

Supplementary Materials

Title

Behavioral profiles associated with adherence to adjuvant endocrine therapy in breast cancer: a retrospective population-based cohort study

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Appendix Table 1. ICD-10 codes used to define pre-AET comorbidity indicators.

Comorbidity indicators included in the model were derived from inpatient and outpatient claims in the Komodo Healthcare Map®. A patient was classified as having a given comorbidity if at least one qualifying diagnosis code appeared on any claim with a service date prior to the AET index date (no minimum lookback was applied; the maximum lookback was the full available claims history). Code matching used a prefix/contains rule, so each listed code family captured all of its specified subcodes (for example, the code family F32 matched F32.0, F32.1, ..., F32.9).

Comorbidity	ICD-10 code families	Description
Anxiety	F41.0	Panic disorder [episodic paroxysmal anxiety]
	F41.1	Generalized anxiety disorder
	F41.3	Mixed anxiety and depressive disorder
	F41.8	Other specified anxiety disorders
	F41.9	Anxiety disorder, unspecified
Depression	F32	Major depressive disorder, single episode
	F33	Major depressive disorder, recurrent
	F34.1	Dysthymic disorder (persistent depressive disorder)
	F41.3	Mixed anxiety and depressive disorder
Arthralgia / musculoskeletal pain	M25.5 (incl. M25.50–M25.59)	Pain in joint, by anatomic site
	M79.1	Myalgia
	M79.6 (incl. M79.60–M79.67)	Pain in limb, hand, foot, fingers, and toes
Osteoporosis	M80	Osteoporosis with current pathological fracture
	M81	Osteoporosis without current pathological fracture
	M82	Osteoporosis in diseases classified elsewhere
Vasomotor symptoms	E28.3	Primary ovarian failure
	N95.1	Menopausal and female climacteric states
	N95.8	Other specified menopausal and perimenopausal disorders
	N95.9	Unspecified menopausal and perimenopausal disorder
Sexual dysfunction	F52	Sexual dysfunction not caused by organic disorder or disease

Appendix Table 2. Missingness of predictors

Missingness of predictors in final analytic dataset. Predictors with initial missingness < 0.5% (patient age, state) were handled via casewise deletion. Due to the strict join logic between the behavioral and clinical datasets, none of the behavioral predictors exhibited missingness. The listed demographic & socioeconomic predictors exhibited moderate missingness, handled via explicit flags in the final dataset; the predictor with the highest missingness, race/ethnicity, was subjected to a sensitivity analysis to ensure validity of this method. The remaining predictors exhibited no missingness.

Predictor	Missingness (%)
Educational attainment	9.6
Marital status	2.8
Race/ethnicity	13.2

Appendix Table 3. Cohort representativeness relative to national breast cancer incidence estimates, by age group, race/ethnicity, and census region.

For each characteristic, expected shares were derived from published breast cancer incidence data. For age and race/ethnicity, expected case counts are based on HR+/HER2– breast cancer cases from the SEER 21 registries (November 2024 submission). For geography, expected shares are based on average annual counts of all invasive breast cancer cases across all US states, reported by state cancer registries via State Cancer Profiles (SEER November 2024 and NPCR 2024 submissions, data years 2018–2022), aggregated to the four US Census Bureau regions; HR+/HER2– stratification is not available at this level. The “ratio observed/expected” column reflects the degree of over- or underrepresentation in the cohort: values above 100% indicate overrepresentation and values below 100% indicate underrepresentation.

a. Age

	Number of SEER 21 cases	Expected share	Observed share	Ratio observed/ expected
40 to 44 years	22,173	5.4%	4.0%	75%
45 to 49 years	33,657	8.2%	6.0%	74%
50 to 54 years	39,256	9.5%	10.0%	105%
55 to 59 years	44,941	10.9%	12.9%	118%
60 to 64 years	58,289	14.2%	16.7%	118%
65 to 69 years	65,207	15.8%	17.0%	107%
70 to 74 years	60,687	14.7%	15.4%	105%
75 to 79 years	42,700	10.4%	10.4%	100%
80 to 84 years	25,650	6.2%	6.2%	100%
85 years and over	19,344	4.7%	1.2%	26%

b. Race/Ethnicity

	Number of SEER 21 cases	Expected share	Observed share	Ratio observed/ expected
Asian or Pacific Islander	35,835	8.5%	3.1%	37%
Black or African American	42,373	10.0%	10.5%	105%
Hispanic or Latino	62,007	14.7%	8.8%	60%
White non-Hispanic	282,590	66.8%	77.5%	116%

c. Geography

	Avg. annual cases (SEER+NPCR, 2018–2022)	Expected share	Observed share	Ratio observed/ expected
Northeast	51,033	18.9%	22.6%	120%
Midwest	57,850	21.4%	23.4%	109%
South	102,525	37.9%	38.0%	100%
West	58,835	21.8%	16.0%	73%

Appendix Table 4. Unadjusted and adjusted odds ratios for behavioral predictors

Unadjusted (univariate logistic regression) and adjusted (mixed-effects logistic regression with ZIP3 random intercept) odds ratios for behavioral predictors of one-year AET adherence (MPR $\geq$ 80%; n = 401,450). Predictors are listed alphabetically by label. Continuous scales (e.g., Champion scale, fatalism, social support, trust in doctors) were dichotomized at prespecified cutoff points; “score above X” indicates the upper category. Sociodemographic, clinical, and geographic covariates are not duplicated here.

Predictor	Crude OR (95% CI)	Crude p	Adjusted OR (95% CI)	Adjusted p
Agrees health is a matter of luck	0.82 (0.79–0.84)	<0.001	0.99 (0.93–1.05)	0.7008
Agrees health means everything to them	1.07 (1.05–1.09)	<0.001	1.00 (0.97–1.03)	0.9368
Agrees safety comes first for health	1.12 (1.10–1.14)	<0.001	1.02 (0.99–1.04)	0.2462
Agrees they have high social support	1.20 (1.18–1.22)	<0.001	0.99 (0.96–1.02)	0.5886
Agrees they organize life around future health	1.10 (1.08–1.12)	<0.001	1.02 (0.99–1.05)	0.1415
Agrees they take good care of their body	1.14 (1.13–1.16)	<0.001	1.01 (0.99–1.04)	0.3612
Breast cancer knowledge score: 4 correct	1.13 (1.11–1.15)	<0.001	1.00 (0.98–1.03)	0.7717
Champion barriers subscale score above 15	0.86 (0.85–0.88)	<0.001	1.00 (0.98–1.03)	0.7897
Champion scale total score above 50	0.81 (0.79–0.82)	<0.001	0.99 (0.96–1.02)	0.5925
Champion susceptibility subscale score above 6	1.11 (1.09–1.13)	<0.001	0.98 (0.95–1.01)	0.1317
Comfortable completing medical forms	1.13 (1.09–1.17)	<0.001	0.98 (0.94–1.03)	0.4565
Comfortable finding health information from multiple sources	1.20 (1.17–1.24)	<0.001	1.00 (0.96–1.05)	0.9048
Comfortable following medication instructions	1.45 (1.37–1.54)	<0.001	1.15 (1.06–1.24)	<0.001
Consumer index: Bible/religious engagement	1.06 (1.04–1.09)	<0.001	1.04 (1.01–1.08)	0.0107
Consumer index: health and fitness interest	0.99 (0.97–	0.1688	0.94 (0.92–	<0.001

Predictor	Crude OR (95% CI)	Crude p	Adjusted OR (95% CI)	Adjusted p
	1.01)		0.97)	
Correctly knows overweight increases breast cancer risk	1.10 (1.09–1.12)	<0.001	1.01 (0.99–1.04)	0.3378
Could not fill prescription due to cost	0.83 (0.81–0.84)	<0.001	0.98 (0.95–1.01)	0.1354
Experienced an unexpectedly high medical bill	0.99 (0.98–1.00)	0.1279	0.97 (0.95–1.00)	0.0227
Fatalism score above 15	0.91 (0.89–0.92)	<0.001	1.02 (0.99–1.05)	0.1140
Health perceptions score above 35	0.96 (0.94–0.99)	0.0029	1.01 (0.98–1.05)	0.4103
History of breast cancer in a non-family member	1.07 (1.05–1.09)	<0.001	0.99 (0.96–1.02)	0.3539
Managing addiction issues is very challenging	0.71 (0.68–0.74)	<0.001	1.00 (0.94–1.06)	0.9437
Managing general health is challenging	0.80 (0.78–0.81)	<0.001	0.99 (0.96–1.02)	0.52462
Primary support person: family member or relative	0.84 (0.83–0.85)	<0.001	1.01 (0.95–1.08)	0.7455
Primary support person: friend	0.81 (0.79–0.83)	<0.001	1.02 (0.95–1.10)	0.5420
Primary support person: health care provider	0.83 (0.81–0.86)	<0.001	1.03 (0.97–1.09)	0.4044
Primary support person: spouse or partner	1.07 (1.06–1.09)	<0.001	1.00 (0.97–1.02)	0.7034
Social support affirmation score above 6	1.23 (1.20–1.27)	<0.001	0.95 (0.91–1.00)	0.0532
Social support aid score above 6	1.21 (1.19–1.24)	<0.001	1.06 (1.00–1.13)	0.0441
Strongly agrees cancer is meant to be	1.06 (1.02–1.11)	0.0073	1.02 (0.96–1.08)	0.5248
Strongly agrees cancer makes them anxious	0.76 (0.74–0.78)	<0.001	0.96 (0.93–1.01)	0.0871
Strongly agrees cancer makes them feel edgy	0.92 (0.88–0.96)	<0.001	0.99 (0.94–1.04)	0.6871

Predictor	Crude OR (95% CI)	Crude p	Adjusted OR (95% CI)	Adjusted p
Strongly agrees cancer makes them feel scared	0.86 (0.84–0.89)	<0.001	0.98 (0.94–1.03)	0.4481
Strongly agrees cancer makes them feel uneasy	0.91 (0.89–0.93)	<0.001	1.00 (0.96–1.03)	0.9443
Strongly agrees cancer prevention is not possible	0.95 (0.90–0.99)	0.0217	1.06 (0.99–1.13)	0.0759
Strongly agrees death is unavoidable with cancer	0.89 (0.85–0.93)	<0.001	0.98 (0.92–1.04)	0.4293
Strongly agrees doctors will make the right diagnosis	1.02 (1.01–1.05)	0.0138	1.00 (0.98–1.03)	0.7712
Strongly agrees life pushes them around	0.76 (0.72–0.79)	<0.001	0.98 (0.93–1.04)	0.5585
Strongly agrees others say they take health risks	0.78 (0.74–0.82)	<0.001	0.98 (0.90–1.06)	0.5500
Strongly agrees patients are not victims of rising health care costs	0.97 (0.94–0.99)	0.0163	0.98 (0.94–1.03)	0.4522
Strongly agrees patients receive sufficient information	1.05 (1.03–1.08)	<0.001	0.99 (0.96–1.03)	0.6503
Strongly agrees they have taken risks with their health	0.78 (0.75–0.81)	<0.001	1.01 (0.96–1.06)	0.6697
Strongly agrees they would give things up for health	0.95 (0.93–0.97)	<0.001	0.99 (0.96–1.03)	0.6372
Strongly agrees things tend to go wrong for them	0.73 (0.70–0.77)	<0.001	1.00 (0.93–1.07)	0.9859
Total social support score above 24	1.05 (1.04–1.07)	<0.001	0.99 (0.97–1.01)	0.2639
Trust in doctors score above 25	1.09 (1.06–1.11)	<0.001	1.04 (1.01–1.07)	0.0227
Two or more self-management domains rated very challenging	0.80 (0.79–0.82)	<0.001	1.00 (0.97–1.04)	0.8618
Unable to see doctor due to cost	0.85 (0.83–0.86)	<0.001	0.97 (0.95–1.00)	0.0452
Very high immediate-help social support	1.18 (1.16–1.19)	<0.001	1.03 (1.00–1.07)	0.0675
Very worried about fatigue as a side effect	0.89 (0.88–0.91)	<0.001	1.01 (0.99–1.04)	0.3333

Predictor	Crude OR (95% CI)	Crude p	Adjusted OR (95% CI)	Adjusted p
Very worried about hot flashes/sweating as a side effect	0.81 (0.79–0.82)	<0.001	0.97 (0.94–1.01)	0.1278
Very worried about sexual side effects	0.79 (0.78–0.81)	<0.001	0.96 (0.93–0.99)	0.0145