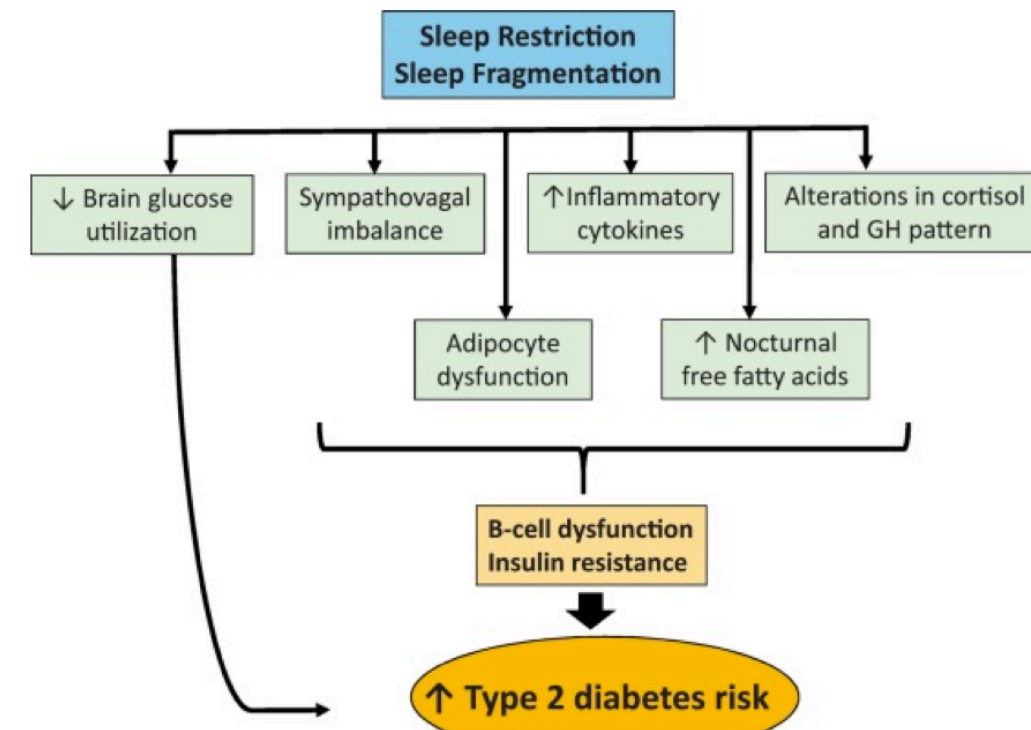


## Introduction

- Poor sleep quality affects nearly one third of breast cancer survivors and is associated with greater breast cancer mortality.
- A detrimental effect of poor sleep quality is the development of insulin resistance, the underlying pathophysiologic disruptor of metabolic syndrome and type 2 diabetes (Figure 1).



**Figure 1. Sleep disruptions negatively impact the risk of Type 2 diabetes.**  
Reutrakul and Van Carter, *Metabolism*, 2018

- The purpose of this secondary analysis was to examine the effects of a 16-week aerobic and resistance exercise intervention on sleep quality among breast cancer survivors. We assessed whether exercise-induced changes in sleep quality were associated with insulin resistance.

## Methods

- Participants:** Sedentary, overweight /obese (BMI>25.0 kg/m<sup>2</sup>) breast cancer survivors (Stage I-III) were randomized to exercise (n=50; Table 1) or usual care (n=50)
- Outcomes:** (measured at baseline and week 17)
  - Sleep quality was assessed by the Pittsburgh Sleep Quality Index (PSQI).
  - Insulin resistance was estimated using the homeostatic model assessment of insulin resistance (HOMA-IR) calculated from fasting insulin and glucose levels.
- Statistical Analysis:** Within and between group differences were assessed by paired t-tests and repeated measures ANOVA. The association between changes in PSQI and HOMA-IR in the exercise group was computed using Pearson correlation.

**Table 1. Traditional Aerobic and Resistance Exercise Intervention**

Day 1		Day 2		Day 3	
<b>Resistance Exercise</b>		<b>No Resistance Exercise</b>		<b>Resistance Exercise</b>	
3 sets	10 repetitions			3 sets	10 repetitions
	65-80% 1-rep max				65-80% 1-rep max
<b>Aerobic Exercise</b>		<b>Aerobic Exercise</b>		<b>Aerobic Exercise</b>	
30 minutes	65-80% VO <sub>2</sub> max	30 minutes	65-80% VO <sub>2</sub> max	30 minutes	65-80% VO <sub>2</sub> max

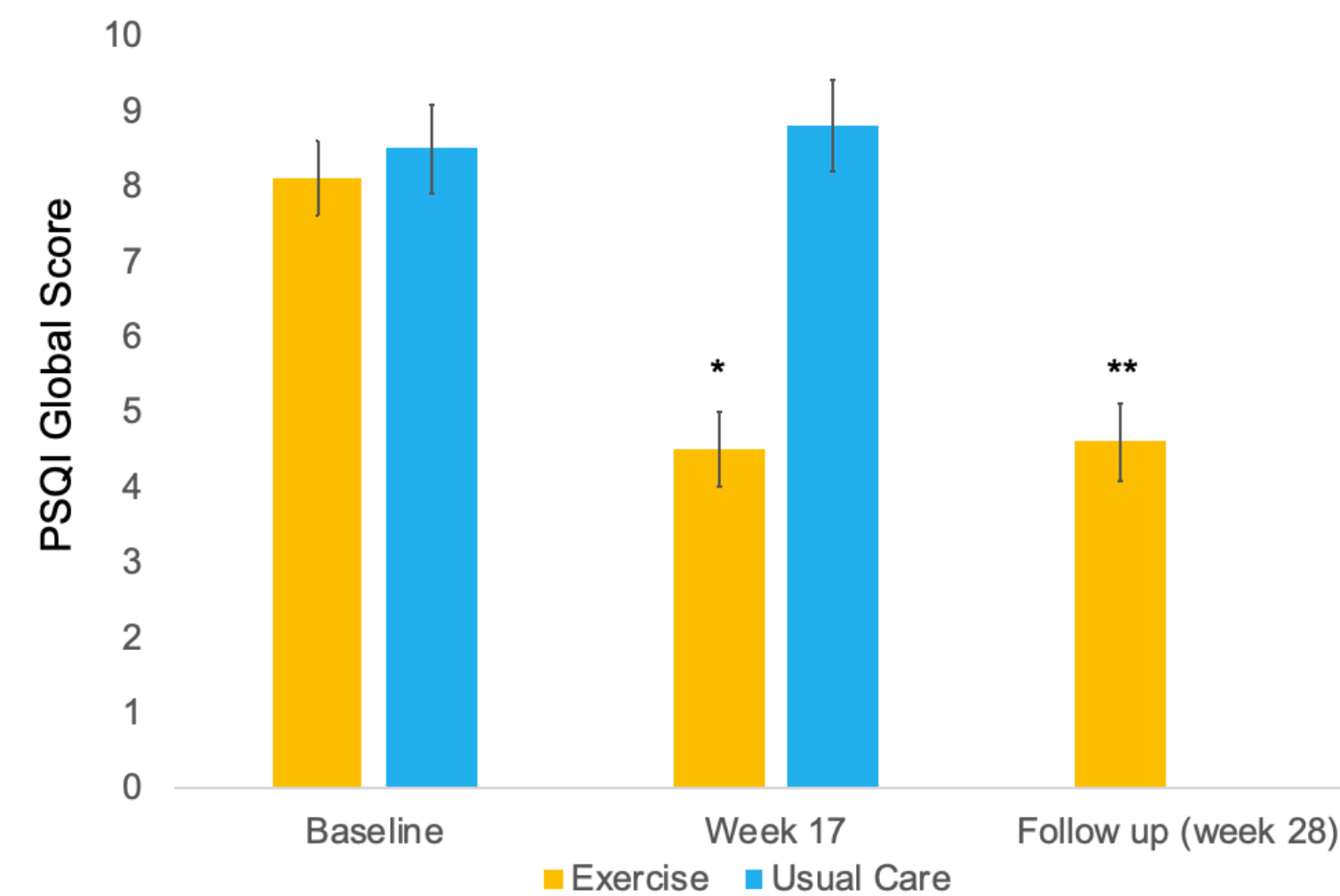
Ligibel et al. JCO, 2008

## Results

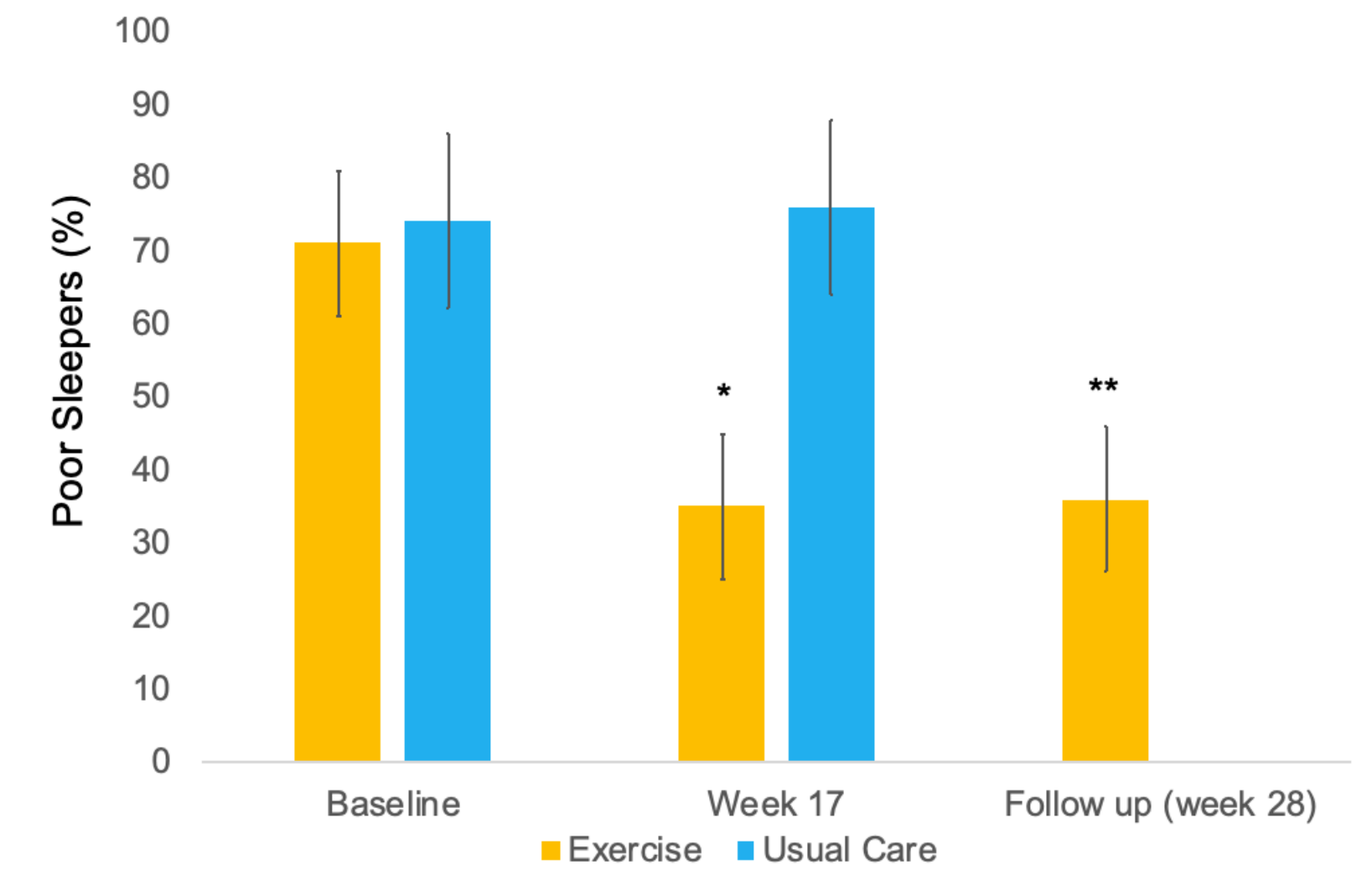
**Table 2. Participant Characteristics**

	Exercise (N=50)	Usual Care (N=50)
<b>Age, y</b>	52.8 (10.6)	53.6 (10.1)
<b>Menopausal status, n (%)</b>		
Premenopausal	23 (44)	19 (38)
Postmenopausal	27 (56)	28 (62)
<b>Weight (kg)</b>	85.0 (13.0)	83.9 (11.0)
<b>Height (cm)</b>	160.3 (6.1)	158.5 (10.4)
<b>Race/Ethnicity, n (%)</b>		
Non-Hispanic White	11 (21)	15 (31)
Hispanic White	28 (56)	27 (53)
African American	3 (6)	1 (2)
Asian/Pacific Islander	8 (17)	7 (14)
<b>Disease stage, n (%)</b>		
I	20 (40)	21 (42)
II	19 (38)	19 (38)
III	11 (22)	10 (20)
<b>Treatment in addition to surgery, n (%)</b>		
Radiation only	4 (8)	6 (13)
Chemotherapy only	8 (15)	5 (11)
Radiation and chemotherapy	38 (76)	39 (78)
<b>Current endocrine therapy, n (%)</b>		
None	6 (12)	10 (20)
Tamoxifen	23 (46)	24 (49)
Aromatase inhibitor	21 (42)	16 (31)

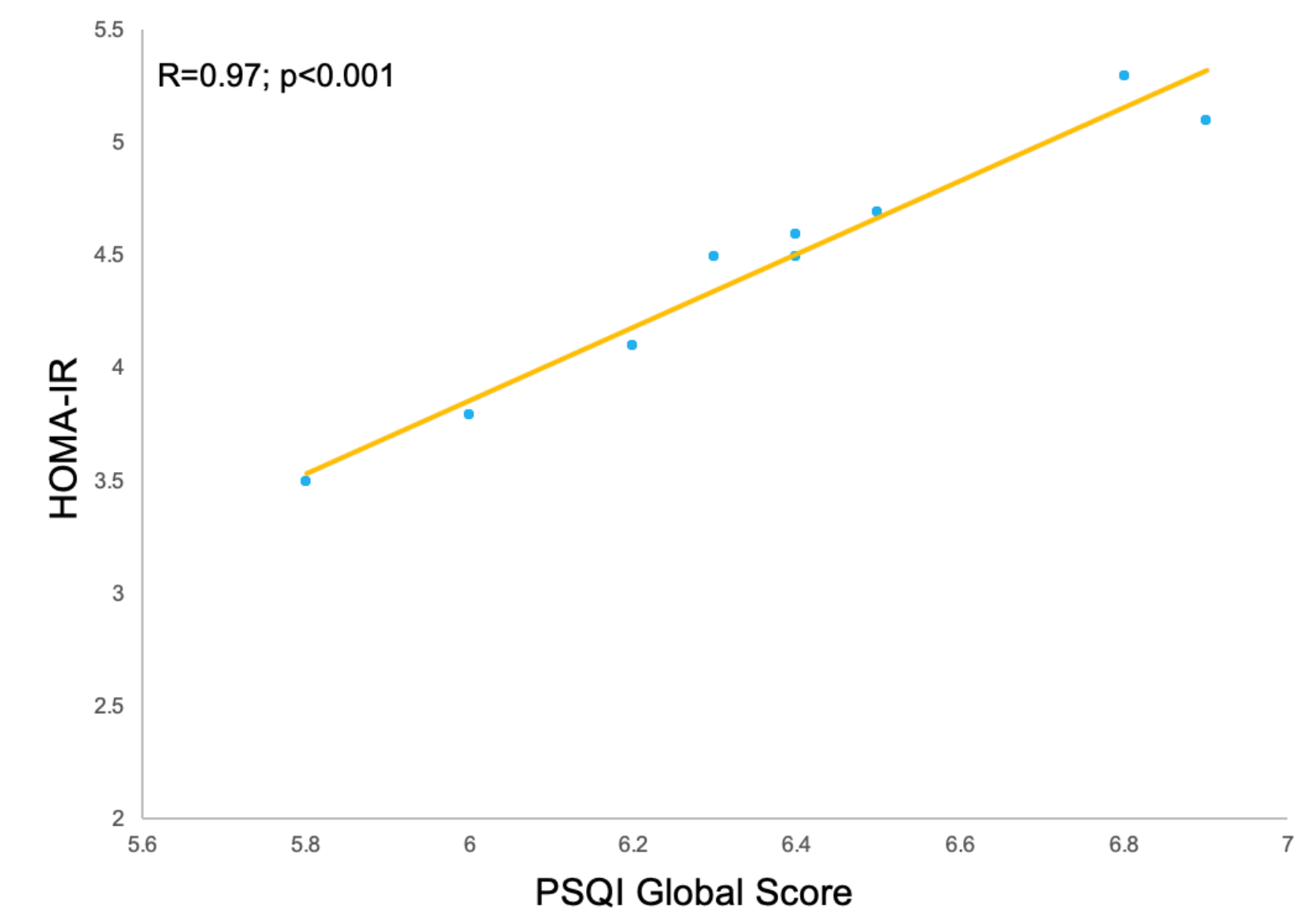
Data expressed as mean (SD)



**Figure 2. Aerobic and resistance exercise improves sleep quality in overweight or obese breast cancer survivors.**  
\*Statistically significant when compared to baseline and the usual care group (p<0.001); \*\* Statistically significant when compared to baseline (p<0.001)



**Figure 3. Aerobic and resistance exercise reduces the number of poor sleepers among overweight or obese breast cancer survivors.**  
\*Statistically significant when compared to baseline and the usual care group (p<0.001); \*\* Statistically significant when compared to baseline (p<0.001)



**Figure 4. Exercise-induced improvements in sleep quality were associated with improved insulin resistance in overweight or obese breast cancer survivors.**

## Conclusion

- An aerobic and resistance exercise intervention appears effective to improve sleep quality in breast cancer survivors. Breast cancer survivors who experience exercise-induced improvements in sleep quality may also experience improved insulin resistance.
- We would like to thank the participants for their time and dedication to this study. This trial was supported by funding from the National Cancer Institute (K07CA160718; PI: Dieli-Conwright).