



# Comparison of Cardiovascular Disease Risk Using Framingham Risk Score Between Women With Breast Cancer and Without Cancer in Korea

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## Background

- Cardiovascular disease (CVD) is a leading cause of morbidity and mortality in breast cancer survivors.
- Early screening and preventive management of CVD risk factors are important in breast cancer survivors.
- Despite such increasing needs, the CVD risk assessment and management specific to breast cancer survivors remain lacking.

## Objective

This study aimed to compare the CVD risk between women with breast cancer and without cancer.

## Methods

- **Design:** A secondary data analysis
- **Data source:** 2014–2018 Korea National Health and Nutrition Examination Survey (KNHNES)
- **Subjects:** Women aged 30 to 74 years, those who were diagnosed with breast cancer, or those who had never been diagnosed with cancer
- **Measures**

### Framingham risk score (FRS)

- Index to predict the risk of CVD events within the next 10 years among adults aged 30-74 years
- Composition variables: sex, age, total cholesterol, high-density cholesterol (HDL), systolic blood pressure, diabetes, and smoking status

### Cardiovascular disease-related factors

- Anthropometric measures of Obesity: body mass index [BMI], Waist-to-Height Ratio [WHtR]
- Physical activity (metabolic equivalent of task [MET]-minute per week [MET-min/week])
- Sedentary time

### Statistical analysis

- Propensity score matching (PSM)
  - PSM was calculated using a logistic regression model with the following covariates: marital status, education, household income, occupation, residence area, presence or absence of menopause, and menopause age.
  - The nearest neighbor matching with a greedy algorithm was used to match the subjects (breast cancer: non-cancer = 1:4).
  - After matching, the standardized mean difference for assessing the balance of covariates was less than 0.1.
- To compare continuous and categorical variables between two groups, independent *t*-test and chi-square test were used before matching, respectively, and generalized estimation equations were used after matching.

## Results

### Sample characteristics

- After PSM, breast cancer and non-cancer groups showed no significant differences in general characteristics .
- In both groups, the mean age was 57 years (range 31-74) and the age of menopause (85%) was 48 years (range 32–60)
- Time since breast cancer diagnosis was 8.46±6.96 years (range 0–37) and a survival period of ≥ 5 years was 65%.

### Framingham risk scores and related factors of cardiovascular diseases after propensity score matching

Characteristic	Non-breast cancer	Breast cancer	<i>p</i> -value
	( <i>n</i> = 544)	( <i>n</i> = 136)	
	<i>n</i> (%) or M ± SD	<i>n</i> (%) or M ± SD	
FRS (%)	5.47 ± 4.96	4.92 ± 4.20	0.153
Low risk (< 10)	451 (82.9)	114 (83.8)	0.793
Intermediate risk (≥ 10)	93 (17.1)	22 (16.2)	
Age (year)	57.15 ± 9.83	57.12 ± 9.60	0.957
SBP (mmHg)	119.70 ± 17.72	117.71 ± 17.74	0.223
DBP (mmHg)	75.17 ± 9.62	74.45 ± 8.91	0.393
HDL cholesterol (mg/dL)	53.39 ± 12.801	57.02 ± 14.46	0.006
Total cholesterol (mg/dL)	201.23 ± 38.12	193.71 ± 39.30	0.034
Diabetes (yes)	64 (11.8)	17 (12.5)	0.821
Current smoker (yes)	29 (5.3)	2 (1.5)	0.076
BMI (kg/m <sup>2</sup> )	23.86 ± 3.28	23.18 ± 3.14	0.031
< 18.5 (underweight)	14 (2.6)	5 (3.7)	0.023
18.5-22.9 (normal)	219 (40.3)	66 (48.5)	
23-24.9 (overweight)	139 (25.6)	35 (25.7)	
≥ 25 (obese)	172 (31.5)	30 (22.1)	
Waist-to-Height Ratio	0.52 ± 0.06	0.51 ± 0.06	0.048
< 0.5	210 (38.6)	63 (46.3)	0.094
≥ 0.5	334 (61.4)	73 (53.7)	
Total Physical Activity	807.78 ± 1287.98	807.94 ± 1000.94	0.999
Work			
Vigorous	10.81 ± 207.45	10.59 ± 123.48	0.987
Moderate	90.81 ± 665.64	29.12 ± 131.86	0.087
Leisure			
Vigorous	68.01 ± 333.58	97.94 ± 489.65	0.503
Moderate	161.73 ± 383.80	204.41 ± 473.61	0.324
Transport	476.42 ± 731.15	465.88 ± 707.34	0.873
Sedentary Time (min/day)	459.39 ± 203.89	436.40 ± 208.38	0.243
< 420	230 (42.3)	70 (51.5)	0.050
≥ 420	314 (57.7)	66 (48.5)	

### Comparison of Framingham risk scores by waist-to-height ratio and time since cancer diagnosis

- Women with breast cancer had the highest mean FRS in those with WHtR of ≥ 0.5 and 5 years or longer survival since the cancer diagnosis (*p* < 0.001)

## Conclusions

- The CVD risk of women with breast cancer was similar to that of women without cancer. Combined factors such as WHtR and longer survival may be useful in CVD risk assessment for women with breast cancer.
- Further longitudinal cohort studies are needed to expand knowledge on the trajectories of CVD risk factors and CVD outcomes for women with breast cancer.