.9% and 37.0% of the patients (Figure 4.7). Only a small proportion of patients had tumours of sizes exceeding five cm. In the patient cohort, screen-detected tumours were significantly smaller than those self-detected by chance (mean: 1.3±1.0 cm vs. 2.3±1.4 cm; p<0.001).

Figure 4.7: Distribution of tumour size (cm) of invasive breast cancer (N=2,185)

4.11   Of the patients with invasive breast cancer, 66.1% had no positive axillary lymph nodes, 4.8% had isolated tumour cells (metastasis size ≤ 0.2 mm or a cluster of fewer than 200 tumour cells), 6.5% had micrometastasis (metastasis size > 0.2 mm and ≤ 2 mm), while 22.7% had at least one positive axillary lymph node with metastasis size larger than two mm (Figure 4.8).

Figure 4.8: Number of positive axillary lymph nodes among patients with invasive breast cancer (N=2,291)

4.12 The surrogate definitions of the intrinsic biological subtypes and their relative frequencies by cancer stage in the patient cohort are shown in Table 4.3.

Overall, 71.0% of the invasive tumours were HR+ HER2-, 10.9% were HR+ HER2+, 7.7% were HR- HER2+ and 10.5% were TNBC.

Table 4.3: Biological subtypes of invasive tumours by cancer stage (N=2,664)

	Cancer stage, %				
	I (N=1,200)	IIA (N=662)	IIB (N=387)	III (N=334)	IV (N=81)
Luminal A	41.2	26.3	19.1	12.9	9.9
Luminal B (HER2 negative)	25.5	35.0	40.8	38.0	35.8
Luminal A/B (HER2 negative)	9.8	12.4	15.0	12.6	8.6
Luminal B (HER2 positive)	7.4	10.9	11.1	12.0	21.0
HER2 positive (HR negative)	7.0	5.1	5.2	11.1	13.6
TNBC	9.2	10.3	8.8	13.5	11.1

HR: hormone receptors (ER and PR)
Luminal A: ER and/or PR+, HER2-, and low Ki-67 index (<14%)
Luminal B (HER2 negative): ER and/or PR+, HER2-, and high Ki-67 index (≥14%)
Luminal A/B (HER2 negative): ER and/or PR+, HER2-, and Ki-67 index not known
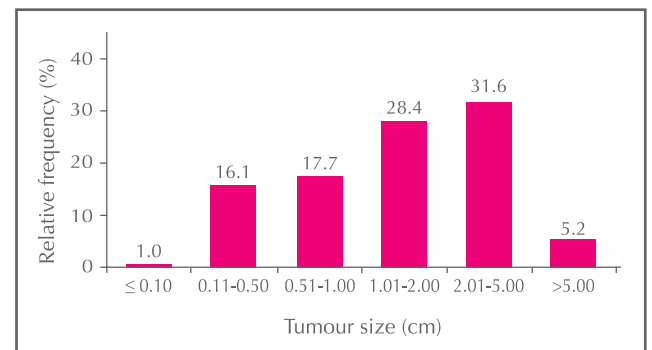Luminal B (HER2 positive): ER and/or PR+, HER2+, and any Ki-67 index
HER2 positive (HR negative): ER and PR-, HER2+, and any Ki-67 index
TNBC (Triple Negative Breast Cancer): ER and PR-, HER2-, and any Ki-67 index

ii. Characteristics of in situ breast cancer

4.13 The mean size of tumours of in situ breast cancer was 2.0 cm (standard deviation: ±1.6 cm). Tumours of one cm or less in size were found in 34.8% of the patients, while tumours of 2.01 to 5.00 cm in size were found in 31.6% of the patients (Figure 4.9). A small proportion (5.2%) of the patients had in situ tumours larger than five cm. Of the in situ breast cancer cases where MMG was performed, 70.2% showed microcalcification.

Figure 4.9: Distribution of tumour size (cm) of in situ breast cancer (N=497)

C. Treatment methods

4.14 Of the patients, 39.0% received care at private medical services, 26.3% received care at public medical services, and 34.7% received care at both private and public medical services. Combinations of treatments, including surgery, radiotherapy, chemotherapy, endocrine therapy, targeted therapy and immunotherapy, are usually used to treat breast cancer effectively. In general, the number of modalities increased with increasing cancer stage (Table 4.4). In the cohort, the majority (91.1%) of patients with stage 0 disease received two or less treatments. On the other hand, 76.9% of the patients with stage IIA, 92.9% of those with stage IIB and 97.0% of those with stage III disease received three or more modalities.

Table 4.4: Number of treatment modalities by cancer stage (N=3,292)

| | Cancer stage, % | | | | | |
	0 (N=580)	I (N=1,228)	IIA (N=670)	IIB (N=395)	III (N=335)	IV (N=84)
0	0.0	0.0	0.0	0.0	0.0	0.0
1	37.1	6.4	3.3	1.3	0.3	6.0
2	54.0	30.0	19.9	5.8	2.7	8.3
3	7.6	48.5	41.6	25.3	15.8	19.0
4	1.4	10.8	27.5	52.7	59.4	47.6
5	0.0	4.3	7.8	14.9	21.8	19.0

4.15 Nearly all (98.8%) patients received surgery as part of their treatment. Of the patients with breast-conserving surgery, 94.4% received radiotherapy, while 42.7% of the patients with mastectomy received radiotherapy. Among the invasive breast cancer patients, 53.7% received chemotherapy. In addition, 67.6% of the patients received endocrine therapy, while 17.0% received targeted therapy.