Breast Cancer and Exercise

이 정 아

Post-doctoral follow, Yonsei University Department of Sport and Leisure Studies Sport Medicine Laboratory

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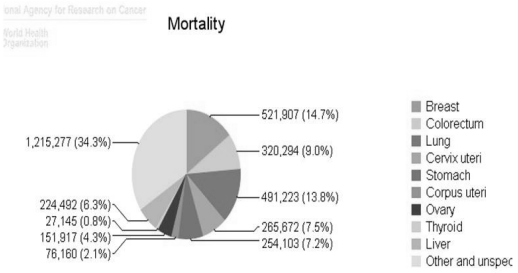
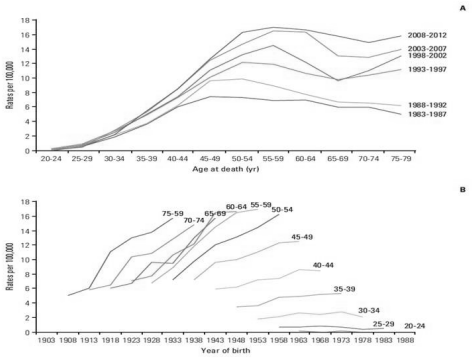
Cancer & Mortality



Incidence of Breast Cancer in Korea



Exercise & Breast Cancer

- Exercise plays a major role in recovery of function following treatment, and in reducing the lingering effects of both the disease and its treatment.

Breast Cancer Survivorship

- Being physically active after a breast cancer diagnosis:
  - 26% reduced risk of breast cancer recurrence
  - 30-40% reduced risk of death from any cause
  - 2-3 hours of brisk walking per week

Exercise & Pre & Post Diagnosis Mortality

Physical Activity and Survival After Breast Cancer Diagnosis

Michelle D. Holmes, MD, DrPH
Wendy Y. Chen, MD
Diane Feskanich, ScD
Candyce H. Kroenke, ScD
Graham A. Colditz, MD, DrPH

Table 2. Age-Adjusted and Multivariable-Adjusted Relative Risks According to Physical Activity Category After Breast Cancer Diagnosis

		Physical Activity After Diagnosis, MET-h/wk					
	Total (N = 2987)	<3 (n = 959)	3-8.9 (n = 862)	9-14.9 (n = 335)	15-23.9 (n = 428)	≥24 (n = 403)	*P* for Trend
Total deaths	463	188	126	38	51	60	
Age-adjusted RR (95% CI)		1.00	0.69 (0.55-0.87)	0.53 (0.37-0.75)	0.56 (0.41-0.77)	0.67 (0.50-0.90)	.004
Multivariable-adjusted RR (95% CI)*		1.00	0.71 (0.56-0.89)	0.59 (0.41-0.84)	0.56 (0.41-0.77)	0.65 (0.48-0.88)	.003
Breast cancer deaths	280	110	84	20	32	34	
Age-adjusted RR (95% CI)		1.00	0.79 (0.60-1.06)	0.47 (0.29-0.76)	0.60 (0.41-0.89)	0.64 (0.44-0.94)	.01
Multivariable-adjusted RR (95% CI)*		1.00	0.80 (0.60-1.06)	0.50 (0.31-0.82)	0.56 (0.38-0.84)	0.60 (0.40-0.89)	.004
Recurrence	370	137	108	29	45	51	
Age-adjusted RR (95% CI)		1.00	0.82 (0.64-1.06)	0.53 (0.35-0.79)	0.66 (0.47-0.93)	0.76 (0.55-1.04)	.05
Multivariable-adjusted RR (95% CI)*		1.00	0.83 (0.64-1.08)	0.57 (0.38-0.85)	0.66 (0.47-0.93)	0.74 (0.53-1.04)	.05

Abbreviations: CI, confidence interval; MET, metabolic equivalent task; RR, relative risk.
*Adjusted for age (months); interval between diagnosis and physical activity assessment (28-33, 34-40, ≥41 mo); smoking status (never, current, past); body mass index (<21, 21-22.9, 23-24.9, 25-26.9, ≥29), which was calculated as weight in kilograms divided by the square of height in meters; menopausal status and hormone therapy use (pre-menopausal, postmenopausal, and never use; postmenopausal and current use; postmenopausal and past use; uncertain menopausal status, missing); age at first birth and parity (nulliparous, <25 y and 1-2 births, <25 y and ≥3 births, ≥25 y and 1-2 births, ≥25 y and ≥3 births); oral contraceptive use (never, ever, missing); energy intake (quintiles); energy-adjusted protein intake (quintiles); disease stage (I, II, III); radiation treatment (yes or no); chemotherapy (yes or no); and tamoxifen treatment (yes or no).

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9 MET hour per week of physical activity participation significantly decreased the recurrence of cancer and increased the survival among breast cancer patients

Table 1. MET-Hours of Activities Surveyed

Leisure-Time Activity	MET-Hours
Normal pace walking (2 to 2.9 mph)	3
Brisk pace walking (3 to 3.9 mph)	4
Very brisk pace walking (4+ mph)	4.5
Jogging (slower than 10 min/mile)	7
Running (faster than 10 min/mile)	12
Bicycling	7
Tennis, squash, racquetball	7
Lap swimming	7
Calisthenics, ski or stair machine, other aerobic exercise	6

Physical Activity in Advanced-Stage Cancer

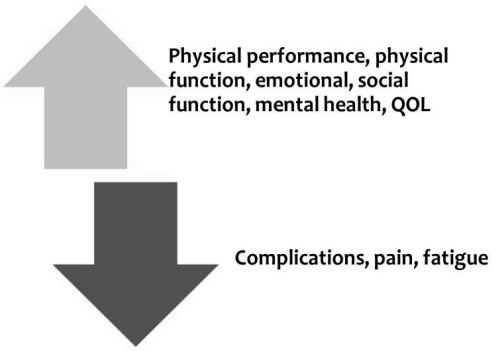
Exercise & Advanced Stage

TABLE 1. Research on PA in Patients With Advanced-Stage Cancer From 1994–2010

Study	Purpose	Design and Sample	Findings	Limitations
Carson et al., 2007	Determine the feasibility of a yoga-based intervention in women with metastatic breast cancer, and examine its effects on pain, fatigue, distress, invigoration, acceptance, and relaxation.	Pilot/feasibility study; N = 13 women with metastatic breast cancer; X age = 59 years (SD = 44–75 years)	Yoga improved daily invigoration and acceptance, with trends for improved pain and relaxation. Yoga practice is predictive of improved levels of next-day pain, fatigue, invigoration, acceptance, and relaxation. Program was appropriate and very useful.	Small sample size limits generalizability of findings; lack of control group
Crevenna, Schmidinger, Keilani, Nuhr, Fialka-Moser, et al., 2003	Determine the feasibility and effects of an aerobic exercise program for patients with bone metastases.	Prospective case study; 48-year-old woman with breast cancer and advanced metastasis to the lung, liver, and bone	Exercise was safe, practical, and feasible. Compliance was excellent. Improvements were seen in endurance, physical and social functioning, mental health, pain, vitality, and general health perception. Immense benefit was reported from	Case study, making generalizing to other populations difficult
Jones & Peppercorn, 2010	Determine the safety and feasibility of cardiopulmonary exercise testing with advanced-stage cancer.	Cross-sectional pilot study enrolling consecutive patients with inoperable NSCLC or metastatic breast cancer (N = 85)	A symptom-limited, individualized cardiopulmonary exercise testing appears to be a relatively safe and feasible assessment tool to evaluate physical functioning in patients with advanced cancer.	Potential selection bias; exclusion of patients with low performance status; cross-sectional design; small sample size[a]
Headley et al., 2004	Examine the effects of a seated exercise program on fatigue and QOL in patients with metastatic breast cancer.	Randomized, controlled longitudinal trial (N = 32)	Intervention group had a slower decline in total and physical well-being and QOL and less increase in fatigue scores starting with the third cycle of chemotherapy.	Potential confounders such as spousal support; 16% attrition; small sample size[a]

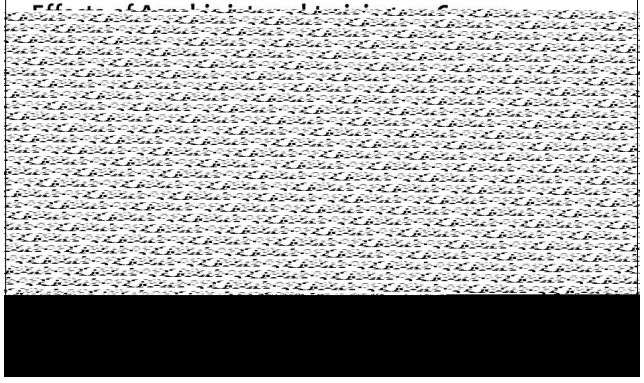
Tara A. Albrecht, PhD, RN, and Ann Gill Taylor, EdD, RN, FAAN

Exercise & Advanced Stage



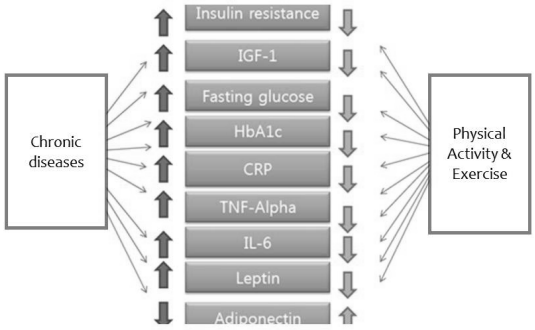
Physical Activity during Cancer Therapy Decreases Treatment Side Effects

Side Effects



Mechanisms

Mechanisms



Mechanisms

Fasting C-Peptide Levels and Death Resulting From All Causes and Breast Cancer: The Health, Eating, Activity, and Lifestyle Study

Melinda L. Irwin, Catherine Duggan, Ching-Yun Wang, Ashley Wilder Smith, Anne McTiernan, Richard N. Baumgartner, Kathy B. Baumgartner, Leslie Bernstein, and Rachel Ballard-Barbash

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ORIGINAL REPORT

Table 3. Fasting C-Peptide and Risk of Death Resulting from Breast Cancer in Women Diagnosed With Breast Cancer

ıtide Level	No. of Events	Total No. of Patients	Age-Adjusted Model HR	95% CI	Age and BMI-Adjusted Model HR	95% CI	Multivar HR
ıL†							
	7	184	1.00		1.00		1.00
	11	187	1.70	0.65 to 4.44	1.96	0.74 to 5.22	2.19
				.28		.072	
ıl							
	7	184	1.00		1.00		1.00
	11	187	1.69	0.65 to 4.41	1.92	0.72 to 5.07	2.19
	10	175	1.70	0.64 to 4.54	2.67	0.98 to 7.68	2.55
ɒe 2 diabetes	5	58	2.81	0.86 to 9.23	4.69	1.30 to 16.91	2.83
ıl (continuous)‡	28	546	1.21	0.92 to 1.58	1.37	1.04 to 1.82	1.36
				.18		.027	

ɜMI, body mass index; HR, hazard ratio.
riables included age, race/site, and initial treatment; stratification variables included BMI, disease stage, and estrogen receptor st
ıgories based on tertiles, excluding women with type 2 diabetes.
ıtinuous) excludes women with type 2 diabetes. Range of C-peptide is 0.25 to 9.70 ng/mL.

Exercise Interventions

Exercise Interventions

[Intervention Review]

Exercise interventions on health-related quality of life for people with cancer during active treatment

Shiraz I Mishra[1], Roberta W Scherer[2], Claire Snyder[3], Paula M Geigle[4], Debra R Berlanstein[5], Ozlem Topaloglu[6]

- Exercise have beneficial effects on HRQoL and certain HRQoL domain including physical functioning, role function, social functioning, and fatigue.
- Positive effects of exercise interventions are more pronounced with moderate- or vigorous-intensity vs. mild-intensity exercise program.

Exercise Interventions

Effects of exercise on breast cancer patients and survivorship: a systematic review and meta-analysis

Margaret L. McNeely, Kristin L. Campbell, Brain H. Row, Terry P. Klassen, John R. Mackey, Kerry, Courneya

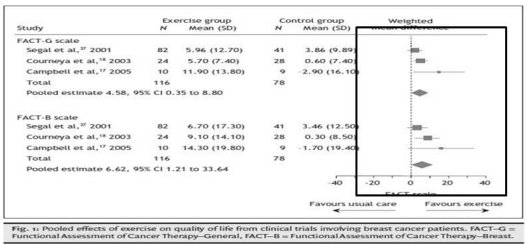

Fig. 1. Pooled effects of exercise on quality of life from clinical trials involving breast cancer patients. FACT-G = Functional Assessment of Cancer Therapy–General, FACT-B = Functional Assessment of Cancer Therapy–Breast.

Exercise Interventions

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Table 3: Effects of exercise on cardiorespiratory fitness, body composition and physical functioning

Outcome	No. of studies	N	Weighted mean difference (95% CI)	p value	Standardized mean difference (effect size) (95% CI)	p value
Cardiorespiratory fitness						
VO_{2peak} absolute, L/min	2	95	0.30 (0.2 to 0.41)	0.00001*	Not estimated	-
VO_{2peak} relative, mL/kg per min	3	95	3.39 (1.67 to 5.1)	0.0001*	1.14 (0.47 to 1.81)	0.0009*
Predicted VO_2, mL/kg per min	2	150	0.99 (-0.21 to 2.18)	0.07	Not estimated	-
6-min walk test, m	2	39	35 (12.6 to 58.1)	0.002*	Not estimated	-
12-min walk test, m	1	19	101 (62.5 to 140.4)	0.00001*	Not estimated	-
1-mile walk test, min	1	89	-1.31 (-0.42 to -0.20)	0.004*	Not estimated	-
Body composition						
Weight, kg	4	277	-0.03 (-0.44 to 0.38)	0.88	-0.07 (-0.36 to 0.21)	0.61
Body mass index, kg/m^2	4	240	-0.02 (-0.09 to 0.05)	0.58	-0.12 (-0.38 to 0.13)	0.35
Percent body fat	1	81	-1.38 (-1.57 to -1.19)	0.03	Not estimated	-
Lean body mass, kg	1	81	0.86 (0.76 to 0.96)	0.008	Not estimated	-
Bone density, %	1	66	3.79 (2.55 to 4.17)	0.02	Not estimated	-
Physical functioning	4	208	Not estimated	-	0.84 (0.36 to 1.32)	0.0006

Note: CI = confidence interval.
*Indicates significant value.

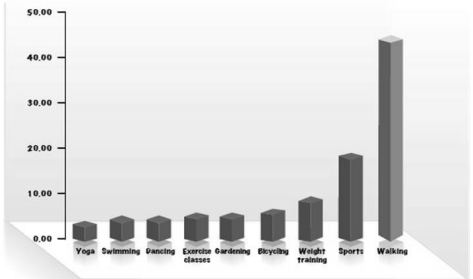
Exercise Interventions

A randomized trial of exercise on well-being and function

Recommendations

Most Enjoyable Exercise

Figure 1. Physical Activities Breast-cancer Survivors Typically Find Most Enjoyable



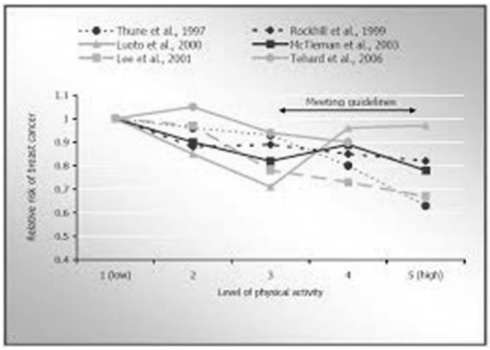
Note: The sports category included minimal reporting of sailing, kayaking, tennis and snowshoeing, and higher reporting of golf and skiing (both downhill and cross-country). Exercise classes included both water-based and organized instructor–led workouts.

Exercise Intensity

High Intensity Activity Provides More Benefits Than Light Activity

- A recent Cochrane database systematic review of 56 trials encompassing 4,800 subjects found that compared to light exercise, moderate-intensity or vigorous exertion during cancer treatment provided greater improvements in health-related quality of life, physical functioning, anxiety, fatigue, and sleep disturbances.
- This suggests that for patients on chemotherapy or radiation, and without contraindications to vigorous exercise, even more benefits will accrue with high-intensity activity.

Exercise Intensity



Summary

- **Improved physical fitness and function, and increased feelings of vitality.**
- **Exercise and physical activity reduced cancer-specific mortality, total mortality.**
- **Patients with different cancer diagnoses may require different amounts and intensities of exercise to obtain the maximum benefit.**