

## **CHILDHOOD CANCER SURVIVOR STUDY**

### **Analysis Concept Proposal**

**1. TITLE:** Psychological Outcomes of Siblings of Adult Long-term Survivors of Childhood Cancer

**2. WORKING GROUP INVESTIGATORS:** This proposed study will be within the Sibling research section of the Psychosocial Working Group.

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### **3. BACKGROUND AND RATIONALE:**

**3.1 Introduction:** There is a rapidly growing population of pediatric cancer survivors because of improved multi-modal treatment regimens. The consequences of cure; however, are not without a cost. One cost that has been paid little attention, until recently, is the impact of childhood cancer on an important part of the family unit, the siblings. There are now approximately 270,000 survivors of childhood cancer in the United States (US). Five year survival rates of greater than 75 % have led to a rapidly growing population of childhood cancer survivors in the US and an even larger and rapidly growing population of siblings that are impacted by childhood cancer.<sup>1</sup> Siblings experience a number of losses with respect to physical and emotional availability of parents. They also experience a number of emotions including sadness, loneliness, rejection, anxiety, anger, and jealousy. They also suffer from a number of unmet needs with respect to familial communication, involvement in the care of the patient, and support to continue their interests and activities.<sup>2-6</sup> Stemming from these experiences, previous reports have noted an increase in the prevalence of psychological distress as manifested by emotional and behavioral problems in a subset of siblings after the diagnosis of childhood cancer.<sup>7-9</sup>

Based upon the gap in the medical literature with respect to the impact of cancer upon family members, the National Cancer Institute, Office of Cancer Survivorship recognizes that it is critical to expand our assessment of the quality of life and care of the family members of cancer survivors. Therefore, as the population of siblings of pediatric cancer survivors grows, the investigation of the impact of childhood cancer on the psychological distress of siblings is an important endeavor.

Tremendous progress has been made in the understanding of the long-term outcomes of adult survivors of childhood cancer through the efforts of the Childhood Cancer Survivor Study (CCSS) since this is the largest cohort of long-term survivors that are continuing to be followed.<sup>10</sup> This study has also conveniently incorporated the use of a group of siblings as control participants making this the largest cohort of siblings of childhood cancer survivors. The CCSS has the potential to be a vital resource in understanding the impact of childhood cancer upon siblings. Thus, given the paucity of information with respect to the psychological distress of this large and rapidly growing population of siblings affected by childhood cancer and the resources

provided by the sibling cohort of the CCSS, the proposed analysis is a justifiable starting point for understanding the impact of childhood cancer upon the psychological distress of siblings as well as the socio-demographic and health related factors that modulate these sibling experiences.

**3.2 Psychological Distress and Siblings of Childhood Cancer Survivors:** Early research with respect to the psychological distress of siblings focused largely upon bereaved siblings. These early studies exemplified the severe psychological distress and the emotional and behavioral sequelae that are associated with sibling loss.<sup>11-12</sup> Later studies focused on the impact of childhood cancer upon non-bereaved siblings. These studies showed similar psychological distress and emotional and behavioral sequelae that are experienced by siblings affected by childhood cancer in the absence of bereavement.<sup>13-15</sup> In addition to the limited scope of applicability of previous literature (e.g. bereaved sibling data), other limitations of data were addressed by increasing the use of non-proxy data and qualitative methods of inquiry. From the studies described above it became clear that siblings suffer a number of losses with respect to parental availability on a physical and emotional level. Siblings experience a vast array of intense emotions including sadness, loneliness, rejection, anxiety, anger, and jealousy. They also experience a host of unmet communication needs and support needs.<sup>2-6, 8-9, 13-16</sup>

The limitations imposed by small samples and heterogeneous study designs have been addressed by the efforts of the Sibling Adaptation to Childhood Cancer Study (SACC).<sup>17</sup> This multi-institutional collaborative effort has reported on the experiences of 254 siblings. Numerous reports from this study have been published including a report describing the approximate doubling of the prevalence of parent reported emotional and behavioral problems after diagnosis of childhood cancer.<sup>7</sup> Other studies have confirmed an increased prevalence of emotional and behavioral problems in a subset of siblings after the diagnosis of childhood cancer.<sup>8-9</sup>

With respect to the issue of psychological impairment, many tools have been utilized to help quantify the degree of impairment. One tool that has been used to quantify the presence of psychological impairment is the BSI-18 (brief symptom inventory 18). This 18 item instrument is a self report measure of psychological symptoms that can be completed in a short period of time. It has been utilized for rapid screening of psychopathology and is regarded as being very sensitive for the detection of psychological distress.<sup>18</sup>

### **3.3 Predictors of Psychological Distress in Siblings of Childhood Cancer Survivors:**

Age and gender have been described previously as factors which modulate psychological distress and its emotional and behavioral correlates in siblings impacted by the childhood cancer experience.<sup>6-9, 13, 15, 19</sup> In general, younger individuals have been described as more likely to have a negative perception of the cancer experience and were more likely to manifest emotional and behavioral problems after diagnosis. On the other hand, older siblings have been described as more likely to perceive the cancer experience positively, but other reports have noted that older siblings have had significant internalizing problems. With respect to gender differences, female siblings were noted to respond less well to their own negative feelings and were noted to experience more distress. Gender as well as other important variables such as socioeconomic status indicators has also been found to modulate risk for psychological distress in the general population. In general, female gender and lower socioeconomic status portend a higher risk of psychological distress in the general population.<sup>20, 21</sup>

In addition to the socio-demographic factors noted above health related factors play a role in the psychological distress experienced by siblings. Literature demonstrates that there is an association between patient health issues and the psychological impact of the disease on siblings

in other chronic disease populations.<sup>22,23</sup> Survivor health related factors which may increase psychological distress in siblings affected by childhood cancer include the presence of chronic health conditions which have recently been reported in the survivors of the childhood cancer experience.<sup>24</sup> This spectrum of morbidity includes a host of severe, debilitating, or life-threatening chronic health conditions as well as the extremes of survivor death resulting in sibling bereavement and the presence of second neoplasms.

#### **4. SPECIFIC AIMS/ OBJECTIVES/ RESEARCH HYPOTHESES:**

**4.1 Aim 1:** To describe the psychological distress levels of siblings of childhood cancer survivors as measured by the global severity index and symptom specific (anxiety, depression, somatic distress) subscales of the BSI-18.

**4.2 Aim 2:** To identify the predictors of psychological distress among the survivors' siblings, with focus on: a) siblings' demographic and health factors, b) survivors' diagnosis, treatment, and current physical and mental health status in a case-control cohort of siblings and matched survivors.

**a) Hypothesis 2.1:** *Sibling factors at patient's diagnosis including age (younger), gender (female), and ethnicity (minority race / ethnicity) will be associated with the presence of increased psychological distress as measured by the BSI-18 amongst siblings of long-term survivors of childhood cancer. Self-identified long-term sibling factors including poor health status (self assessment and chronic health severity index) and low socioeconomic status (total income, unmarried, unemployed, low education attainment ) will be associated with the presence of increased psychological distress as measured by the BSI-18 amongst siblings of long-term survivors of childhood cancer.*

**b) Hypothesis 2.2:** *Patient factors at diagnosis including disease (e.g. CNS tumor, bone tumor) and treatment-related factors (combined chemotherapy and radiation therapy) will be associated with the presence of increased psychological distress as measured by the BSI-18 amongst siblings of long-term survivors of childhood cancer. Long-term survivor patient factors including survivors' poor health status (self assessment, chronic health severity index, death, and second neoplasm) and survivors' increased psychological distress (BSI-18) will be associated with the presence of increased psychological distress as measured by the BSI-18 amongst siblings of long-term survivors of childhood cancer.*

**4.2 Aim 3:** To identify family relationship between siblings and their matched survivor as predictors of siblings' psychological distress

**Hypothesis 3.1:** *Patient factors in relation to sibling factors at diagnosis including patient age (younger age than sibling) and gender (different gender from sibling) will be associated with the presence of increased psychological distress as measured by the BSI-18 amongst siblings of long-term survivors of childhood cancer.*

#### **5. ANALYSIS FRAMEWORK:**

##### **5.1 Sample:**

Healthy adult (greater than or equal to 18 years of age at time of responding to baseline questionnaire) siblings of childhood cancer survivors (n = 3,899)

## **5.2 Outcomes of Interest and Predictor Variables (data from the first questionnaire):**

### ***Aim 1: Outcomes of Interest***

The global severity index of the BSI-18  
The three symptom specific subscales (depression, somatization, and anxiety) of the BSI-18.

### ***Predictor Variables***

Not applicable, descriptive data

### ***Aim 2: Outcomes of Interest***

The global severity index of the BSI-18  
The three symptom specific subscales (depression, somatization, and anxiety) of the BSI-18.

### ***a) Sibling Predictor Variables***

Age  
Gender  
Race / Ethnicity  
Health Status (self-reported health status, chronic health severity index)  
Socioeconomic Status (income, marital, employment, education)

### ***b) Survivor Predictor Variables***

Diagnosis  
Treatment Intensity  
Psychological Health Status (BSI -18 Global Severity Index and subscales)  
Health Status (self-reported health status, chronic health severity index, death, second neoplasm)

### ***Aim 3: Outcomes of Interest***

The global severity index of the BSI-18  
The three symptom specific subscales (depression, somatization, and anxiety) of the BSI-18.

### ***Sibling in Relation to Survivor Predictor Variables***

Sibling Older/Younger than Survivor at Diagnosis  
Sibling Gender Concordant/Discordant with Survivor

## **5.3 Statistical Analysis:**

The first step in data analysis will be to screen the dataset for any missing data or invalid codes. Particular patterns in the missing data and variables with moderate to high amounts of missing data will be used only if these are crucial for a particular analyses. In reports, we will state, as a caveat, potential mechanisms that may cause non-response. We will look for possible problems due to outliers or low cell counts. We will collapse categories as needed before additional analysis. Descriptive statistics of the subject population will include demographic characteristics, such as, age of the sample, marital status, education, employment status, ethnicity, and cancer diagnosis of ill brother or sister, age of healthy sibling at time of cancer diagnosis, and time interval from diagnosis to completion of baseline questionnaire.

Responses on the BSI – 18 will be scored according to the published manual with each participant getting a T score (mean = 50 and standard deviation = 10) on the global severity index (GSI) and three symptom specific subscales including depression, somatization, and anxiety. Raw scores will be transformed into T scores using a linear transformation.

**Aim 1:** Siblings T-Scores on the BSI-18 Global Severity Index (GSI) and three subscale scores will be reported by sibling gender, age, marital status, employment status, race/ethnicity, annual household income, educational status, self-rated health status, and chronic health severity index. Siblings T-Scores on the BSI-18 Global Severity Index (GSI) and three subscale scores will also be reported by survivor diagnosis, treatment, self-rated health status, chronic health severity index, and psychological distress on the BSI-18. Finally, siblings T-Scores on the BSI-18 Global Severity Index (GSI) and three subscale scores will be reported by sibling age and gender in relation to survivor age and gender.

T scores will be compared with community normative data by running a one sample t-test (null hypothesis that sample mean = 50) for the GSI and symptom specific subscales. T-scores will also be compared within subgroups of siblings by comparing mean t-scores between siblings (e.g. we will compare sibling mean GSI scores if your survivor had a bone tumor to sibling mean GSI scores if your survivor had a kidney tumor). These comparisons will be made by running a two sample t-test.

**Aim 2 and 3:** Ordinary least squares regression will be used to determine those sibling and survivor factors that are associated with sibling psychological distress as measured by the GSI and subscales T-scores. We will utilize an additive model building approach. We will begin by focusing on sibling sociodemographic (sibling gender, age, marital status, employment status, race/ethnicity, annual household income, educational status) and sibling health (self-rated health status, chronic health severity index) factors. We will then focus on survivor diagnosis / treatment factors (treatment intensity operationalized as combined chemotherapy / radiation) and survivor health (self-rated health status, chronic health severity index, death, second neoplasm, and psychological distress on the BSI-18) factors. This model will control for the previous sibling sociodemographic and sibling health factors. Finally, we will focus on sibling age and gender in relation to survivor age and gender while controlling for previous factors including sibling sociodemographic and sibling health factors, survivor diagnosis/ treatment factors, and survivor health factors.

For the analyses described above we will use a T score of 63 or higher to define survivor psychological distress on the GSI and subscales of the BSI-18. This represents the upper 10<sup>th</sup> percentile of scores reported in a community sample and is considered significantly elevated. Scores are classified as elevated and not elevated on each of the four scales. Significant elevation on any of the three symptom specific subscales classify individuals as having psychological impairment.

Since the outcomes (elevation or no elevation on each of the four scales of the BSI-18 and classification of an individual as having psychological impairment) variables are dichotomous a logistic regression will also be utilized to adjust for potential contribution of sibling and survivor sociodemographic and independent (exploratory) variables that have been described above. Results will be given as adjusted odds ratios with 95% confidence intervals reported for all demographic and exploratory variables included in the model. The bivariate analyses and ordinary least squares regression analysis will help guide the construction and interpretation of the logistic regression models. Analysis will be completed using STATA version 9.0 (College Station, TX).

## **6. TABLES/ FIGURES:**

**6.1 Table 1:** Characteristics of the Sibling Population

**6.2 Table 2:** Siblings T-Scores on the BSI-18 Global Severity Index (GSI) and Three Subscale Scores by Sibling Gender, Age, Marital Status, Employment Status, Race/Ethnicity, Annual Household Income, Educational Status, Chronic Health Severity Index, Self-Rated Health Status

**6.3 Table 3:** Siblings T-Scores on the BSI-18 Global Severity Index (GSI) and Three Subscale Scores by Survivor Diagnosis, Treatment, and Sibling Age at Diagnosis

**6.3 Table 4:** Siblings T-Scores on the BSI-18 Global Severity Index (GSI) and Three Subscale Scores by Survivor's Self-Rated Health Status, Chronic Health Severity Index, Death, Sibling Age at Death, Second Neoplasm, Sibling Age at Second Neoplasm, and Psychological Distress

**6.3 Table 5:** Siblings T-Scores on the BSI-18 Global Severity Index (GSI) and Three Subscale Scores by Sibling Age and Gender in Relation to Survivor Age and Gender

**6.4 Table 6:** OLS Models examining the association between GSI and subscale T-scores and sibling sociodemographic and health variables

**6.4 Table 7:** OLS Models examining the association between GSI and subscale T-scores and survivor diagnosis and treatment variables

**6.4 Table 8:** OLS Models examining the association between GSI and subscale T-scores and survivor health related variables

**6.4 Table 9:** OLS Models examining the association between GSI and subscale T-score and sibling sociodemographic factors in relation to survivor sociodemographic factors

**6.4 Table 10:** Logistic Regression Model examining the association between GSI and subscale T-scores (>63) and sibling/survivor sociodemographic, health related variables, and psychological impairment

**Table 1 Characteristics of the Sibling Population**

	Siblings N=3899 (%)
<b>Age</b>	
<b>Gender</b>	
Male	
Female	
<b>Race/Ethnicity</b>	
Minority	
Non-minority	
<b>Household Income</b>	
Less than \$20,000	
\$20,000 – 59,999	
Greater than \$60,000	
<b>Education</b>	
Less than high school	
HS graduate	
College graduate	
<b>Employment Status</b>	
Unemployed	
Employed	
<b>Marital Status</b>	
Not married	
Married or live as married	
<b>Self-Rated Health Status</b>	
Excellent/Very Good/Good	
Fair/Poor	
<b>Chronic Health Conditions</b>	
None/Mild	
Moderate/Severe/Life Threaten/Disabling	
<b>Sibling Age at Diagnosis</b>	
Not Yet Born	
0-9 yrs	
10-19 yrs	
>20 yrs	
<b>Diagnosis</b>	
Leukemia	
CNS	
Hodgkin Disease	
Non-Hodgkin Lymphoma	
Kidney Tumor	
Neuroblastoma	
Sarcoma	
Bone Tumor	
<b>Treatment</b>	
Chemo or Radiation	
Chemo & Radiation	
<b>Sibling Bereaved</b>	
Yes	
No	
<b>Sibling Age at Bereavement</b>	
0-9 yrs	
10-19 yrs	
>20 yrs	
<b>Survivor Second Neoplasm</b>	
Yes	
No	
<b>Sibling Age at Survivor Second Neoplasm</b>	
0-9 yrs	
10-19 yrs	
>20 yrs	

**Table 2 Siblings T-Scores on the BSI-18 Global Severity Index (GSI) and Three Subscale Scores by Sibling Gender, Age, Marital Status, Employment Status, Race/Ethnicity, Annual Household Income, Educational Status, Chronic Health Severity Index, Self-Rated Health Status**

	GSI Mean	SD	P	Somatization Mean	SD	P	Depression Mean	SD	P	Anxiety mean	SD	P
Female												
Male			ref			ref			ref			ref
18-25												
25-35												
35-45			ref			ref			ref			ref
>45												
Unmarried												
Married			ref			ref			ref			ref
Employed												
Unemployed			ref			ref			ref			ref
Minority												
Non-minority			ref			ref			ref			ref
<\$20,000												
\$20-59,000												
>\$60,000			ref			ref			ref			ref
Less HS												
HS												
College			ref			ref			ref			ref
Mod/Severe												
None/Mild			ref			ref			ref			ref
Poor												
Fair												
Good												
Very Good												
Excellent			ref			ref			ref			ref

#Mean T-score NOT below community norms with  $p < 0.05$  on one-sample t-test

\*\*Statistically significant difference on two-sample t-test



**Table 3 Siblings T-Scores on the BSI-18 Global Severity Index (GSI) and Three Subscale Scores by Survivor Diagnosis, Treatment, and Sibling Age at Diagnosis**

	GSI Mean	SD	P	Somatization Mean	SD	P	Depression Mean	SD	P	Anxiety mean	SD	P
CNS												
HD												
NHL												
NBL												
Sarcoma												
Bone												
Leukemia												
Kidney			ref			ref			ref			ref
Chemo/XRT												
Chemo Only												
Neither			ref			ref			ref			ref
XRT Only												
Not Born												
0-9 yrs												
10-19 yrs			ref			ref			ref			ref
>20yrs												

#Mean T-score NOT below community norms with p<0.05 on one-sample t-test

\*\*Statistically significant difference on two-sample t-test

**Table 4 Siblings T-Scores on the BSI-18 Global Severity Index (GSI) and Three Subscale Scores by Survivor’s Self-Rated Health Status, Chronic Health Severity, Death, Sibling Age at Death, Second Neoplasm, Sibling Age at Second Neoplasm, and Psychological Distress**

	GSI mean	SD	P	Somatization Mean	SD	P	Depression Mean	SD	P	Anxiety Mean	SD	P
Poor												
Fair												
Good												
Very Good												
Excellent			Ref			ref			ref			Ref
Life												
Severe												
Moderate												
Mild												
None			Ref			ref			Ref			Ref
Death												
No Death			ref			ref			ref			ref
0-9 yrs												
10-19 yrs			ref			ref			ref			ref
>20yrs												
Second Neoplasm												
No Second Neoplasm			ref			ref			ref			ref
0-9 yrs												
10-19 yrs			ref			ref			ref			ref
>20yrs												
GSI Distress												
None			ref			ref			ref			ref
Somatization												
None			Ref			ref			ref			ref
Depression												
None			Ref			ref			ref			ref
Anxiety												
None			ref			ref			ref			ref

#Mean T-score NOT below community norms with p<0.05 on one-sample t-test

\*\*Statistically significant difference on two-sample t-test

**Table 5 Siblings T-Scores on the BSI-18 Global Severity Index (GSI) and Three Subscale Scores by Sibling Age and Gender in Relation to Survivor Age and Gender**

	GSI mean	SD	P	Somatization Mean	SD	P	Depression Mean	SD	P	Anxiety Mean	SD	P
Older			ref			ref				ref		ref
Younger												
Gender Diff												
Gender Same			ref			ref			ref			ref

#Mean T-score NOT below community norms with p<0.05 on one-sample t-test

\*\*Statistically significant difference on two-sample t-test

**Table 6 OLS Models examining the association between GSI and subscale T-scores and sibling sociodemographic and health variables**

	GSI Coeff.	SE	T	P	Somatization Coeff.	SE	T	P	Depression Coeff.	SE	T	P	Anxiety Coeff.	SE	T	P
<b>Age</b>																
<b>Female Gender</b> Ref. Male																
<b>Minority Status</b> Ref. Non-minority																
<b>Household Income</b> < \$20,000 \$20,000 – 59,000 Ref. >\$60,000																
<b>Education</b> Less than high school HS graduate Ref. College graduate																
<b>Employment Status</b> Unemployed Ref. Employed																
<b>Marital Status</b> Not married Ref. Married																
<b>Chronic Health Prob</b> Life/Disable Severe Moderate Mild Ref. None																
<b>Health Status</b> Poor Fair Good Very Good Excellent																

**Table 7 OLS Models examining the association between GSI and subscale T-scores and survivor diagnosis and treatment variables%**

	GSI Coeff.	SE	T	P	Somatization Coeff.	SE	T	P	Depression Coeff.	SE	T	P	Anxiety Coeff.	SE	T	P
<b>Diagnosis</b>																
Leukemia																
Hodgkin																
NHL																
Bone																
Sarcoma																
Neuroblastoma																
CNS Tumor																
Ref. Kidney																
<b>Treatment Intensity</b>																
High																
Moderate																
Ref. Low																
<b>Sib Age at Diagnosis</b>																
Not Born Yet																
0-9 years																
>20 years																
Ref. 10-19 years																

**% Model constructed controlling for sibling sociodemographic and health variables**

**Table 8 OLS Models examining the association between GSI and subscale T-scores and survivor health related variables%#**

	GSI Coeff.	SE	T	P	Somatization Coeff.	SE	T	P	Depression Coeff.	SE	T	P	Anxiety Coeff.	SE	T	P
<b>Survivor Health Status</b> Fair/poor Good Very Good Ref. Excellent																
<b>Survivor Chronic Health Prob</b> Life/Disable Severe Moderate Mild Ref. None																
<b>Sibling Bereavement</b> Ref. No																
<b>Sibling Age at Bereavement</b> 0-9 years >20 years Ref. 10-19 years																
<b>Survivor Second Neoplasm</b> Ref. No																
<b>Sibling Age at Survivor Second Neoplasms</b> 0-9 years >20 years Ref. 10-19 years																
<b>Survivor Global Distress</b> Ref. None																
<b>Survivor Somatization</b> Ref. None																
<b>Survivor Depression</b> Ref. None																
<b>Survivor Anxiety</b> Ref. None																

**%# Model constructed controlling for sibling sociodemographic, sibling health, and survivor diagnosis and treatment variables**

**Table 9 OLS Models examining the association between GSI and subscale T-score and sibling sociodemographic factors in relation to survivor sociodemographic factors%#\$**

	GSI Coeff.	SE	T	P	Somatization Coeff.	SE	T	P	Depression Coeff.	SE	T	P	Anxiety Coeff.	SE	T	P
<b>Sibling Age in relation to Survivor Age</b> Younger Ref. Older																
<b>Sib Gender Different in relation to Survivor Gender</b> Ref. Same Gender																

**%#\$ Model constructed controlling for sibling sociodemographic, sibling health, survivor diagnosis and treatment, and survivor health variables**

**Table 10 Logistic Regression Model examining the association between GSI and subscale T-scores (>63) and sibling/survivor sociodemographic, health related variables, and psychological impairment**

	Siblings GSI (OR 95% CI)	Siblings Depression (OR 95% CI)	Siblings Somatic Distress (OR 95% CI)	Siblings Anxiety (OR 95% CI)
<b>Age</b>				
<b>Female Gender</b> Ref. Male	ref	ref	ref	ref
<b>Minority Status</b> Ref. Non-minority	ref	ref	ref	ref
<b>Household Income</b> < \$20,000 \$20,000 – 59,000 Ref. >\$60,000	ref	ref	ref	ref
<b>Education</b> Less than high school HS graduate Ref. College graduate	ref	ref	ref	ref
<b>Employment Status</b> Unemployed Ref. Employed	ref	ref	ref	ref
<b>Marital Status</b> Not married Ref. Married	ref	ref	ref	ref
<b>Chronic Health Prob</b> Life/Disable Severe Moderate Mild Ref. None	ref	ref	ref	ref
<b>Diagnosis</b> Leukemia Hodgkin NHL Bone Sarcoma Neuroblastoma CNS Tumor Ref. Kidney	ref	ref	ref	ref
<b>Sib Age at Diagnosis</b> Not Born Yet 0-9 years >20 years Ref. 10-19 years	ref	ref	ref	ref
<b>Survivor Health Status</b> Fair/poor Good Very Good Ref. Excellent	ref	ref	ref	ref
<b>Survivor Chronic Health Problems</b> Life/Disable Severe Moderate Mild Ref. None	ref	ref	ref	ref
<b>Sibling Bereavement</b> Yes Ref. No	ref	ref	ref	ref
<b>Sibling Age at Bereavement</b> 0-9 years >20 years Ref. 10-19 years	ref	ref	ref	ref
<b>Survivor Second Neoplasm</b> Yes Ref. No	ref	ref	ref	ref

<b>Sibling Age at Survivor Second Neoplasms</b> 0-9 years >20 years Ref. 10-19 years	ref	ref	ref	ref
<b>Survivor Global Distress</b> Ref. None	ref	ref	ref	ref
<b>Survivor Somatization</b> Ref. None	ref	ref	ref	ref
<b>Survivor Depression</b> Ref. None	ref	ref	ref	ref
<b>Survivor Anxiety</b> Ref. None	ref	ref	ref	ref
<b>Sib Age in relation to Survivor Age</b> Younger Ref. Older	ref	ref	ref	ref
<b>Sib Gender Different in relation to Survivor Gender</b> Ref. Same Gender	ref	ref	ref	ref

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