Published in final edited form as:

J Adolesc Health. 2018 July ; 63(1): 115–117. doi:10.1016/j.jadohealth.2018.02.005.

Childhood Cancer Survivorship and Substance Use Behaviors: A Matched Case-Control Study among Hispanic Adolescents and Young Adults

Joel Milam, PhD¹, Rhona Slaughter, MA¹, Jessica L. Tobin, MS¹, Jennifer B. Unger, PhD¹,
Anamara Ritt-Olson, PhD¹, David R. Freyer, DO, MS^{1,2,3}, Daniel Soto, MPH¹, and Ann S.
Hamilton, PhD¹

¹Keck School of Medicine, University of Southern California, Los Angeles, CA, USA

²Children's Hospital Los Angeles, Los Angeles, CA, USA

³USC Norris Comprehensive Cancer Center, Los Angeles, CA, USA

Abstract

Objective—This case-control study compared substance use behaviors between Hispanic adolescent and young adult survivors of childhood cancers (cases) and a community sample of participants without cancer (controls).

Methods—A total of 100 cases (mean age at survey 19.9, SD=2.8), were matched 1-1 by ethnicity, age, and sex to controls (200 participants). Differences in self-reported prior 30-day use of tobacco, alcohol, binge drinking of alcohol, and marijuana were examined using conditional multivariable logistic regression.

Results—The odds of tobacco, alcohol, binge drinking, and marijuana use were significantly lower for cases than controls (all p 's <.05). When stratified by age, cases (vs. controls) under 21 years of age reported lower levels of substance use (all p 's <.05), whereas differences over the age of 21 were non-significant.

Conclusions—Lower levels of substance use among Hispanic adolescent and young adult survivors of childhood cancers (vs. controls) are most apparent at younger ages. Future work needs to examine a potential delay in initiation of use among survivors.

Keywords

childhood; adolescent; young adult; cancer; oncology; survivorship; substance use; depressive symptoms; Hispanic; alcohol; tobacco; marijuana

Corresponding Author: Joel Milam, PhD; 2001 Soto Building, MC9239, Los Angeles, CA 90032; 323-442-8243; milam@usc.edu.

The authors have no financial disclosures.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Childhood cancer survivors (CCS) experience an increased risk of early life morbidity and mortality, partially due to late effects of intensive and toxic treatment regimens [1]. Thus, CCS are recommended to practice health promoting behaviors, including the avoidance of substance use, to improve health outcomes [2].

Adolescence and young adulthood is a time marked by identity formation and often experimentation with risk behaviors such as substance use, posing an additional threat to the health of CCS when they reach these critical years. Although rates of health risk behaviors among CCS have been found to be similar to, or lower than, those of their peers for certain risk behaviors, engaging in tobacco or alcohol use is still prevalent, putting their health at increased risk [3–5]. Hispanic CCS have remained underrepresented in the literature, despite constituting a large segment of childhood cancer cases and being considered a vulnerable population [6]. Our prior work examined correlates of CCS substance use [5], but did not include a non-cancer comparison group. This case-control study compares substance use between the Hispanic CCS in our study, with ethnicity-, age-, and sex-matched controls without cancer who participated in a different study during the same time period.

Methods

Participants

Detailed procedures for data collection for cases and controls were previously described for Projects Forward and RED by Milam, et al. [7] and Unger [8], respectively. IRB approved data collection from both studies took place during the same years (2009/10) and geographic location. The participants in Project Forward were recruited through the Los Angeles SEER Cancer Registry database (diagnosed and treated between 2000 and 2007 at two Los Angeles area children's hospitals, and were off treatment for a minimum of two years). Project RED began in 2005 as a longitudinal study of health behaviors among Hispanic youth in the Los Angeles area. Hispanic cases from Project Forward were individually matched on sex and age with Hispanic participants from the Project RED study who were not known to have cancer (controls). One hundred Hispanic cases from Project Forward were successfully matched 1:1 with Hispanic Project RED controls. Age was taken to up to the fourth decimal place in order to ensure a single matched control per case (32 Hispanic Project Forward cases were excluded because their age was outside the upper range of Project RED participants).

Measures

Participants in both studies responded to equivalent self-report measures and were classified as current smokers, drinkers, marijuana users, or binge drinkers if they had smoked at least one cigarette, consumed at least one alcoholic drink, used marijuana, or consumed at least 5 drinks in a single setting, at least once in the past 30 days, respectively (1=yes, 0=no).

Depressive symptoms (prior week), a well-established risk factor for substance use, was measured using the Center for Epidemiologic Studies Depression Scale (CES-D)[9]. Cronbach's Alphas for CCS and control samples were 0.88 and 0.87, respectively.

Statistical Analyses

Chi-square tests of independence and Independent t-tests were conducted comparing risk behaviors and depressive symptoms between cases and controls, respectively. Conditional logistic regression models were conducted to examine the associations between case/control status and each risk-behavior (separate models for each behavior), adjusting for depressive symptoms. In sensitivity analyses, models were stratified at age 21 (the legal age for alcohol consumption).

Results

The matching process yielded 100 pairs (200 participants). The sample was 49.0% female (N=98 [49 pairs]), and ranged in age from 15.13 to 23.67 (Table 1). There was no significant difference in mean depressive symptoms between cases and controls. Overall, cases (vs. controls) had significantly lower rates of smoking (9.1% vs. 21%), drinking (31.3 vs. 52.5%), binge drinking (18% vs. 36.1%), and marijuana use (10.3% vs. 25.3%) (chi-square $p < 0.05$ for all; Table 1).

Table 2 presents adjusted odds ratios (OR) and 95% confidence intervals (95% CI) for risk behaviors associated with being a case vs. control, controlling for depressive symptoms, overall and stratified by age. Overall, smokers, drinkers, binge drinkers, and marijuana users were significantly less likely to be cases (vs. controls; all p 's $< .05$). When stratified by age, cases were significantly less likely to engage in any substance use under the age of 21 (all p 's $< .05$), whereas at or above the age 21 there were no significant differences.

Discussion

Although in aggregate, prevalence rates across all substances (tobacco, alcohol, and marijuana) were lower among CCS compared to their peers without cancer, it is possible that these behaviors begin to “normalize” as CCS enter young adulthood. Much of this difference was observed among participants younger than 21 years, whereas at or above age 21 there were no significant differences. This pattern was most pronounced between cases and controls over the age 21 for alcohol use (57% vs. 47%, respectively) and binge drinking (29% vs. 30%, respectively; both p 's n.s.). This potential delay in initiation may reflect the eventual attainment of normal adolescent/young adult socialization/experimentation among CCS. This may also be due to delayed achievement of independence and/or protection by parents of CCS that extends beyond the period of cancer treatment [10].

It is concerning that 18% of overall CCS reported binge drinking, which may put them at increased risk for health problems. Clinicians caring for CCS should assess risk behaviors and provide health education during follow-up care visits, especially during the transition from pediatric to adult oriented care, which commonly occurs around the age of 21. It is possible, for example, that the lower rates of substance use among CCS could be attributed to their greater interaction with healthcare providers.

Limitations to this study include the potential for unmeasured confounders between cases and controls (e.g., health of controls) that could have biased results and the smaller sample

size above age 21 that reduced our statistical power. However, both samples resided in Los Angeles County and there were no differences across matching factors. The CCS sample was largely representative of cases treated at two large hospitals in Los Angeles and the control sample substance use rates are similar to California state averages.

Acknowledgments

This project was supported by 1R03CA144851 from the National Cancer Institute of the National Institutes of Health and the Whittier foundation. Additional support was provided by P30CA014089 and T32CA009492 from the National Cancer Institute and 1R01MD007801 from the National Institute on Minority and Health Disparities (Project Forward) and 5R01DA016310 from the National Institute on Drug Abuse (Project RED). The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Cancer Institute, the National Institute on Minority and Health Disparities, the National Institute on Drug Abuse, or the National Institutes of Health.

References

1. SchwartzCL, , HobbieWL, , ConstineLS, , RuccioneKS. Survivors of Childhood and Adolescent CancerSpringer; 2015
2. Tonorezos ES, Henderson TO. Clinical Guidelines for the Care of Childhood Cancer Survivors. Children (Basel). 2014; 1(2):227–40. [PubMed: 27417477]
3. Marjerrison S, et al. Smoking, Binge Drinking, and Drug Use Among Childhood Cancer Survivors: A Meta-Analysis. Pediatric Blood & Cancer. 2016; 63(7):1254–1263. [PubMed: 26999299]
4. Klosky JL, et al. Risky health behavior among adolescents in the childhood cancer survivor study cohort. J Pediatr Psychol. 2012; 37(6):634–46. [PubMed: 22427699]
5. Milam J, et al. Substance use among adolescent and young adult cancer survivors. Psychooncology. 2016; 25(11):1357–1362. [PubMed: 26315824]
6. Trends in childhood cancer mortality--United States, 1990–2004. MMWR Morb Mortal Wkly Rep. 2007; 56(48):1257–61. [PubMed: 18059256]
7. Milam JE, et al. Cancer-related follow-up care among Hispanic and non-Hispanic childhood cancer survivors: The Project Forward study. Cancer. 2015; 121(4):605–13. [PubMed: 25345867]
8. Unger JB. Cultural Influences on Substance Use Among Hispanic Adolescents and Young Adults: Findings From Project RED. Child Dev Perspect. 2014; 8(1):48–53. [PubMed: 24729791]
9. Radloff LS. The CES-D Scale. Applied Psychological Measurement. 1977; 1(3):385–401.
10. Smits-Seemann RR, et al. A Qualitative Inquiry of Childhood and Adolescent Cancer Survivors' Perspectives of Independence. J Adolesc Young Adult Oncol. 2017; 6(1):91–95. [PubMed: 27419536]

Implications and Contribution

Hispanic survivors of childhood cancer are underrepresented in survivorship research and little is known about their substance use behaviors compared to peers who have not had cancer. This study finds lower rates substance use among survivors, and longitudinal studies examining trajectories/initiation of substance use during young adulthood are needed.

Table 1

Descriptive characteristics, depressive symptomology and substance use among matched Hispanic cases and controls (N=100 pairs)

	Controls	Cases		
	Mean(SD)		<i>t</i>	<i>p-value</i>
Years since diagnosis	--	7.30 (2.14)		
Age at survey	19.72(1.92)	19.72 (1.92)		
Median neighborhood income (\$)	37,321 (8,040)	34,883 (10,672)	1.81	0.073
Depressive symptoms	15.12(10.32)	15.56(12.30)	0.26	0.795
	N(%)	N(%)	χ^2	<i>p-value</i>
Cancer type	--		NA	
Leukemia		35(35.0)		
Lymphoma		24(24.0)		
Brain/CNS		13(13.0)		
Bone		7(7.0)		
Other		21(21.0)		
Smokers	21(21.0)	9(9.1)	5.51	0.019
Drinkers	52(52.5)	31(31.3)	9.15	0.003
Binge drinkers	35(36.1)	18(18.0)	8.17	0.004
Marijuana Users	25(25.3)	10(10.3)	7.46	0.006

* Missing data: case smokers=1, case drinkers=1, control drinkers=1, control binge drinkers=3, case marijuana users=3, control marijuana users=1. All other cells consisted of the full sample of 100 cases and 100 controls.

Adjusted Odds ratios and 95% confidence intervals for behaviors associated with being a cancer survivor (vs. control) for each substance use behavior

Table 2

	Overall			Under age 21 n=158			Age 21+ n=42		
	OR	95% CI		OR	95% CI		OR	95% CI	
Smokers	0.36 *	0.14–0.93		0.34 *	0.13–0.96		0.54	0.05–6.07	
Drinkers	0.42 *	0.20–0.87		0.23 *	0.09–0.60		1.92	0.43–8.63	
Binge drinkers	0.41 *	0.20–0.83		0.33 *	0.14–0.77		0.70	0.17–2.84	
Marijuana Users	0.30 *	0.11–0.82		0.24 *	0.07–0.84		0.46	0.08–2.60	

CCS: Childhood cancer survivor; Each row is a separate conditional logistic regression model; All models controlled for CES-D score. OR=Odds ratio. CI=Wald confidence interval

* p < .05