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Healthcare Use According to Breast Cancer Subtype in Early Breast Cancer: **A Patient-Level Data Analysis in Taiwan**

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Background

- Breast cancer (BC) is projected to be among the top 5 cancers globally with the highest economic costs.¹
- The cost of managing BC rises with higher stage at diagnosis with the emergence of innovative and costly therapeutics.²

Methods

- This is a non-interventional study retrospective clinical patient chart data from early BC patients diagnosed between 2018-2021 from Linkou Chang-Gung Memorial Hospital, Taiwan.
- Data pertained to patient profiles, treatment patterns, and healthcare use within first 2 years post-diagnosis was retrospectively collected from medical records to the standardized electronic Case Report Form (eCRF) via an online platform.
- Adjusted odds-ratio (aOR) and 95% confidence interval (CI) were computed using logistic regression to quantify the association between tumor subtype (human epidermal growth factor-2positive [HER2+], HER2-negative/hormone receptor-positive [HER2-&HR+], triple-negative breast cancer [TNBC]), and higher

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• However, there is a paucity of information on the costs of managing early breast cancer according to different subtypes in Taiwan.

Objective

This study explored the relationship of healthcare use (HCU) within the first 2 years after diagnosis of early BC subtype in Taiwan, using patient-level data.

• The differences between groups were determined using Analysis of variance (ANOVA) and Chi-square tests for continuous variables and categorical variables, respectively.

healthcare resource utilization (HCU).

- Definition of Higher HCU:
 - The cut-off used for each healthcare utilization was determined as percentile 75 (the third quartile, Q3) of each healthcare utilization among overall patients to form the high and low-use groups.
- A 2 tailed P-value <.05 was considered statistically significant.

Results

Patient characteristics of early breast cancer patients

- A total of 1719 early BC patients with two-year follow-up were identified (Figure 1).
 - Most patients had HER2-&HR+ subtype (67.4%, n=1159), 23.7% (n=407) had HER2+, and 8.9% (n=153) had TNBC (Table 1).
- The mean age of patients with HER2-&HR+ was 55.13 years (SD: 11.74), HER2+ was 53.46 years (SD: 10.67), and TNBC was 56.18 (SD: 12.14).
- Majority of patients were diagnosed between 2019 and 2020.
- A higher proportion of early BC patients had stage 2 cancer (HER2-&HR+: 48.5%; HER2+: 59.2%; TNBC: 61.4%), lymph node negative (71.4%; 56.5%; 61.4%), had breast conserving surgery (68.9%; 60.2%; 69.3%), did not have neoadjuvant treatment (82.3%; 60.9%; 52.3%) and had adjuvant treatment (95.8%; 92.9%; 72.6%) (Table 1).

Figure 1. Patient flowchart



Early BC patients with HER2+ or TNBC subtypes were more likely to experience higher healthcare resource utilization than HER2-&HR+ patients.

- Compared with HER2-&HR+ patients (Figure 3)
 - HER2+ and TNBC subtypes were more likely to have:
 - neoadjuvant treatment (aOR [95% CI], HER2+: 2.51 [1.89-3.33]; TNBC: 4.78 [3.17-7.20]),
 - more outpatient visits (2.39 [1.85-3.10]; 2.00 [1.36-2.94]),
 - more hospitalizations (3.53 [2.67-4.65]; 4.06 [2.67-6.18]),
 - longer length of stay (3.61 [2.77-4.71]; 2.29 [1.52-3.44]);
 - o but HER2-&HR+ patients were less likely to have adjuvant treatment than HER2+ patients (0.56 [0.34-0.91]) and TNBC patients (0.12 [0.07-0.19]) within 2-years' post-diagnosis (all p<0.05).

Figure 3. (a) Correlation between healthcare utilization and subtypes, HER2+ vs. HER2-&HR+ patients

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ealthcare utilization	aOR*	959	%CI	P-value
reast surgery				
Breast conserving surgery (ref)				
Fotal mastectomy	1.27	0.98	1.64	0.071
eoadjuvant treatment				
No (ref)				
/es	2.51	1.89	, 3.33	<.0001
djuvant treatment				
No (ref)				

Table 1. Baseline characteristics of early-stage breast cancer patients, by subtypes

	HE	HER2+		HER2- & HR+		ТИВС		
Characteristic	n	%	n	%	n	%	P-value	
No. of patients	407		1159		153			
Age							0.736	
Mean, SD	53.46	10.67	55.13	11.74	56.18	12.14		
BMI							0.014	Abbreviatio
Mean, SD	24.44	4.54	24.52	4.37	24.23	4.72		Standard Dev
Diagnosis year							0.147	SD; the first o
2018	27	6.63	49	4.23	4	2.61		Q1; the third
2019	203	49.88	565	48.75	68	44.44		Q3; Human
2020	146	35.87	441	38.05	62	40.52		Epidermal gr
2021	31	7.62	104	8.97	19	12.42		factor Recept
Clinical stage							<.0001	HER2; Hormo
Stage I	124	30.47	535	46.16	38	24.84		Receptor, HR
Stage II	241	59.21	562	48.49	94	61.44		Negative Bre
Stage III	42	10.32	62	5.35	21	13.73		Cancer, TNB
.ymph node							<.0001	
Vegative	230	56.51	827	71.35	94	61.44		Notes: The s
Positive	177	43.49	332	28.65	59	38.56		were defined
Surgery							0.005	according to
Breast conserving surgery	245	60.20	799	68.94	106	69.28		assessment
Total mastectomy	162	39.80	360	31.06	47	30.72		estrogen rec
Neoadjuvant treatment							<.0001	the progeste
No	248	60.93	954	82.31	80	52.29		receptor and
fes	159	39.07	205	17.69	73	47.71		epidermal gr
Pathological complete response							<.0001	factor recept
No	67	42.14	161	78.54	38	52.05		status.
Yes .	92	57.86	44	21.46	35	47.95		
Adjuvant treatment							<.0001	
No	29	7.13	49	4.23	42	27.45		
Yes	378	92.87	1110	95.77	111	72.55		

Healthcare resource utilization of early BC patients during the two-year follow-up.

- Nearly all patients regardless of subtype had outpatient visits. A higher proportion of HER2+ (30.0%) and TNBC patients (28.8%) had visited the emergency department during the two-year follow up than HER2-&HR+ early BC patients (21.6%) (p=0.001) (Figure 2a).
- The frequency of outpatient visits among HER2-&HR+ early BC patient was significantly less than early BC patients with the subtypes HER2+ and TNBC (28.01 vs. 33.05 vs. 32.33, p<0.001) (Figure 2b).
- Similarly, HER2-&HR+ patients were hospitalized less frequent than those with HER2+ and TNBC subtypes (3.12 vs. 8.27 vs. 6.29, p<0.001). The duration of hospitalization (days) among HER2+ early BC patients was significantly longer than HER2-&HR+ and TNBC subtypes (20.70 vs. 9.05, vs. 14.89, p<0.001) (Figure 2b).

Figure 2. Patients with each healthcare utilization during the two-year follow-up period, by subtypes (a) Percentage of patients; (b) mean value of each healthcare utilization



Yes	0.56	0.34	0.91	0.020
Outpatient visit (times)				
Less (ref)				
More	2.39	1.85	3.10	<.0001
Hospitalization (times)				
Less (ref)				
More	3.53	2.67	4.65	<.0001
Length of stay (days)				
Less (ref)				
More	3.61	2.77	4.71	<.0001
Emergency department visit (times)				
Less (ref)				
More	1.62	1.10	2.39	0.015



Abbreviations: Human Epidermal growth factor Receptor 2, HER2; Hormone Receptor, HR; Triple Negative Breast Cancer, TNBC; adjusted odds ratio, aOR; confidence interval, Cl; Reference group, Ref.

Figure 3. (b) Correlation between healthcare utilization and subtypes, TNBC vs. HER2-&HR+ patients

Healthcare utilization	aOR*	95%CI		P-value
Breast surgery				
Breast conserving surgery (ref)				
Total mastectomy	0.67	0.45	1.00	0.049
Neoadjuvant treatment				
No (ref)				
Yes	4.78	3.17	7.20	<.0001
Adjuvant treatment				
No (ref)				
Yes	0.12	0.07	0.19	<.0001
Outpatient visit (times)				
Less (ref)				
More	2.00	1.36	2.94	0.0004
Hospitalization (times)				
Less (ref)				
More	4.06	2.67	6.18	<.0001
Length of stay (days)				
Less (ref)				
More	2.29	1.52	3.44	<.0001
Emergency department visit (times)				
Less (ref)				
More	1.39	0.76	2.54	0.285



aOR (95%CI)





Mean outpatient visits Mean hospitalization Mean length of stay Mean emergency visits (days per patient) (times per patient) (times per patient) (times per patient)

Conclusion

- The HCU in early BC care within the first 2-years' post-diagnosis was mainly driven by the tumor subtype with higher utilization associated with HER2+.
- When comparing healthcare use across the subtypes, HER2+ was more likely than TNBC to have higher outpatient and emergency department visits and longer hospitalization stays.
- These data implied a need for efforts to address the potential healthcare burden for early BC in Taiwan especially for patients with HER2+ and TNBC subtypes.

Abbreviations: Human Epidermal growth factor Receptor 2, HER2; Hormone Receptor, HR; Triple Negative Breast Cancer, TNBC; adjusted odds ratio, aOR; confidence interval, Cl; Reference group, Ref.

References

- 1. Chen, Simiao, et al. "Estimates and projections of the global economic cost of 29 cancers in 204 countries and territories from 2020 to 2050." JAMA oncology 9.4 (2023): 465-472.
- 2. Wilkinson, Anna N., et al. "Capturing the true cost of breast cancer treatment: molecular subtype and stage-specific per-case activity-based costing." Current Oncology 30.9 (2023): 7860-7873.

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