1.3 Health background

Body mass index at the time of diagnosis

Body mass index (BMI) is calculated as body weight in kilograms divided by the square of body height in metres.

$$BMI = Weight (kg) / [Height (m)]^2$$

WHO BMI classification for Asian adults

Classification	BMI
Underweight	<18.5
Normal weight	18.5-22.9
Overweight	23.0-24.9
Obese	≥ 25.0

The average height and weight of the patient cohort were 157.8 cm and 56.3 kg respectively. According to World Health Organization (WHO) classification for Asian adults[12], 34.4% were overweight or obese at the time of diagnosis (Table 1.3.1). The proportion of obesity or overweight was higher in postmenopausal women (46.1%) than that in premenopausal women (32.9%).

There was a trend that cases of overweight or obese increased as age increased. The proportion ranged from 19.4% in the age group of 30-39 to 56.4% in the age group of 70-79 (Figure 1.3.1).
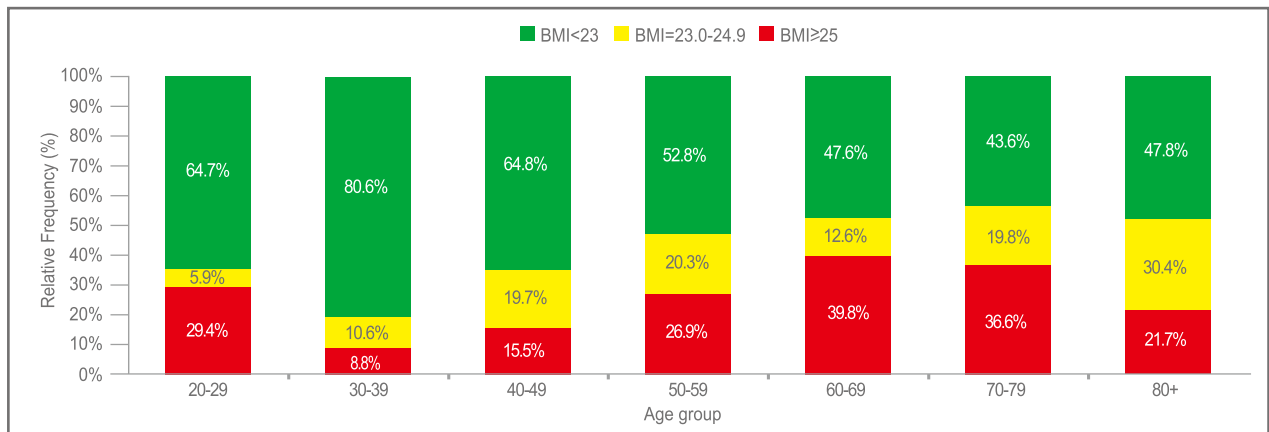
Bra size and cup size at the time of diagnosis

In the patient group, 62.1% had a bra size of 34 inches or above and only 13.6% had cup C or above (Table 1.3.1).

Table 1.3.1 Body mass index, bra size and cup size at the time of diagnosis (N=2,330)

	Number (%)		Number (%)
BMI		**Cup size**	
< 18.5	169 (7.3%)	Cup B or smaller	1,400 (60.1%)
18.5-22.9	1,066 (45.8%)	Cup C	242 (10.4%)
23.0-24.9	366 (15.7%)	Cup D	60 (2.6%)
≥ 25.0	435 (18.7%)	Cup E or above	14 (0.6%)
Unknown	294 (12.6%)	Unknown	614 (26.4%)
Bra size			
32 inches or smaller	500 (21.5%)		
34 inches	640 (27.5%)		
36 inches	487 (20.9%)		
38 inches	247 (10.6%)		
40 inches or larger	74 (3.2%)		
Unknown	382 (16.4%)		

Figure 1.3.1 Body mass index at the time of diagnosis by age group

Family history of breast cancer

Over 85% of the patients did not have family history of breast cancer. About 10% reported family history of breast cancer among their first degree relatives (8.7% mother or sister, 0.1% brother, 1.5% two or more first degree relatives) and 3.8% reported that their non first-degree relatives had history of breast cancer (Table 1.3.2).

Personal history of tumours

In the patient cohort, 77.0% reported no personal history of tumours, 11.6% had benign tumours and 3.9% had malignant tumours at the time of diagnosis. Out of the 3.9% of the patient cohort with malignant tumour, nasopharyngeal cancer (4.4%), thyroid cancer (4.4%) and metachronous breast cancer (4.4%) were the most common reported malignant tumours. (Table 1.3.2).

Previous breast disease

There was 10.3% of the patients with previous breast disease. Fibroadenoma was the most recorded breast disease with 47.9% of the cases, followed by fibrocystic disease (6.3%) (Table 1.3.2).

Table 1.3.2 Family history, personal history of tumours and history of breast diseases at the time of diagnosis

	Number (%)
Family history of breast cancer	
No family history	1,984 (85.2%)
First-degree relatives (mother or sister only)	204 (8.7%)
First-degree relative (brother only)	1 (0.1%)
2 or more first degree relatives	36 1.5%)
Non first degree relative (either paternal or maternal side)	89 (3.8%)
Unknown	16 (0.7%)
History of tumours	
No history of tumours	1,793 (77.0%)
Benign tumour	270 (11.6%)
Malignant tumour	91 (3.9%)
Unknown	176 (7.5%)
Type of malignant tumours	
Nasopharyneal cancer	4 (4.4%)
Thyroid cancer	4 (4.4%)
Breast cancer	4 (4.4%)
Ovarian cancer	2 (2.2%)
Cervical cancer	2 (2.2%)
Skin cancer	2 (2.2%)
Colorectal cancer	2 (2.2%)
Lymphoma	1 (1.1%)
Tongue cancer	1 (1.1%)
Stomach cancer	1 (1.1%)
Medullary cancer	1 (1.1%)
Intestine cancer	1 (1.1%)
Uterus cancer	1 (1.1%)
Unknown	65 (71.4%)
History of previous breast diseases	240 (10.3%)
Type of previous breast disease	
Fiboadenoma	115 (47.9%)
Fibocystic disease	15 (6.3%)
Papilloma	7 (3.0%)
Papillomatosis	2 (1.0%)
Atypia	4 (2.0%)
Unknown	99 (41.2%)

Early menarche

The reported mean and median age at menarche was 13.2 years and 13.0 years respectively. Early menarche, defined as starting menarche before 12 years of age, was noted in 12.7% of the patient cohort (Table 1.3.3).

Late menopause

The reported mean and median age at menopause was 49.0 years and 50.0 years respectively. Late menopause, defined as having menopause after 55 years of age, was recorded in 1.9% of the patient cohort (Table 1.3.3).

Childbirth and reproductive age

At the time of diagnosis, 10.3% had no childbirths, 63.4% had their first live births before age 35 and 4.7% of the cohort had their first live births after age 35 (Table 1.3.3). Mean age at their first live births was 27.1 years and the median number of live births was 2 children.

Breast feeding

Over 50% had never practised breast feeding. Breast feeding was reported in 29.8% of the cohort for a mean duration of 12.8 months (range: 1- 216 months) (Table 1.3.3).

Table 1.3.3 Early menarche, late menopause and reproductive history at the time of diagnosis

	Number (%)
Menarche	
Early menarche (< 12 years of age)	296 (12.7%)
Normal menarche (≥12 years of age)	1,857 (79.7%)
Unknown	177 (7.6%)
Menopause	
Late menopause (> 55 years of age)	44 (1.9%)
Normal menopause (≤ 55 years of age)	1,125 (48.3%)
Unknown	1,161 (49.8%)
Reproductive history	
No childbirth	241 (10.3%)
Childbirth at early age (≤ 35 years of age)	1,478 (63.4%)
Childbirth at late age (>35 years of age)	109 (4.7%)
Unknown	502 (21.5%)
Breast feeding	
Yes	694 (29.8%)
No	1,247 (53.5%)
Unknown	389 (16.7%)

Use of exogenous hormones

At the time of diagnosis, 21% used oral contraceptives (OC) for a mean duration of 7.5 years. Only 6.8% had used hormone replacement therapy (HRT) for a mean duration of 4.0 years at the time of diagnosis (Table 1.3.4). The percentages of OC use and HRT use were relatively low across all age groups (Figures 1.3.2- 1.3.3).

Table 1.3.4 Use of exogenous hormone at the time of diagnosis

	Number (%)
OC use	
Non-user	1,371 (58.8%)
OC < 5 years	218 (9.4%)
OC 5-10 years	161 (6.9%)
OC > 10 years	109 (4.7%)
Unknown	471 (20.2%)
HRT use	
Non-user	1,806 (77.5%)
HRT < 5 years	95 (4.1%)
HRT 5-10 years	60 (2.6%)
HRT >10 years	3 (0.1%)
Unknown	366 (15.7%)

OC: oral contraceptives
HRT: hormonal replacement therapy

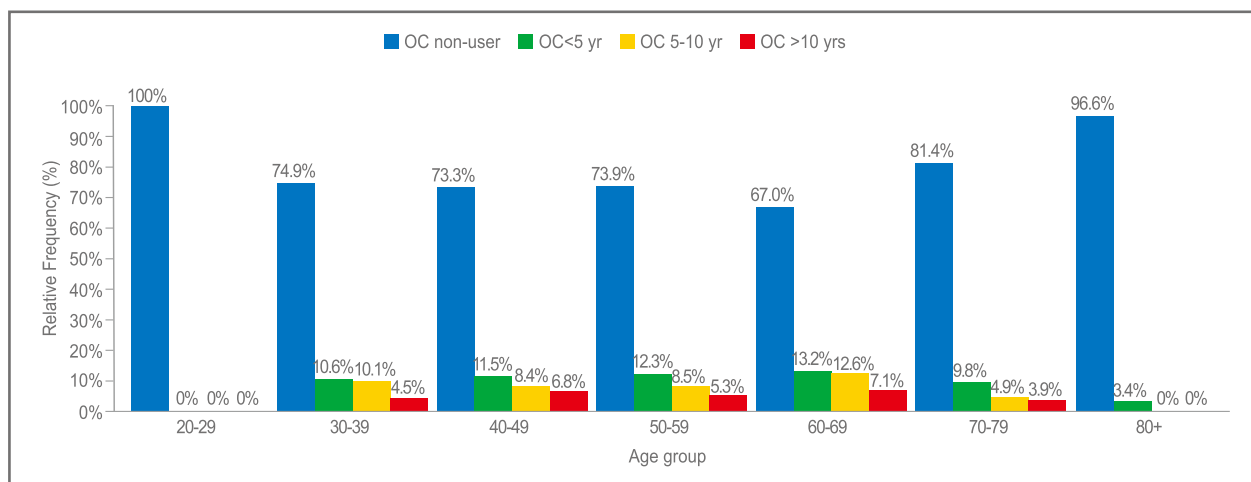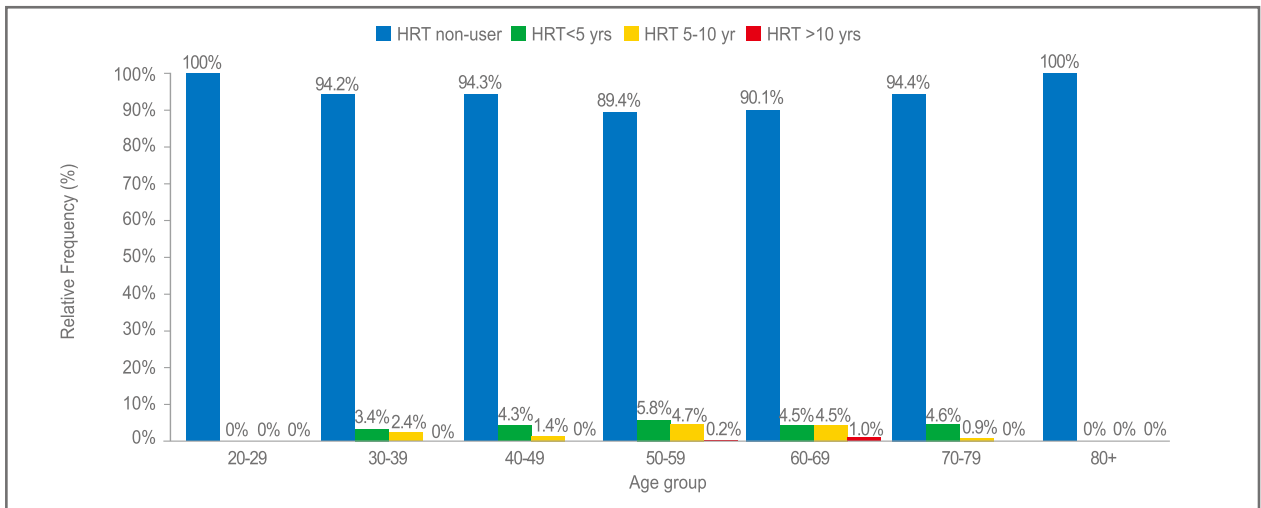Figure 1.3.2 Use of oral contraceptives at the time of diagnosis by age group

Figure 1.3.3 Use of hormone replacement therapy at the time of diagnosis by age group

Summary of risk exposures

- Most of the cases (97%) bore at least one risk factor at the time of diagnosis. In summary, more than half of the patient cohort had less than 3 types of risk exposure at the time of diagnosis (Figure 1.3.4).

- The ten most common risk factors were listed in Table 1.3.5. Lack of exercise, no breast feeding and being overweight or obese were the three most prevalent risk factors in the cases.

Table 1.3.5 The ten most common risk factors in the patient cohort

Rank	Risk factors	Number (%)
1	Lack of exercise (<3 hrs / wk)	1,650 (70.8%)
2	No breast feeding	1,247 (53.5%)
3	Being overweight/ obese	801 (34.4%)
4	High level of stress (>50% of time)	769 (33.0%)
5	Oral contraceptives use	489 (21.0%)
6	No childbirth / first live birth afterage 35	350 (15.0%)
7	Family history of breast cancer	346 (14.8%)
8	Early menarche (<12 years old)	296 (12.7%)
9	Meat / dairy products rich in diets	286 (12.3%)
10	Having previous breast disease	240 (10.3%)

Figure 1.3.4 Distribution of patient cohort bearing different number of risk factors at the time of diagnosis