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Collaborators:

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CHILDHOOD CANCER SURVIVOR STUDY

Analysis Concept Proposal

Title

Employment Status of Adult Survivors of Childhood Cancer: A Report from the Childhood Cancer Survivor Study

Working Group and Investigators

This publication will be written within the Epidemiology working group

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Jenny Pang is a hematology/oncology fellow and MPH student at the University of Washington. She will collect, analyze and describe the data. Noel Weiss is her MPH advisor at the University of Washington. He and Debra Friedman will supervise Jenny with respect to issues of study design and analysis.

Background & Rationale

It has been estimated that 1 in 1000 adults is a survivor of childhood cancer. In the past, the success of modern cancer therapy has been evaluated mainly by survival data. There has been recent interest in assessing quality of life measures on childhood cancer survivors: their ability to form long-term relationships, their psychological well being, and their long term vocational achievements. Small case-control studies have attempted to associate psychological factors, long-term effects of therapy, and the highest educational attainment with employment status. Some have examined the barriers that prevent survivors from seeking careers in the military and in occupations requiring pristine physical health (policemen, firefighter). These studies have been limited by the small numbers of participants (40-200), by the restricted experience of a single institutions, and by incomplete followup. The Childhood Cancer Survivor Study (CCSS) is the largest cohort of childhood cancer survivors treated in the most recent age of cancer therapy and reflects closest a population-based cohort of survivors. Using data from this study, we can estimate the prevalence of employment status and category in adult survivors of childhood cancers, precisely describe the association of prior cancer diagnosis, treatment, and other risk factors that would influence a survivor's current employment status, career choice, and income level.

Specific Aims/Objectives/Research Hypotheses

This publication will address the epidemiology of employment in adult survivors of childhood cancers.

Specific Aim 1: To examine the overall demographics and descriptive statistics of employed adult survivors of childhood cancers.

Specific Aim 2: To evaluate risk factors associated with survivor's current employment status

Specific Aim 2a: To examine the association of age of diagnosis and its association with current employment. Hypothesis: Younger age at diagnosis is less likely to affect long-term employment status.

Specific Aim 2b: To examine the association of length of time from last therapy to current employment status. Hypothesis: Longer latency from time from last therapy is associated with a decreased risk of unemployment.

Specific Aim 2c: To examine the role of the highest educational attainment with current employment. Hypothesis: Higher educational attainment will be associated with current employment status and employment type.

Specific Aim 2d: To examine the role of cranial radiation on employment status. To also determine if age is an effect modifier to radiation dose applied. Hypothesis: Cranial radiation received before the age of 8 years results in more significant neurocognitive consequences and hence, affect employment.

Specific Aim 2e: To examine the role of primary and/or subsequent malignancy on survivor's employment status. Hypothesis: Type and number of malignancy will affect survivor's ability to attain gainful employment.

Specific Aim 2f: To examine the role of specific chemotherapy agents on the survivor's employment status. Agents of interest include: IT MTX, HC, ARA-C, IV MTX, bleomycin, platinum, anthracyclines. Hypothesis: Exposure to these agents that have potential side effects (neurocognitive, pulmonary, cardiac, renal and otologic toxicities) may adversely affect survivor's employment.

Specific Aim 2g: To examine the role of surgery on the survivor's employment status. Hypothesis: Neurological surgery and/or limb amputation +/- limb salvage may adversely affect survivor's employment status and career choice. To examine whether there is an interaction with neurosurgery and cranial radiation in determining eventual employment status.

Specific Aim 2h: To examine the role of specific disabilities and illness on employment, specifically hearing impairment, legal blindness, second malignancies, pulmonary fibrosis, chronic pain syndrome, scarring and disfigurement, cardiac, lung, and renal transplants, mental retardation, myocardial infarction and congestive heart failure, stroke. Hypothesis: Survivors with physical disabilities and/or serious illnesses will less likely be employed.

Specific Aim 2i: To examine the role of marriage, number of children, total household income, and ratio of survivor's income on household income on employment. Hypothesis: Marital status and number of dependents may affect survivor's employment status and the ratio of survivor's income of total household income would be strong determinant of employment status. Similarly, survivors who are unable to obtain employment due to functional and/or psychological limitations may be less likely to marry.

Specific Aim 3: To assess the prevalence of barriers in seeking specific forms of employment (denial of employment in the military, police and fire departments, civilian job).

Specific Aim 4: To compare employment status of childhood cancer survivors with age-matched peers in the general population using normative data from NHIS.

Analysis Framework

(a) Outcome of interest: Employment status in childhood cancer survivors.

(b) Subject Population: All survivors registered in CCSS who are currently 18 years or older who have completed the primary questionnaire

(c) Explanatory variables:

- primary diagnosis, age at diagnosis (medical record abstraction p2)
- follow-up time since diagnosis (date of last chemotherapy or radiation, whichever is last)
- race, gender, current residence (A.1, A.2, A.3, A.4, A.8, A.9)
- age when radiation was given for primary cancer (p10 of medical record abstraction)

- type of treatment: radiation dose and field, cumulative chemotherapy doses for intrathecal MTX, HC and araC, IV MTX, bleomycin, anthracyclines, platinum, limb or neurosurgery.
- other chronic diseases and conditions other than primary cancer : hearing impairment (C1-C3), legal blindness (C8, C13), second malignancies (K1-K8), MI and CHF (F4, F5, F6, F17, I7, I9, N14c, N14e), stroke (F9), depression (J19, J21, J22-J26, J30, J35, B8.15), pulmonary fibrosis (G9, G6, G11, G12, N14c, N14e), chronic pain syndrome (J36), organ transplant (I23-I27), renal failure requiring dialysis (D4), mental retardation (J3, J4) handicaps or disabilities (N10-N13, B9), conditions present at birth (P1)-highest educational attained (L1)
- marital status (L1-L4, L6-L8, L9-L13)
- number of children (P6)
- total household income, survivors yearly income (Q8, Q9)
- discriminatory barriers to obtaining employment (O10, O11)
- employment history (O5-O9)

(d) Univariate analysis will be done by Pearson chi-square analysis. Adjustments will be done with Mantel-Haenszel logistic regression and further modeling with the biostatistical support of the Department of Biostatistics in the School of Public Health at the University of Washington.

(e) Specific tables:

1) Characteristics of employed and unemployed survivors in CCSS

Vital statistics (% alive)

Gender (%M; %F)

Race

Current age

Primary diagnosis (% of each cancer type)

Age at diagnosis

Type of treatment

Chemotherapy only

Surgery only

Radiation only

Combined chemotherapy and radiation

Other

Education level

Marital status

Follow-up time

Other chronic conditions (hearing impairment, legal blindness, second malignancies, organ transplant, pulmonary fibrosis, chronic pain syndrome, scarring and disfigurement, MI and congestive heart failure, stroke, renal failure requiring dialysis)

Total household income/Personal income

2) Employment by demographics

	Employment Status (Y/N)	Employment Category*		
Gender				
Race				
Current Age				
Age at diagnosis				
Followup period				

*Employment categories: managerial and professional specialty occupations, technical/sales/and administrative support occupations, service occupations, farming/forestry/and fishing occupations, precise production/craft/and repair occupations, operators, fabricators, and laborers, experienced unemployed not classified by occupation (taken from the National Bureau of Census)

3)Income level by employment category

	Income level <\$9,999	\$10,000-19,999	\$20,000-39,999	\$40,000.-59,999	>\$60,000
Employment category*					

4)Employment by primary diagnosis

	Employment Status (Y/N)	Employment Category*		
Leukemia				
CNS				
Hodgkin's				
NHL				
Kidney (Wilms)				
Neuroblastoma				
Soft Tissue Sarcoma				
Bone Cancer				

4)Employment by treatment modality

	Employment Status (Y/N)	Employment category*		
chemotherapy*				
radiation***				
surgery				
chemotherapy and radiation				
chemotherapy and surgery				

all modalities				
radiation and neurosurgery				

specifics outlined in specific aim 2e*cranial radiation

5)Employment by highest level of educational attainment

	Employment Status (Y/N)	Employment category*		
less than high school				
high school				
vocational school				
associate degree in college				
bachelor degree in college				
professional degree				

6) Employment by chronic disease

	Employment status (Y/N)	Income Level		
blindness				
hearing impairment				
secondary malignancies				
pulmonary fibrosis				
organ transplant				
chronic pain syndrome				
scarring and disfigurement				
severe congestive heart failure				
stroke				