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TITLE: Emotional, Biological, and Cognitive Impact of a Brief Expressive Writing Intervention for Women at Familial Breast Cancer Risk

PRINCIPAL INVESTIGATOR: Heiddis Valdimarsdottir, Ph.D.

CONTRACTING ORGANIZATION: The Mount Sinai School of Medicine
New York, NY 10029-6574

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14. ABSTRACT Women at familial breast cancer risk have highly inflated perceptions of their risk of developing the disease, high levels of cancer-specific distress, and lower levels of natural killer cell activity (NKCA) than women without familial breast cancer risk. The proposed study will examine the impact of an expressive writing intervention on emotional, biological, and cognitive processes among women at familial breast cancer risk. This intervention has been shown to have positive effects on emotional outcomes (e.g., decreased distress), biological outcomes (e.g., increased NKCA), and cognitive outcomes (e.g., increased working memory) in individuals writing about a variety of life stressors including minor stressors and major trauma. We propose a randomized controlled trial examining the effects of expressive writing intervention on emotional, biological, and cognitive functions in healthy women at familial breast cancer risk.						
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Principal Investigator: Dr. Heiddis Valdimarsdottir

INTRODUCTION:

Having a family history of breast cancer is a risk factor for developing cancer in one's lifetime. Women at familial breast cancer risk have highly inflated perceptions of their risk of developing the disease, high levels of cancer-specific distress, and lower levels of natural killer cell activity (NKCA) than women without familial breast cancer risk. The most common intervention for women at familial risk is breast cancer risk counseling which provides a wealth of information about personal breast cancer risk and various screening options. Considering the high levels of cancer-specific distress that many of these women report, it may not be surprising that a number of studies now suggest that these women do not adequately process the information provided to them during the counseling. The possibility that distress associated with familial breast cancer risk affects cognitive processing is raised by studies demonstrating that working memory, which plays a critical role in various tasks, including learning of new information, is compromised by intrusive thoughts about stressful life events. The proposed study will examine the impact of an expressive writing intervention on emotional, biological, and cognitive processes among women at familial breast cancer risk. This intervention has been shown to have positive effects on emotional (e.g., decreased distress), biological (e.g., increased NKCA), and cognitive outcomes (e.g., increased working memory) in individuals writing about a variety of life stressors including minor stressors (e.g., going to college) and major trauma (e.g., surviving the Holocaust). We propose a randomized controlled trial examining the effects of an expressive writing intervention on emotional, biological, and cognitive functions in women at familial breast cancer risk.

The goal of the proposed research was: first, to examine the impact of expressive writing on emotional, biological, and cognitive outcomes among women at familial breast cancer risk. We hypothesize that: 1) the expressive writing intervention will lead to reduced distress, increased immune function (e.g., NKC) and increased cognitive functioning (e.g., working memory); 2) the impact of the intervention on immune function and working memory will be mediated by cancer-specific distress; 3) the intervention will be particularly effective for women with high levels of social constraints in expressing their concerns about cancer. Second, to determine if expressive writing improves the effectiveness of familial risk counseling. We hypothesize that: 1) the women in the expressive writing intervention will have greater increases in knowledge following the risk counseling than women in the control condition and be more likely to adhere to

recommended surveillance behaviors; 2) this increased knowledge will be due to the beneficial effects of the intervention on emotional and cognitive processes.

BODY:

As indicated in our Statement of Work, our goal was to recruit participants into the study in months 20 to 44 of the grant. As we discussed in last year's submission, during the first two years, we had expected to start recruiting and enrolling participants into the study and to be collecting data. However, we were behind in recruitment for the following reasons: 1) We had to spend more time than expected on designing an appropriate familial breast cancer risk counseling session. The current literature mainly focuses on hereditary breast cancer risk counseling sessions, but that type of counseling is not appropriate for women at familial breast cancer risk. Therefore, we spent a considerably longer time than anticipated to develop a counseling manual with information tailored to women at familial risk; 2) We modified the study to include Caucasian women as we had access to daughters of Caucasian breast cancer patients through Dr. Ambrosone's study entitled "Race and Risk Factors for Early/Aggressive Breast Cancer." This allowed us to examine the generalizability of expressive writing to African-American women without compromising the original aims of the study. Data are available for 63 participants, who have signed consent forms. Research Assistants have entered the data for these participants and the Principal Investigator and Project Coordinator have completed quality checks on the data. The study has now been closed to enrollment.

KEY RESEARCH ACCOMPLISHMENTS:

The findings have been submitted to be presented at the Society of Behavioral Medicine 2012 and the data was used in a Master of Art (MA) thesis for a PHD student at Albert Einstein College of Medicine NY.

REPORTABLE OUTCOMES: We will first present some descriptive data followed by preliminary results which are available for: 1) the impact of the Expressive Writing Intervention on emotional and cognitive variable and, 2) the impact of familial breast cancer on cognitive processing. These results are briefly described below. The data from this protocol were and will be analyzed under the Mount Sinai School of Medicine Protocol

Descriptive statistics of the study sample can be seen in Table 1. Approximately half of the participants were minorities and 46,7% reported that their yearly household income was less than \$50,000

Table 1. Demographic Variables and frequencies

Demographic variables	Mean or Percentage (SD)
Age	M=39.1 years (SD=12.2; range=20-59)
Ethnicity/Race	Caucasian = 49% Black or African American=33.3% Asian = 6.6% Other = 11.1%
Education Level	College degree = 28.9% Post-college graduate degree = 33.3% Some college = 15.6% H.S. diploma, equivalent, or less = 13.2%
Income Level	<\$50,000 = 46.7% \$50,000-\$90,000 = 22.2% >\$90,000 = 26.7% No response = 6.7%
Marital Status	Married or living as married = 35.5% Single = 37.8% Divorced or separated = 15.6 Widowed = 2.2%
Age of participant at time of family member's diagnosis	M = 29.0 (SD = 11.7; range=2–50)
Age of family member at time of diagnosis	M = 57.8 (SD = 11.6; range=30-76)

Impact of Expressive writing on emotional and cognitive variables.

The Expressive Writing Intervention group and the Control group (i.e., who wrote about neutral topic) did not differ on any of the demographic variables (e.g., age, education, income, and marital status). As shown in Table 2, the manipulation check indicated that women in the Expressive Writing condition rated their essays as significantly more personal ($F=17.99$; $p >.001$) and emotional ($F=40.70$; $p <.0001$) than the women in the control group. In addition, the intervention group reported that the event that they wrote about was significantly more stressful ($F=87.91$; $p <.0001$).

Table 2 means and (SD) for manipulation questions

Groups	How personal do you think is the essay you just wrote? 1(not at all) to 6 (a great deal)	To what extent did you reveal your emotions in this essay? 1 (not at all) to 6 (a great deal)	Please rate on a scale from 0 to 100, how stressful this event was for you at the time it took place
Expressive writing	5.25 (0.75)	5.0 (0.73)	90.83 (12.58)
Neutral writing	2.11 (1.61)	2.0 (1.50)	23.05 (22.61)

ANCOVA, controlling for baseline, was conducted to examine if the women in the Expressive Writing intervention performed better on cognitive tasks (e.g., Stroop task) and reported less cancer specific and general distress at the follow-up assessment than women in the Control group. The results revealed that intervention did not affect performance on any of the cognitive tasks (p 's $>.25$) and it did not affect cancer specific distress as measured by intrusive thoughts about breast cancer ($F=0.43$, $p=.43$). On the other hand, the women in the Expressive Writing Intervention group reported significantly less anxiety ($F=3.17$; $p >.05$) and there was a trend for them to report less depression ($F=2.52$; $p=0.08$). These results suggest that women at familial breast cancer risk may benefit from expressive writing interventions. We are currently examining potential moderators of the intervention, for example it is possible that women who feel constraints in expressing their emotions about cancer may benefit more from the intervention.

Impact of familial breast cancer on cognitive processing.

Eileen Farrell who was a project director for this study used the data, described, above for her MA Thesis which is a requirement for her PhD studies in clinical psychology at Albert Einstein College of Medicine. The overarching aim of her thesis was to examine if women with a family history of breast cancer would display longer color-naming times when presented with a cancer-specific word list compared to neutral word lists, which would indicate cognitive interference

when confronted with stimuli of cancer words. Previous research has demonstrated that individuals experiencing stress display aberrant and maladaptive processing of information related to the particular source of stress but little is known about cognitive interference among women at risk for breast cancer due to their family history of the disease. As shown in *Table 3*, the results showed that the mean color naming time for the cancer word-list was significantly slower than it was for the neutral word list, ($p < 0.01$) and the cardiovascular word list ($p < 0.01$). In addition, the mean time for the neutral word list was not significantly different than the mean time of the cardiovascular word list ($p > 0.05$).

Table 3

Means and Standard Errors of Color-Naming Times for the Stroop Task (listed in seconds)

List	Mean Time	Range	Standard Error
Cancer words*	87.9 (22.8)	50-137	3.5
Cardiovascular words	83.4 (22.6)	47-155	3.4
Neutral words	83.2 (22.7)	46-151	3.4

* indicates significantly different from the other Stroop word lists

The findings supported the hypothesis that women with a family history of breast cancer would display significantly longer color-naming times when presented with a cancer-specific word list compared to neutral words lists. These findings suggest cognitive interference when confronted with stimuli of cancer words and there was biased cognitive processing of cancer-related stimuli. These findings raise the possibility that healthy women facing the stress of being at increased risk of cancer due to their family history of the disease may have difficulties in processing important health related information particularly those related to cancer.

CONCLUSIONS:

Initial analyses suggest that health women with family history of breast cancer may benefit from expressive writing interventions and they indicate that these women display altered processing when confronted with cancer-related information

The study has been closed with the Mount Sinai IRB. We are currently only conducting data analysis under the other protocol.

REFERENCES:

None.

APPENDIX:

Not applicable.