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ORIGINAL RESEARCH

Provider advice about smoking cessation and pharmacotherapy among cancer survivors who smoke: practice guidelines are not translating

Karen M Emmons, PhD,[1] Kim Sprunck-Harrild, MPH, MSW,[1] Elaine Puleo, PhD,[2] Janet de Moor, PhD[3]

[1]Dana–Farber Cancer Institute, Center for Community-Based Research, 450 Brookline Avenue, LW601, Boston, MA 02215, USA

[2]University of Massachusetts, School of Public Health and Health Sciences, Amherst, MA, USA

[3]Division of Cancer Control/and Population Sciences, NCI/NIH, Bethesda, MD, USA

Correspondence to: K M Emmons karen_m_emmons@dfci.harvard.edu

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ABSTRACT

Smoking among childhood and young adult cancer survivors may increase risk for late effects of treatment, and survivors need assistance in quitting. This paper reports on the prevalence of discussions between childhood cancer survivors and their health care providers about smoking cessation and pharmacotherapy and explores factors that are associated with these discussions. This is a longitudinal study that included 329 smokers who were childhood or young adult cancer survivors, recruited from five cancer centers in the USA and Canada. Fifty-five percent of smokers reported receiving advice to quit smoking from their regular provider during the study period, and only 36 % of smokers reported discussing pharmacotherapy with their provider. Receipt of advice was associated with being female and having a heavier smoking rate. Pharmacotherapy discussions were associated with readiness to quit, heavier smoking rate, and previous provider advice to quit. Health care providers are missing key opportunities to advise cancer survivors about cessation and evidence-based interventions. Systematic efforts are needed to ensure that survivors who smoke get the treatment that they need.

KEYWORDS

Smoking cessation, Childhood cancer survivors, Pharmacotherapy, Cancer

Implications

Practice: Health care providers should assess tobacco use status and offer assistance, including pharmacotherapy, to survivors at every visit.

Policy: Systematic efforts within survivorship care are needed to ensure that practice guidelines for treating tobacco dependence are implemented. Policy-makers should consider providing incentives to encourage adherence to practice guidelines.

Research: Research is needed on increased provider-delivered smoking cessation interventions in the cancer treatment and survivorship setting.

INTRODUCTION

Significant strides have been made in the treatment and long-term survival of childhood and young adult cancer (c/ya) survivors. There are 325,000 childhood cancer survivors living in the USA today, largely as the result of improved treatments over the last few decades [1, 2]. There are also nearly 70,000 young adults between the ages of [3–27] diagnosed annually with cancer in the USA, although cancer survival rates for young adults have remained nearly flat for the last 30 years. Both childhood and young adult cancer survivors face risks of adverse late effects of treatment and secondary cancers. Cigarette smoking and survivorship share many of the same long-term medical risks, including an increased risk for the development of second primary cancers, cardiovascular and pulmonary diseases, and stroke [28–33]. Therefore, reduction of preventable risk is an increasingly important part of survivorship care [34–36]. The American Society of Preventive Oncology recently called for a paradigm change related to cancer prevention after cancer, highlighting a critical need to reduce preventable risk factors [37].

Among adult survivors of c/ya cancer, recent estimates of current smoking rates are between 15 and 20 % [3, 4, 38, 39]. There is significant interest in cessation among these smokers, with more than half actively trying to quit [5, 39]. There are effective treatments for smoking cessation, and thus, it is critically important that smokers receive them. The Agency for Healthcare Research and Quality guidelines specify that a brief smoking assessment and offer of cessation support and pharmacotherapy should be provided to smokers at every office visit [6, 7] In the general population, provision of assessment and general advice to quit smoking are more common, but discussions about pharmacotherapy less so. Only one third to one half of smokers report receiving advice to quit during a health care visit [8–10], and fewer than half have discussions about pharmacotherapy [11]; in national data, pharmacotherapy discussions were documented for only about 2 % of visits [10]. This is of concern because pharmacotherapy is an evidence-based treatment that increases cessation

rates, particularly when used in combination with behavioral therapy.

In the general population, provider-delivered cessation advice increases quit rates [12, 13], as does specific assistance related to pharmacotherapy [13]. Provider-delivered cessation interventions represent an important translational issue for increasing evidence-based practice. Support from a healthcare provider to quit may be particularly important for cancer survivors in order to help them appreciate the health risks of continued smoking and to capitalize on their relatively high motivation to quit.

The purposes of this paper are to report on the prevalence of provider-delivered cessation advice and discussions about pharmacotherapy between c/ya cancer survivors and their health care providers (HCPs) and to explore factors that are associated with receipt of advice. This paper involves analysis of data collected as part of Partnership for Health-2 (PFH-2), a study of a smoking cessation intervention for childhood and young adult cancer survivors. PFH-2 utilized the social ecological model [14–17] to consider several factors at the individual, interpersonal, and systems levels that may influence the behavior change process. Drawing on this framework and the literature, we hypothesized that provider advice and pharmacotherapy discussions would be more common among women, older and more educated smokers, and those with poorer self-rated health. We also hypothesized that those who are more ready to quit, who had higher levels of perceived risk due to smoking and perceived vulnerability to poor health outcomes overall, who did not have depressed mood, and who had previously received medical advice to quit would be more likely to receive advice and engage in pharmacotherapy discussions.

METHODS

Setting

PFH-2 was a randomized control study that compared two approaches to smoking cessation for c/ya cancer survivors. PFH-2 was designed to evaluate a scalable version of PFH-1, a peer-delivered telephone counseling intervention that was found to double smoking cessation rates among survivors [18]. PFH-2 compared web-based and print versions of the original PFH intervention and was conducted in collaboration with five cancer centers in the USA and Canada (St. Jude Children's Research Hospital, Memorial Sloan Kettering Cancer Center, Princess Margaret Hospital, The Hospital for Sick Children, and Dana–Farber Cancer Institute/Partners), with institutional review board (IRB) approval at all sites [19]. Due to the variability in institutional implementation of patient privacy and institutional review board requirements, the recruitment procedures varied across institutions. However, across all sites, potentially eligible survivors were sent an introductory letter about the study with an opt-out option. After consent was obtained, contact information was forwarded to the study survey team, who verified eligibility and administered the baseline survey.

Eligibility

Eligibility included cancer diagnosis $<$ age 35, currently between ages 18 and 55, no current cancer treatment and out of treatment for $\geq$2 years, able to provide informed consent, reachable by telephone, English speaking, and a current smoker. Forty-seven percent of survivors who were identified as eligible were enrolled in the study (n=374), and 86 % of enrollees (n=329) completed the 15-month follow-up. This follow-up window was selected because we were interested in longer-term outcomes, which are critical for improving health outcomes among survivors. Ockene et al. [20] established definitions of long-term maintenance as being 12 months or longer; the 15-month window allowed us to effectively capture that time period, as the nature of the intervention and the population-based participant recruitment strategies (e.g., enrolling all smokers, regardless of interest in quitting) would suggest that many participants work toward cessation rather than quitting immediately upon enrollment. This report focuses on reports of receipt of cessation advice and pharmacotherapy discussions with one's health care provider among the 329 participants that completed the 15-month follow-up survey.

Access to pharmacotherapy

Both PFH-2 conditions provided participants with the opportunity to receive free pharmacotherapy (nicotine patch or Zyban), with their health care providers' approval. Approval was provided via a fax-back form on which the provider verified that the patient was medically eligible to take the selected medication. Once approval was granted, all pharmacotherapy was sent to the provider, who distributed it directly to the patient. The pharmacotherapy mailing included a cover letter for the provider that highlighted the importance of smoking cessation for c/ya survivors and the role of the provider in helping patients to quit. We also included a fact sheet about adult survivors of c/ya cancers, and the USDHHS/AHCPR booklet, "Helping Smokers Quit: A Guide for the Primary Care Clinician."

Measures

Primary outcome variables

Provider advice to quit smoking–Provider advice to quit smoking during the study period was assessed on the follow-up survey ("During the past 15 months, how much have you been encouraged to quit smoking by your health care provider"). Response options (not at all, a little, a lot) were recoded to reflect receipt of advice (a little or a lot), or not.

Pharmacotherapy discussion with a health care provider–Participants were asked on the follow-up survey

whether or not, during the study period, they had "talked with your doctor, nurse, or other health care professional about whether medication for smoking cessation (such as the patch or Zyban) would be right for you." Ancillary personnel (e.g., nurse, physician's assistant) are often charged with delivering cessation treatment and follow-up after initial discussions with providers, and thus, this question included these staff. Reasons for not discussing pharmacotherapy were also assessed using a measure developed for this study, drawing on our clinical experience and the literature, which included the following barriers: lack of interest in quitting, not wanting to take a medication, cost, and not having shared their smoking status with their provider.

Predictor variables

Sociodemographic characteristics–Variables included age, gender, race, ethnicity, marital status, education, partner's current smoking status, and self-rated health (excellent, very good, good, fair poor) [21, 22].

Provider advice prior to study enrollment–Provider advice to quit smoking at any time prior to study participation was assessed on the baseline survey,

Smoking-related variables–Smoking rate: Participants reported the number of cigarettes they smoked per day. *Nicotine dependence*: Participants reported the number of minutes after waking that they smoked their first cigarette [23, 24]; responses were dichotomized as <30 min (nicotine dependent) and ≥30 min (not nicotine dependent) [24]. *The Stages of Change Scale* was used to assess motivation to quit smoking [23], according to four categories: (1) precontemplation: not seriously thinking about quitting smoking in the next 6 months, (2) contemplation: seriously thinking about quitting smoking in the next 6 months, (3) preparation: intending to quit smoking in the next month and those who have tried to quit in the past year, and (4) action: not currently smoking and quit within the past 6 months or maintenance: have not smoked for at least 6 months.

Psychosocial variables–Intrusive thoughts about cancer were measured with the Intrusive Thoughts Subscale of the Impact of Events Scale (IES) (internal consistency reliability=0.86) [25]. *Perceived risk associated with smoking* was assessed with a question about the extent to which smoking would increase participant's risk of any serious future health problems [26]. *Perceived vulnerability* was assessed with a question about the likelihood of experiencing serious health problems in the future [19]. *Perceived control* was assessed with the three-item Perceived Control Scale, which measures the degree to which participants felt they could control physical side effects, future health, and chance of a cancer recurrence, which has been found to have good predictive validity related to illness control efforts and overall adjustment [27, 40]. *Depression* was measured with the two-item Prime MD scale, which asks about feelings of depression and loss of interest or pleasure during the previous month (sensitivity= 89–96 %; specificity=51–72 %) [6]. Respondents who answered "yes" to either question were classified as screening positive for possible depression.

Data analysis

Means and standard deviations (for continuous variables) and frequencies (for categorical variables) were obtained for all key variables. Distributional assumptions were tested for skewness, and measures of outliers were assessed. All bivariate analyses are based on the bootstrap derivation dataset which consisted of a 66 % stratified random sample of the full dataset. The data were stratified by randomization to study arm to maintain the ratio of the complete dataset. Bivariate relationships predicting provider advice to quit smoking and pharmacotherapy discussions with a priori chosen predictors were assessed using logistic regression models. We then performed bootstrap model selection, tests for colinearity, and validation methods based on the work of Austin and Tu [41]. Based on this work, we determined the best multivariable model predicting each of our outcome variables using variables that were included in 60 % of the bootstrap models. All analyses controlled for cancer center and age, although these variables were not statistically significant in either model. Interaction, modifying and mediating effects were assessed before presenting the final model.

RESULTS

Participant characteristics

The average age at enrollment was 32.5 years (range 19–56), 51 % were male, and 48 % reported having a partner that smoked. Thirty-six percent of the sample had a high school degree or less; 34 % had some college, and 30 % had completed at least college; 80 % were employed in the last year. Thirty-five percent reported being in excellent or very good health, 39 % in good health, and 26 % in fair or poor health. At baseline, participants were largely in later stages of motivation to quit smoking, with 63 % being in preparation to quit; 22 % were in contemplation. The participants were generally light smokers, with 69 % reporting that they smoked less than one pack of cigarettes per day in the previous week. However, 47 % of the sample was nicotine dependent. All participants had at least one visit with their HCP in the year prior to study enrollment.

Prevalence of discussions about smoking and pharmacotherapy

Sixty-eight percent of respondents reported that, prior to study enrollment, a HCP recommended that they quit smoking. During the study period, 55 % of respondents reported that their HCP recommended smoking cessation, although only 36 % of respondents reported discussing pharmaco-

therapy. Among those who did not discuss pharmacotherapy, 48 % reported not being ready to quit, 27 % reported not wanting to use medication, 9 % indicated that their HCP did not know about their smoking status, and 15 % reported other reasons for not engaging their HCP (e.g., cost of pharmacotherapy).

Provider advice to quit smoking

Demographic variables–In bivariate analyses, education level was significantly related to provider advice to quit smoking at the bivariate level (p=0.020), with those having lower education levels having higher odds of receiving advice when compared to those with a college degree. Poorer self-reported health at follow-up was also associated with receiving advice to quit (p=0.012) when compared to higher levels of self-reported health.

Smoking-related variables–A higher smoking rate (20+ cigarettes/day) was associated with higher reporting of provider advice to quit when compared to low smoking rate (<10 cigarettes/day) (odds ratio (OR)=2.87, 95 % confidence interval (CI)=1.30, 5.88; p=0.004)

Psychosocial variables–Reported feelings of depression at follow-up were also associated with higher rates of receiving advice (OR=2.52, 95 % CI=1.43, 4.45; p=0.001). In multivariable analyses, provider advice to quit smoking during the 15-month intervention period was predicted by baseline smoking rate (p<0.001) and gender (p=0.012) (see Table 1). Higher smoking rates were associated with provider advice to quit smoking, with 42 % of light smokers, 69 % of moderate rate smokers, and 68 % of heavy smokers having received provider advice to quit. Women had nearly twice the odds of receiving advice to quit compared to men (OR=1.93, 95 % CI=1.16, 3.22; p=0.012).

Pharmacotherapy discussions

Demographic variables–In bivariate analyses, there were no statistically significant differences in pharmacotherapy discussions during the study period based on demographic variables. Previous provider advice to quit was significantly associated with having pharmacotherapy discussions during the intervention period (OR=2.98, 95 % CI=1.63, 5.45; p<0.001).

Smoking-related variables–There was an association between nicotine dependence and pharmacotherapy discussions (OR=3.06, 95 % CI=1.63, 5.80; p< 0.001); 23 % of light smokers, 33 % of moderate rate smokers, and 45 % of heavy smokers engaged in discussions (p<0.001). Stage of motivation to change was also associated with pharmacotherapy discussions, with higher frequency of discussions among those in later stages (p=0.007).

Psychosocial variables–There were no differences in pharmacotherapy discussions based on depression, IES/intrusive thoughts score, or perceived control. Perceived vulnerability to serious health problems in the future (OR=7.25, 95 % CI=2.00, 26.32; p< 0.001) and perceived risk due to smoking (OR= 3.34, 95 % CI=1.24, 9.05; p=0.018) were associated with pharmacotherapy discussions. The odds of having pharmacotherapy discussions was two times greater for those who felt they were more likely to experience serious health problems in the future and 3.34 times greater for those who perceived increased risk due to smoking.

In multivariable analyses, pharmacotherapy discussions during the intervention period were predicted by having been advised to quit smoking by a health care provider prior to study participation (p=0.021), perceived risk due to smoking (p=0.020), and baseline smoking rate (p<0.001) (see Table 2). Those who received a provider's advice to quit prior to the intervention period had almost two times higher odds of having a pharmacotherapy discussion (OR=1.86, 95 % CI=1.10, 3.15; p=0.021). Heavier smokers (those smoking >20 cigarettes/day; p<0.001) had 1.23 higher odds of having pharmacotherapy discussions as compared to those who smoked <10 cigarettes per day. The odds of having a pharmacotherapy discussion was 2.3

Table 1 | Multivariable model, odds ratios, and confidence intervals for receiving advice to quit smoking from a health care provider during the intervention period

Independent Variable	OR	CI	p value
Baseline smoking rate			‹0.001
‹10/day	Ref		
10–20/day	3.64	1.90, 6.94	0.023
≥20/day	3.49	1.82, 6.68	0.040
Education			0.099
Did not complete high school or equivalency	1.97	0.70, 5.58	0.662
Completed high school or equivalency	2.36	1.19, 4.68	0.145
Some college	1.73	0.90, 3.31	0.905
College graduate	Ref		
Gender			0.012
Male	Ref		
Female	1.93	1.16, 3.22	0.012
Controlling variables			
Age			0.237
Study site			0.141

Table 2 | Multivariable model, odds ratios, and confidence intervals for having a discussion about pharmacotherapy with a health care provider during intervention period

Independent variable	OR	CI	*p* value
Baseline smoking rate			‹0.001
‹10/day vs. ≥20/day	0.25	0.13, 0.48	‹0.001
10–20/day vs. ≥20/day	0.81	0.43, 1.51	0.084
Self-reported health			0.620
Excellent vs. poor	1.85	0.44, 7.83	0.408
Very good vs. poor	0.96	0.29, 3.12	0.259
Good vs. poor	1.51	0.50, 4.58	0.506
Fair vs. poor	1.39	0.43, 4.50	0.804
Perceived risk about smoking	2.30	1.15, 4.60	0.018
Provider advice to quit smoking prior to intervention	1.86	1.10, 3.15	0.021
Controlling variables			
Age			0.336
Study site			0.819

times greater for those with higher levels of perceived risk due to smoking.

DISCUSSION

This study reports on provision of HCP advice to quit smoking and consider pharmacotherapy among childhood and young adult (c/ya) cancer survivors. Only about half of participants reported having a discussion with a HCP about smoking and less than 40 % about pharmacotherapy. About half of those who did not have a discussion with their provider reported not wanting to quit; one third rejected medication as an option, and the remainder had health care system issues that impacted on their ability to consider pharmacotherapy (e.g., too expensive, no HCP). Women and heavier smokers were more likely to report receiving advice to quit; heavier smokers, those with more motivation to quit smoking, and those who had previously received provider advice to quit were more likely to discuss pharmacotherapy. It was somewhat surprising that demographic variables beyond gender did not predict participation in these discussions. This suggests that there is not an implicit bias in who is receiving advice, but rather a more generalized need to increase such discussions.

This study demonstrated that translation of evidence-based guidelines for smoking cessation to the survivorship care context is sub-optimal. Given that only 9 % of survivors reported that their provider did not know their smoking status, there should be good opportunity to significantly increase provision of guideline-recommended smoking cessation interventions to survivors. Use of evidence-based guidelines for smoking is particularly important in the context of survivorship care, in which survivors may perceive a lack of discussion as an implicit acceptance of their smoking status. That one third of participants did not want to use a medication approach to cessation may in part be a function of the long history of medication use that these patients have experienced due to their cancer treatment. It is possible that these survivors would be more willing to consider medication if they had additional information about the medical impact of these medications vs. continued smoking, as suggested by our finding of increased likelihood of pharmacotherapy discussions among those who had higher levels of perceived risk due to smoking. Addressing this issue in the context of provider discussions about cessation may be useful. In future research, it would be important to address how treatment history and concerns about medication use in general intersect with willingness to consider medication use for smoking.

Cost and access to cessation pharmacotherapy can also be important barriers to use. In 2008 the Public Health Service released clinical practice guidelines recommending comprehensive coverage by health insurers of effective smoking cessation medications and counseling [42]. In 2014 CMS programs will cover all FDA-approved medications and cessation counseling [43]. There are very tangible and important health benefits associated with population-level access to evidence-based cessation treatments in the general population [40, 44], and the benefits for survivors may be even greater, given the synergistic effects between smoking and their increased risk of late effects. Our findings suggest that while access is important, alone it may not be sufficient in this high-risk population to achieve large-scale increases in pharmacotherapy use. Only 14 % of study participants who had access to free pharmacotherapy requested it. Thus, it is likely that additional efforts will be needed beyond access to impact on pharmacotherapy use.

The Agency for Healthcare Research and Quality guidelines for treating tobacco use and dependence specify that smoking status should be assessed and cessation discussed at every visit [42]. Quit attempts are most likely and most successful when repeated attention and prompts are provided. Having a health care provider involved in the cessation

process increases the chance of successfully quitting by up to 52 % [45]. Our findings also point to the importance of having providers involved in the cessation process. Provider advice was significantly associated with pharmacotherapy discussions, whereas standard demographic smoking characteristics (e.g., education, stage of motivation to change) were not, suggesting that for survivors, provider involvement in the cessation process is extremely important.

Studies have shown that the frequency of providing active counseling about cessation and pharmacotherapy is suboptimal [8–11]. Data from the National Ambulatory Medical Care Survey [10] revealed that 68 % of doctors identified smoking status in their population, but cessation counseling was provided in only 20 % of visits. Further, use of medication as part of the treatment plan was very low (<2 % of smokers' visits). A recent meta-analysis [46] found that only 8 % of provider-delivered interventions in the general population had pharmacotherapy as a key component. The one published study that assessed provider-delivered cessation advice among adult cancer survivors found that 96 % had seen a health care provider in the last year; 41 % of these had been asked about their smoking status [47]. Of the 17 % who were current smokers, 72 % had been advised to quit within the last year. Of those that made a serious quit attempt, only 33 % used pharmacotherapy and only 4 % used an evidence-based behavioral treatment.

The present study suggests that the rate of provider-delivered counseling for childhood and young adult cancer survivors is about the same as that found in the general population. This is particularly concerning given the heightened risk that survivors face and their more frequent interaction with the health care system, which should create more opportunities for providers to intervene. Substantial progress still needs to be made in understanding how to increase systematic efforts to implement evidence-based guidelines for smoking cessation in settings that care for cancer survivors, how to support and encourage providers in taking steps to consistently intervene with smokers until cessation is achieved, and to provide assistance with the full range of evidence-based treatment options [46].

Study limitations should be noted. The response rate was impacted by IRB requirements regarding patient contact at most participating sites. In addition, all of the sites had a substantial number of patients that could not be contacted, despite use of extensive search methods. However, we did use a population-based approach to conducting this study, identifying all potential smokers within several different survivorship programs in the USA and Canada, which contributes to the external validity of the findings. Single-item measures of risk perception and perceived vulnerability were used to minimize respondent burden. Use of retrospective self-report of pharmacotherapy discussions is also a limitation, as is lack of detail about whether the patient or provider initiated pharmacotherapy discussions and their nature and extent.

CONCLUSIONS

About one half of childhood and adolescent cancer survivors who smoke reported receiving advice from their provider to quit smoking, and one third reported that they discussed pharmacotherapy. Health care providers are missing key opportunities to advise childhood and young adult cancer survivors about cessation and evidence-based interventions. Because of survivors' greater likelihood of seeing providers numerous times throughout the year, the opportunity exists to develop smoking cessation protocols to use with every survivor at every visit, including advice, assessment, assistance, and pharmacotherapy. Systematic efforts within survivorship care will be needed to ensure that survivors who smoke get the treatment that they need.

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