An Investigation into the Link Between Heart Rate Variability and Intrusive Thoughts: Implications for Cancer Survivors

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"I try everyday to find the good, but then my brain brings me right back to the bad…It never stops. It never shuts off. The thoughts just keep coming." –Tanya, Stage IIA (www.breastcancer.org)

Background

Post-Cancer Survivorship Health:

Cancer survivors often suffer from long-term health problems like cardiac dysfunction, chronic stress and fatigue, pain syndromes, insomnia, and depression (Aziz, 2008).

Heart Rate Variability (HRV):

One common underlying factor for these health problems is low heart rate variability (HRV). HRV is the heart's beat-to-beat variability and low HRV is linked to many cardiovascular diseases, fatigue, and all-cause mortality risks (Schwartz et al., 2003).

Intrusive Thoughts:

Stress in the form of persistent, negative thoughts, much like those experienced by some cancer survivors after diagnosis, is also linked to poor health (Fagundes et al., 2011).

Link Between HRV and Intrusive Thoughts?

Persistent, negative thoughts may have a direct, harmful impact on somatic disease, which can be identified by a low HRV value.

Hypothesis

We hypothesize that female breast cancer survivors who report higher levels of intrusive thoughts will exhibit lower HRV than those who report lower levels of intrusive thoughts.

Methodology

Subjects:

163 Stage 0-IIIA breast cancer survivors between 2 months and 3 years post-cancer treatment.

Recruited for a larger study about the possible effects of yoga on breast cancer survivors' stress, fatigue, and inflammation.

The mean age and time since treatment to baseline visit for subjects was 51.58 years and 10.66 months, respectively.

Methodology (Cont'd)

HRV Data Collection:

•Subjects fitted with an HRV monitoring strap that remains on during the entire visit

•HRV data is collected via a Polar s810 wristwatch and WearLink 31 belt worn around each subject's torso (Figure 1a)

•The middle 10 minutes of a 20-minute rest period is analyzed as a measure of baseline HRV (Figure 1b)

Figure 1: ***Polar© Images from www.polarusa.com*** A.) Image of Polar Watch RS800's face that is used in our study; B.) Polar ProTrainer 5 software used in the analysis of HRV for each subject.

Impact of Events Scale (IES):

Complete the IES, a self-report measure of intrusive thought recurrence about breast cancer diagnosis & treatment (Weiss, 2007).

•"I had trouble falling asleep or staying asleep because pictures or thoughts of it came to mind."

•"I was aware that I still had a lot of feelings about it, but I didn't deal with them."

Results

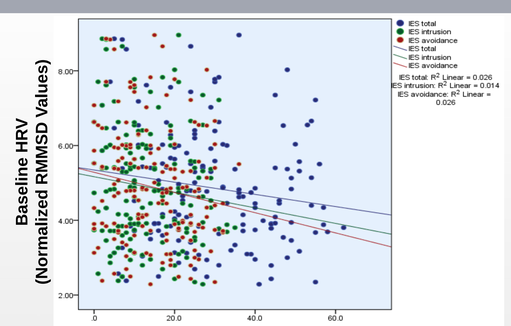

Figure 3: Correlation comparing the relationship between baseline IES total and subscale scores with baseline HRV values.

Results (Cont'd)

Measure	Numerator DF	Denominator DF	F-Statistic	P-Value
IES Total	1	157	4.202	0.042*
IES Intrusion	1	157	2.349	0.127
IES Avoidance	1	157	3.915	0.050*

Figure 3: Multiple regression analysis comparing various IES measure to baseline HRV.

•Data analyses indicate that women more distressed about their cancer diagnosis had lower HRV than those who were less distressed (Figures 3).

•Effects remained significant after controlling for age, body mass index, cardiac medications, and smoking status (Figure 4).

•Follow-up analyses suggested that the relationship between HRV and the IES scale was strongest on the avoidance subscale.

Discussion

The results of this study comparing female breast cancer survivors' intrusive thoughts and heart rate variability confirmed our hypothesis that high levels of intrusive thoughts are related to lower HRV.

These findings establish an important link between survivors' vulnerability to certain health risks and the mental, emotional distress caused by their cancer-related experiences.

Early identification of those who experience traumatic cancer stress upon diagnosis, as indexed by intrusive thoughts, will be important in helping to prolong the long-term health of cancer survivors.

Future studies should be conducted to determine the longitudinal relationship between intrusive thoughts and HRV, particularly testing the predictive power of IES scores in relation to HRV levels, as well as studying the degree to which this association holds true over time.

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