

The Influence of Exercise on Quality of Life among Cancer Survivors

Stacey M. Ryan, Rebecca A. Ferrer, Linda S.
Pescatello, FACSM, Tania B. Huedo-Medina,
and Blair T. Johnson

University of Connecticut, Storrs, CT

Introduction

Cancer Statistics 2008

- Cancer is a major public health burden in the United States (US)
- One in four deaths in the US is due to cancer
- The lifetime probability of developing cancer:
 - Men 45%
 - Women 38%

Introduction

Side- effects :

- Nausea
- Vomiting
- Hair loss
- Peripheral neuropathy
- Anemia
- Fatigue
- Decreased range of motion
- Lymphedema
- Anxiety
- Depression
- Memory loss
- Decreased information-processing speed
- Reduced attention
- Loss of appetite

Introduction

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

- 14 studies included
- Only 4 studies considered high quality
- Exercise is an effective intervention to improve Quality of Life (QOL)
- Larger trials needed

Introduction

Exercise in Cancer Survivors: An Overview of Research

- 47 studies
- Exercise interventions may be effective in enhancing QOL
- Studies are few in number
- Future research needed

Introduction

Systematic review and meta-analysis of psychological and activity-based interventions for cancer related fatigue

- 41 articles
 - 24 psychological based interventions
 - 17 physical activity (PA) based
- Greater effect size for psychologically based interventions

Purpose

To determine the extent to which PA interventions enhance QOL among cancer survivors and what intervention characteristics are best linked with QOL improvements.



Methods

- Search of the literature
 - End date: February 2008
- Searches of PsychINFO (1,334) and PubMed (12,201)
 - *cancer or malign**
and
 - *diagnos*, post-diagnos*, survivor*, patient, treatment, recover*, or “with cancer”*
and
 - *intervention, randomized, controlled, effect*, trial, program*, or study*
and
 - *lifestyle, physical activity, exercise, “weight training,” “resistance training,” or rehabilitat**

Inclusion/ Exclusion Criteria

- Studies must:
 - include an intervention designed to increase PA in adult cancer survivors
 - Include a valid measure of QOL
 - Include an appropriate comparison
 - Provide sufficient statistical information for calculating an effect size
 - Authors contacted in absence of sufficient information

Inclusion/ Exclusion Criteria

- Studies must not:
 - Allow participants to decide whether they would be in the exercise or control group

Outcome Variable

- Self-reported Quality of Life (QOL)
 - Functional Assessment of Cancer Therapy
 - FACT-G
 - FACT- B
 - FACT- C
 - Cancer Rehabilitation Evaluation System (CARES)
 - Short Form Health Survey-36 (SF-36)
 - Other appropriate measures of QOL

Cella et al. 1993. *J Clin Oncology*

Schag et al. 1990. *J Psychosoc Oncology*

Ware Jr JE et al. 1994. Health Institute, NE Medical Center

Standardized Mean Difference Effect size

$$d = \frac{M_{Treatment} - M_{Control}}{SD_{Pooled}}$$

- Positive signs imply higher quality of life for members of the intervention group (compared to those in the control group).
- Corrected for baseline differences & small sample sizes

Coding Form

(V3) _____

Type of cancer:

1=breast

2=prostate

3=head and neck

4=colorectal

5=skin

6=leukemia

7=myeloma

8=lymphoma

9=gastrointestinal

10=lung

11=ovarian

12=pancreatic

13=bladder

14=endometrial

15=kidney/renal

16=appendix

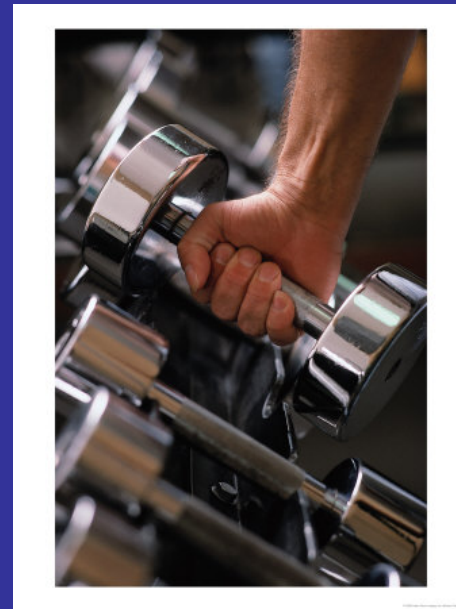
17=cervical

0=combination (list numbers): _____

Coding Form

(V2) ___ **Aerobic/ Cardiovascular Activities (in METS as defined in excel file, none = 0)**

(V3) ___ **Resistance/ Strength Activities (in METS as defined in excel file, none = 0)**



Coding Form

- Flexibility
- Structure
- # minutes
- # sessions



Descriptive Statistics

- 24 studies included in analyses
- Total *N* in intervention group
 - Range: 6-271
 - Median: 34
- Mean age of participants
 - Range: 49.1-71.7
 - Median: 55.05
- Publication year
 - Range: 1998-2007
 - Median: 2006

Descriptive Statistics

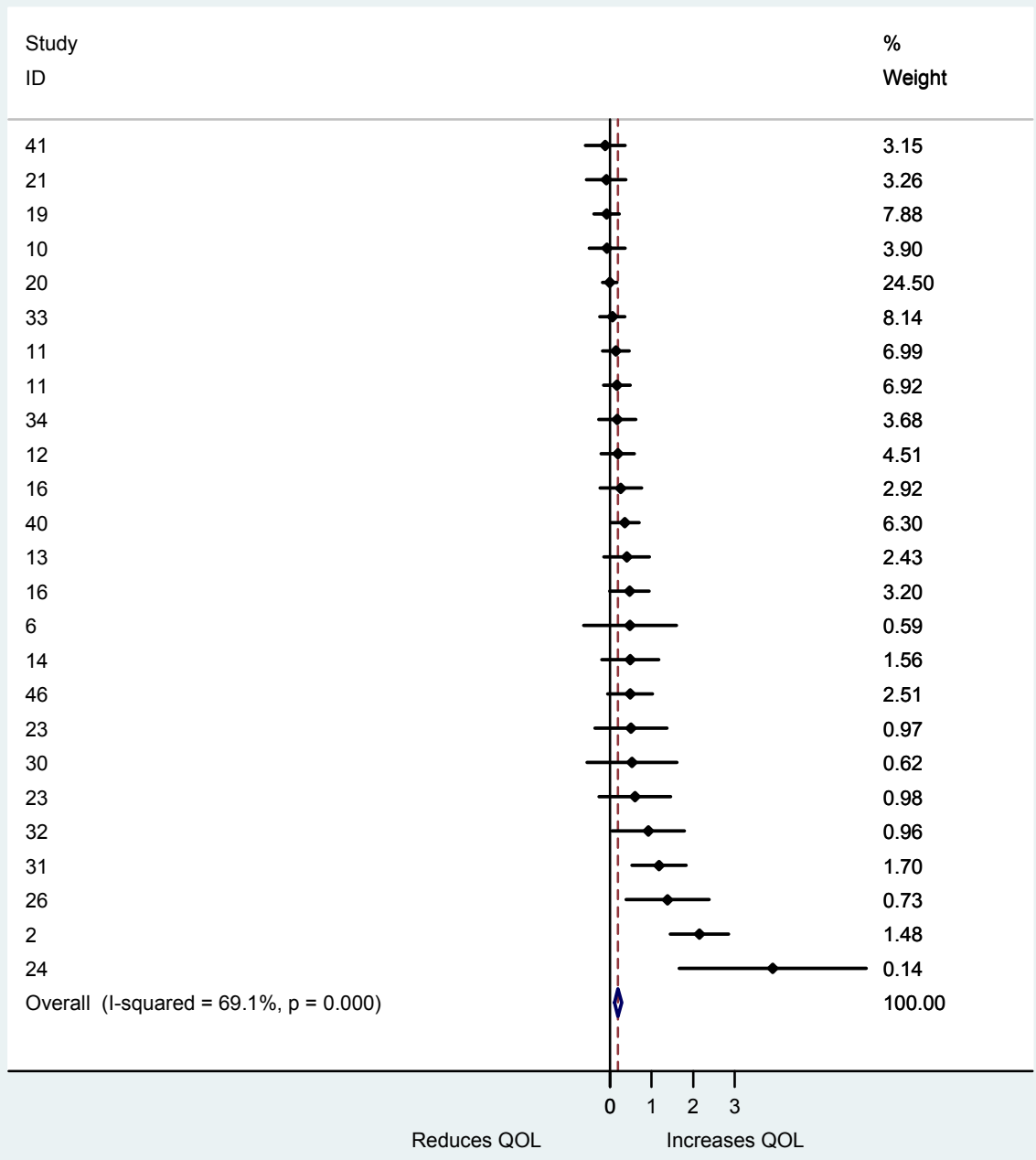
- Gender
 - 77.67% women
- Language of Publication
 - English
- Source
 - 22 journal articles
 - 2 dissertations
- Inter-rater reliability
 - .96

Hypothesis 1

- Physical activity interventions will improve QOL.

Overall Results

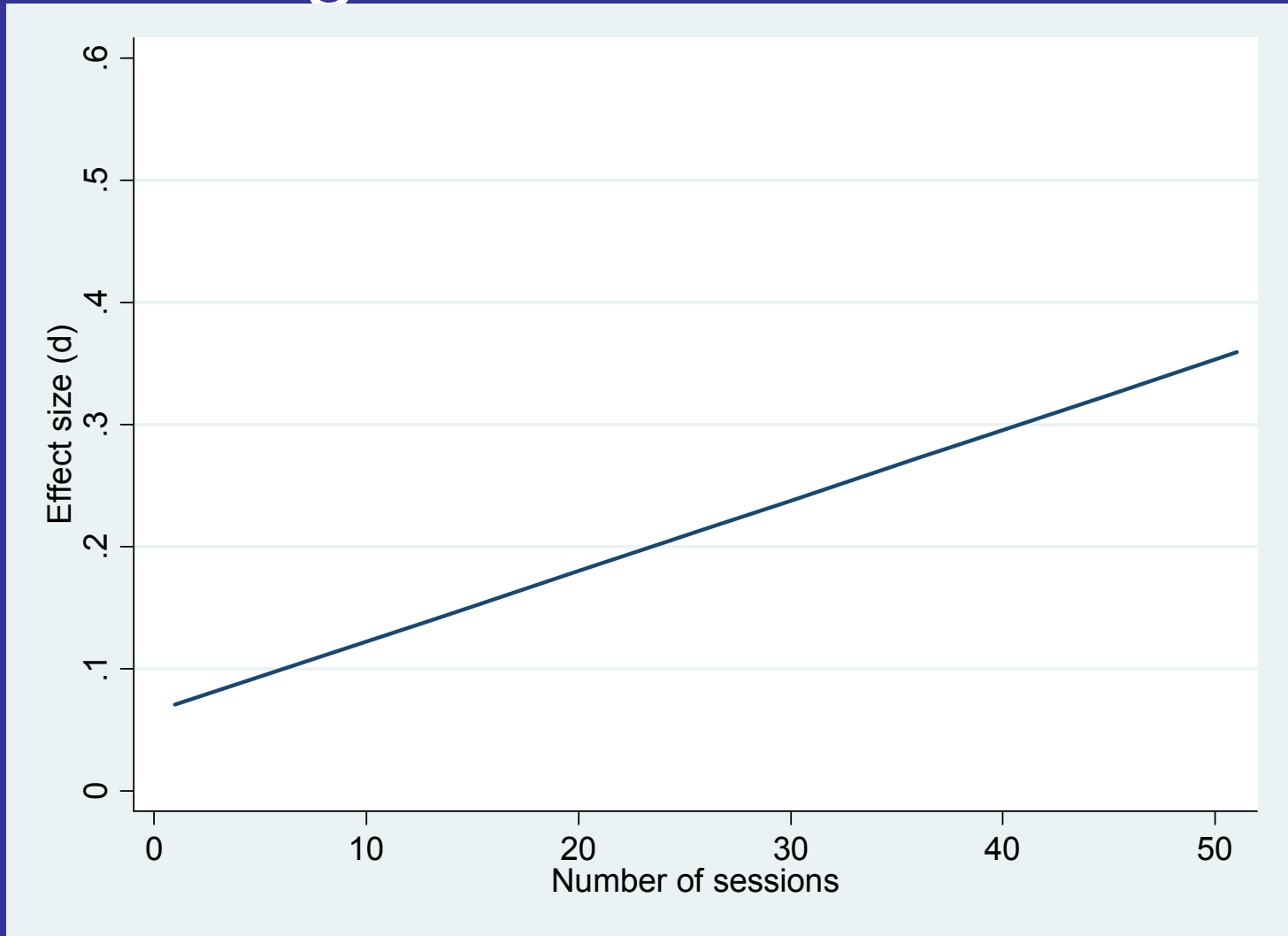
- Interventions significantly improved QOL:
 - Fixed effects: $d = 0.18885$, $SE = 0.04380$, $p < 0.0001$
 - Random effects: $d = 0.35393$, $SE = 0.09344$, $p < 0.001$
- Intervention efficacy varied widely, $I^2 = 67.18$, $p < .001$.



Hypothesis 2

- Physical activity interventions with more sessions will have larger effects on QOL.

Moderating Effect of No. of Sessions

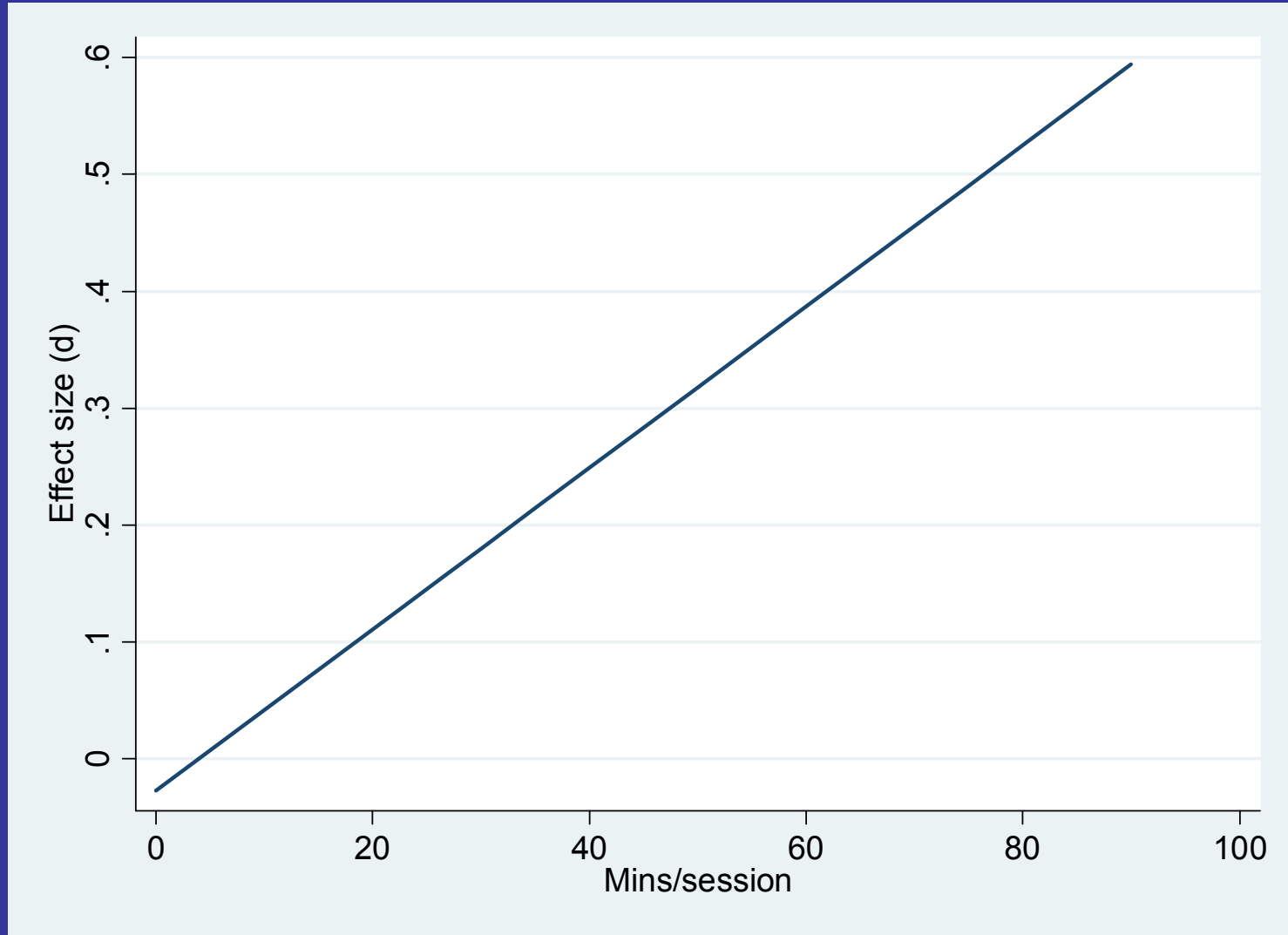


$\beta = .2510, p = .032.$

Hypothesis 3

- Physical activity interventions with longer sessions will improve QOL better than those with shorter sessions.

Moderating Effect of Session Length

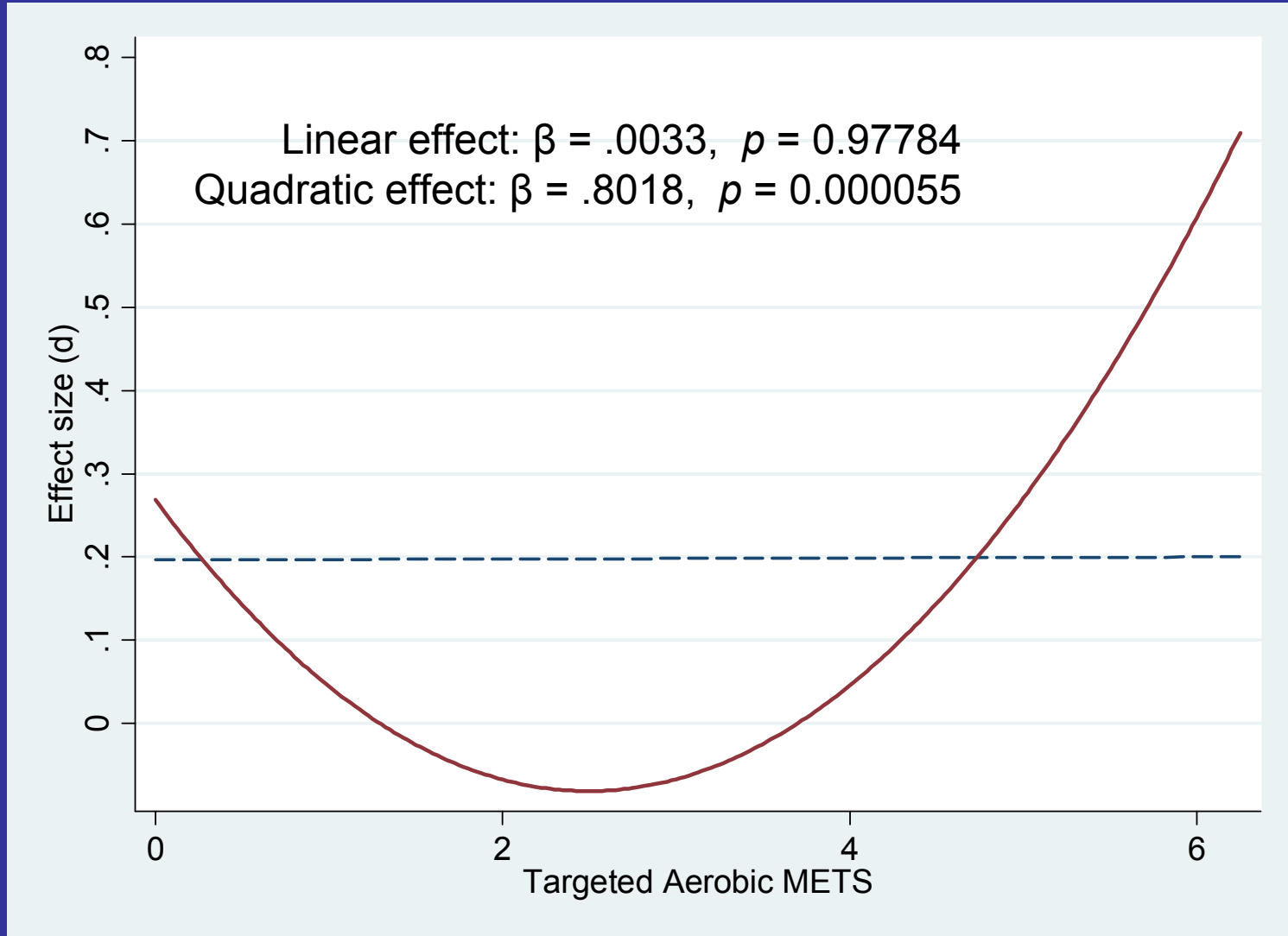


$\beta = 0.4695, p = 0.00029.$

Hypothesis 4

- QOL effect sizes will be larger in physical activity interventions that targeted more METS of aerobic activity.

Moderating Effect of Aerobic METS

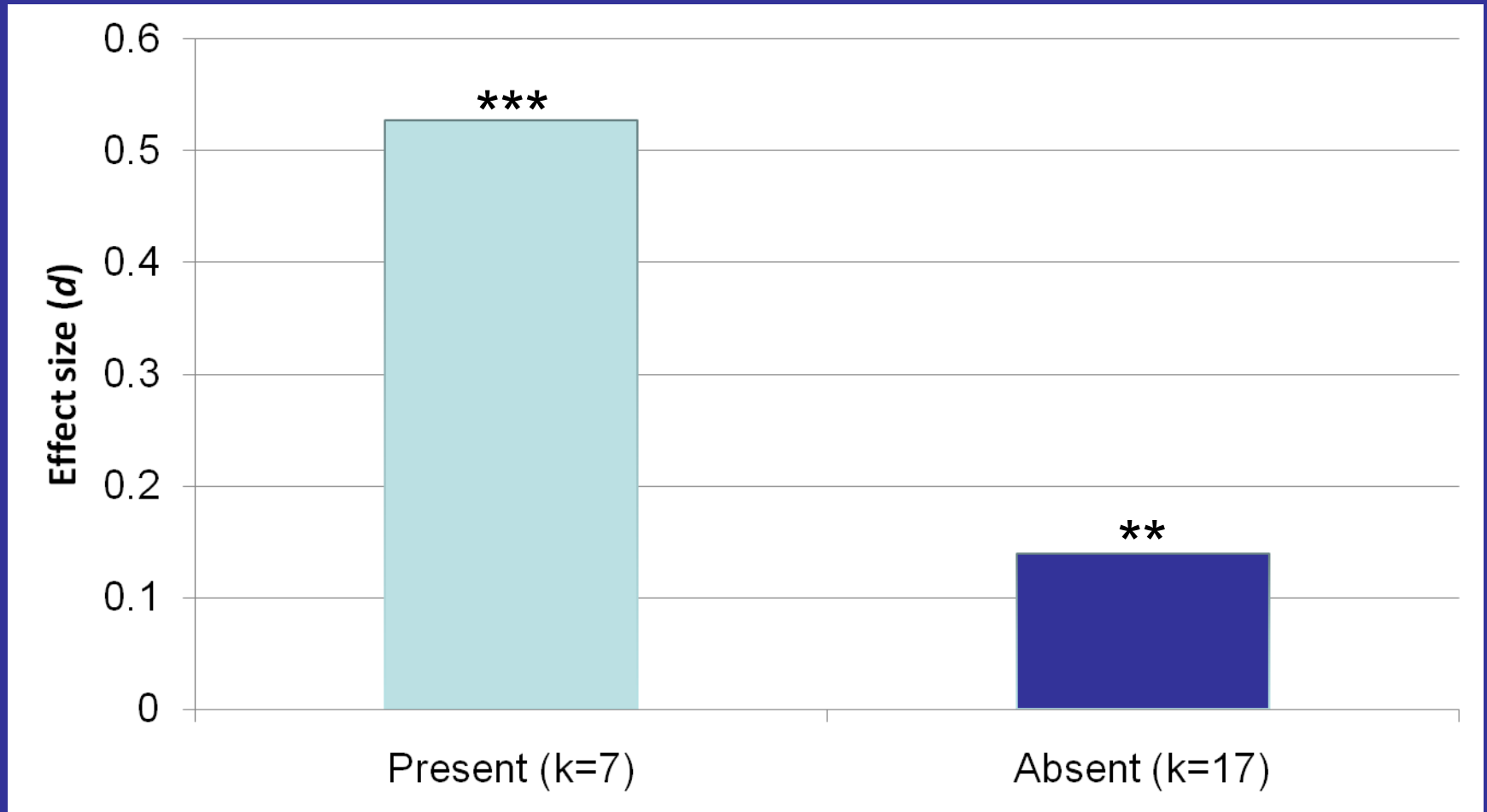


$k = 24.$

Hypothesis 5

- Physical activity interventions with a flexibility component will improve QOL more than those without it.

Moderating Effects of Flexibility Training

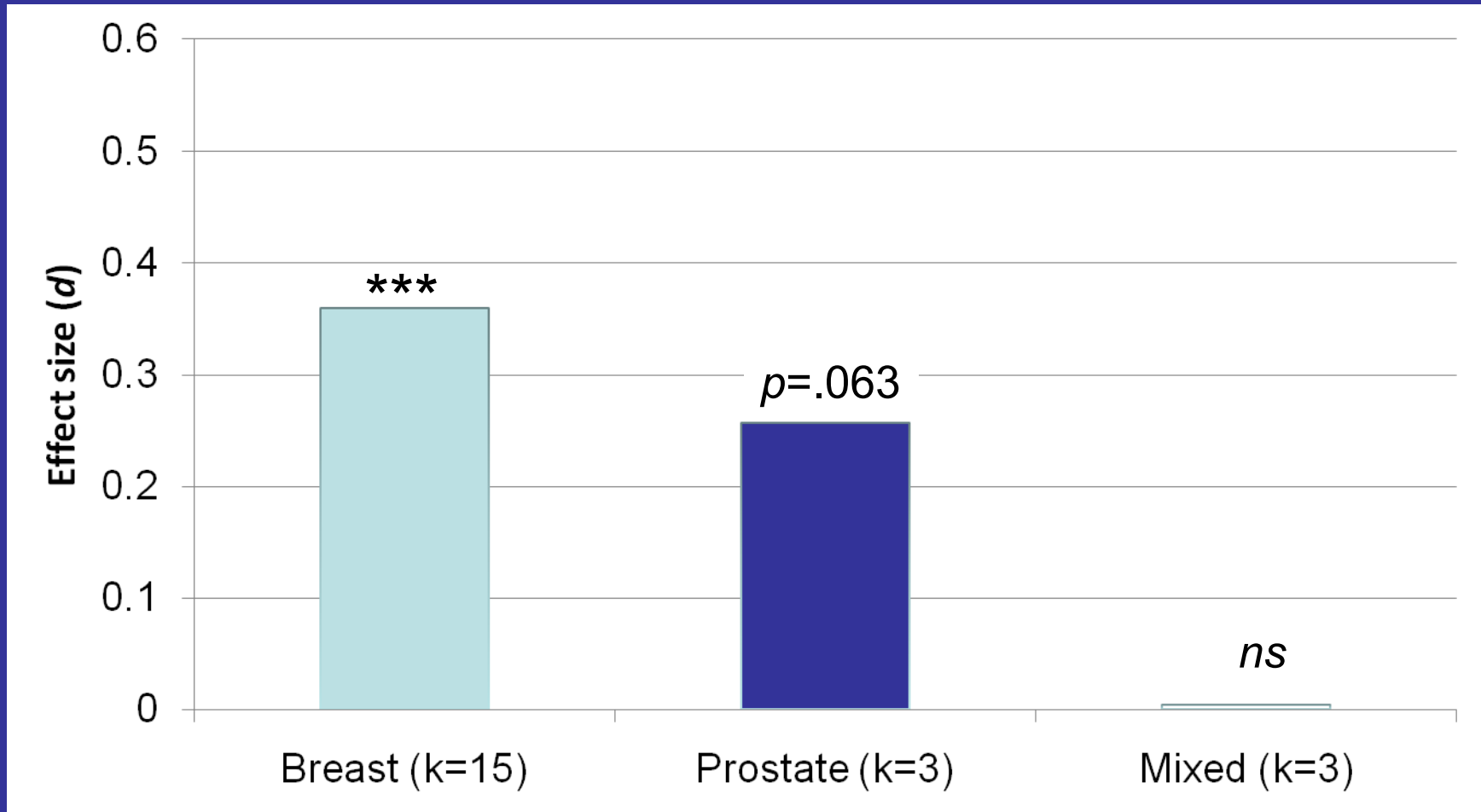


$\beta = .2156, p = .04651.$

Hypothesis 6

- The efficacy of physical activity interventions may depend on cancer type.

Moderating Effects of Cancer Type



**Colorectal cancer excluded because only one study targeted it.*

Other Effect Modifiers

- No significant differences for the following effect modifiers appeared:
 - Age of sample ($\beta=-.19$, $p=0.12$)
 - Supervised vs. unsupervised ($\beta=-.11$, $p=0.32122$)
 - METS targeted for resistance ($\beta=-.10$, $p=0.38$)

Discussion

- Interventions varied in how much they improved quality of life.
- Interventions were more successful when they:
 - (1) Had longer sessions (with more METS of aerobic training).
 - (2) Offered flexibility training
 - (3) Enrolled and targeted breast or prostate cancer survivors (compared with trials that mixed types of cancer)

Conclusion

- Larger number of studies meta-analytically reviewed
- Extended research to all cancer types
- Findings highlight PA intervention characteristics for improving QOL
- Future research still needed

Questions?

