Associations between sociodemographic characteristics and tobacco usage in adult cancer survivors: Evidence from a population-based study

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ABSTRACT

Background: the risk of developing new cancers persists for 15 million cancer survivors in the United States, yet many continue to engage in high-risk behaviours. This analysis aims to compare tobacco use in cancer-free respondents and cancer survivors, in order to elucidate trends and behavioural patterns associated with increased tobacco use in individuals that have survived cancer.
Methods: the Health Information National Trends Survey data of 2014 and 2017 was analysed for this study. Descriptive statistics were generated, and the likelihood of tobacco use was predicted using weighted logistic regression. Included in the study population were 941 cancer survivors, predominantly white (80%), 60-70 years of age, married (52%), with some level of education past high school (65%).
Results: the current smoking rate for cancer survivors was 12.1% versus 14.3% for those without cancer. Sub-high school education (OR 3.02, 95% CI [1.11-8.19]), separation/divorce (OR 2.71, 95% CI [1.52-4.83]), female gender, and lower household income were associated with an increased likelihood of cigarette use amongst cancer survivors. Cervical cancer (19.2%) and lymphoma (20%) survivors were most likely to smoke cigarettes compared to other cancer survivors.
Conclusions: this study demonstrated certain sociodemographic characteristics increase the likelihood of cigarette smoking in cancer survivors. These outcomes suggest cancer survivors with only high school education or lower, and those with household incomes of less than $35,000 are at greater risk and should be targeted for personalised tobacco cessation interventions in the future. High prevalence of smoking in cervical cancer survivors and an increased risk of tobacco-linked cancers suggests focus must be directed to interventions targeting female cancer survivors. Allocating further resources toward the at-risk populations identified in this study may reduce further morbidities in cancer survivors.

Key words: HINTS, smoking patterns, treatment, prevention, cancer

INTRODUCTION

Of the modifiable risk factors for cancer, tobacco usage is among the most prevalent and preventable, yet it is a major factor in over one third of all cancer deaths [1]. There is a strong association between use of tobacco products and an increased incidence of more than 10 major forms of cancer, and is strongly correlated to a greater risk of cardiovascular and respiratory diseases [2]. New laws and public health programs have resulted in a decrease in prevalence of tobacco use, down to 15.1% within the general population. Though smoking prevalence continues to decrease in developed countries, tobacco use remains higher in Caucasian males and those under 44 years compared with other demographics [3].

The total number of cancer survivors in the United States continues to grow; currently standing at over 15.5 million and representing approximately 4.8% of the population [4]. Cancer survivors experience greater risk of developing malignancies in the future, and with a great many tobacco-linked cancers, increased morbidity and mortality has been observed in cancer survivors who continue using tobacco products regularly [5, 6]. The prevalence of tobacco usage in cancer survivors has been estimated through analysis of national survey data, however much of the research uses outdated data [7, 8]. National Health Interview Survey (NHIS) data reported current smoking rates between 7.5-12%, with the highest prevalence of post-diagnosis smoking in bladder cancer survivors. Analysis of Health Information National Trends Survey (HINTS) data indicated a greater likelihood of cervical cancer survivors to smoke compared to any other group of cancer survivors, identifying up to 49% of cervical cancer survivors as current smokers [9]. Both studies found smoking rates varied by age, cancer type and gender. Despite these findings, it is uncommon for cancer survivors to receive specific information regarding cessation of tobacco use, with as little as 31% receiving advice [10]. The results from these studies indicate changing trends in tobacco use over time, highlighting the need for continuous analysis of available data to best target interventions.

Prior studies have suggested as-yet unidentified sociodemographic characteristics may influence rates of tobacco usage by cancer survivors, and further analysis of available data is required to both corroborate these claims and to better understand these variables. As aggregated data across extended periods may not necessarily reflect current trends, the need for continuous analysis of new data is essential to best guide policymaking and healthcare practice in a dynamic landscape. Thus, the purpose of this analysis is to examine how sociodemographic characteristics affect tobacco usage behaviours in cancer survivors, using data from the 2014 and 2017 HINTS surveys. The results of this analysis may prove beneficial in designing specific interventions for high risk groups cancer survivors.

METHODS

Participant data

HINTS is a biannual national population survey undertaken to produce a cross-sectional representation of health behaviour and cancer communication trends over time [11]. The HINTS survey population are civilian, non-institutionalised, age 18 years or older, and citizens of the United States. Data was collected via Spanish and English random-dial phone surveys to ensure fair population capture. Questions addressed perception of health services and risk factors, use of health information technology, health status of the respondent, cancer and demographic characteristics. Datasets, codebooks and replicate weights were obtained for the HINTS 5, cycle 1 (2017) and HINTS 4, cycle 4 (2014) data after submitting a usage declaration to the NCI.

A total of 6,962 people responded to the HINTS 4 cycle 4 and HINTS 5 cycle 1 surveys. Upon preliminary analysis, 711 (10.2%) cases were unusable due to incomplete survey responses (failure to identify gender, ethnicity, age or smoking status), failure to identify cancer status (n=25, 0.8%), or cancer type (n=11, 0.3%), and two reported an inconsistent aetiology for gender. All 749 anomalous cases were removed from the dataset. The remaining 6,213 included 941 (15.2%) with a self-reported diagnosis of cancer. To assess smoking status in cancer survivors versus cases with no cancer history, categorization of respondents as never, former, or current smokers, was based on respondent selection of answers to threshold cigarette consumption (lifetime smoking of 100 cigarettes) and current smoking status (yes or no). Former and never smokers were both classified as 'non-smokers' for the purposes of binary analysis. Smoking status was unable to be calculated for 66 (13.4%) of the 941 cancer survivors. All included variables and their respective categories are displayed in Table 1 and Table 2. Levels of non-response for all variables averaged 4.2%, with a maximum of 15%.

Statistics

Analyses were performed using software capable of executing complex sample analytics while controlling for missing data (SPSS v25, IBM Corporation, Armonk, NY). Bootstrap estimation was used to calculate standard errors and statistical significance using replicate weights provided by the NCI. Smoking status of cancer survivors (CS) and respondents without cancer (NC) were compared by chi-square. Likelihood of being a smoker was analysed via logistic regression, based on variables confirmed by the literature and known to affect smoking status.

TABLE 1. Sociodemographic characteristics for the most frequently reported cancer types and for cancer-free respondents, HINTS 5 cycle 1 (2017) and HINTS 4 cycle 4 (2014) data

	Cancer Survivors						
	All	Cervical	Breast	Lung	Colorectal	Prostate	No Cancer
	n=941 (%)	n=78 (%)	n=192 (%)	n=26 (%)	n=67 (%)	n=120 (%)	n=5272 (%)
Smoking status* **							
Current	11.4	19.2	10.9	15.4	14.9	8.3	14.3
Former	35.6	29.5	28.1	46.2	35.8	48.3	24.7
Never	46.1	41.0	52.1	26.9	38.8	37.5	54.1
Missing	7.0	10.3	8.9	11.5	10.4	5.8	6.8
Age group (years)**							
18-34	1.2	5.1	0.5	0.0	0.0	0.0	14.5
35-49	7.0	21.8	6.3	3.8	3.0	0.0	23.3
50-64	29.4	39.7	32.3	26.9	34.3	15.0	32.1
65-74	30.1	21.8	29.7	38.5	17.9	43.3	14.6
75+	25.1	3.8	26.6	30.8	37.3	35.8	7.8
Missing	7.2	7.7	4.7	0.0	7.5	5.8	7.8
Education level* **							
High school incomplete	8.5	15.4	9.4	3.8	19.4	7.5	7.7
High school completed	23.7	23.1	29.2	46.2	23.9	18.3	19.7
Vocational training	28.1	32.1	25.5	3.9	31.3	31.7	29.5
College graduate	36.9	28.2	34.4	38.5	22.4	38.3	40.9
Missing	2.7	1.3	1.6	7.7	3.0	4.2	2.2
Marital status**							
Single	8.4	12.8	10.9	11.5	6.0	5.8	17.9
Married	52.1	42.3	37.5	38.5	52.2	65.0	52.2
Separated/Divorced	19.2	29.5	22.9	26.9	13.4	14.2	18.3
Widowed	17.2	12.8	27.1	19.2	25.4	11.7	9
Missing	3.2	2.6	1.6	3.8	3.0	3.3	2.6
Gender**							
Female	59.7	100.0	95.8	65.4	62.7	0.0	59.5
Male	37.8	0.0	1.6	34.6	35.8	100.0	39
Missing / Not Applicable	2.5	0.0	2.6	0.0	1.5	0.0	1.5
Health insurance**							
None	2.5	9.0	4.7	0.0	1.5	0.0	7.8
Full/Partial	97.5	91.0	95.3	100.0	98.5	100.0	92.2
Ethnicity**							
White	78.6	74.4	72.4	76.9	64.2	69.2	68
Black	12.3	17.9	18.8	19.2	19.4	23.3	18.7
Hispanic	6.9	19.2	8.3	3.8	7.5	8.3	16
Other/Missing	2.2	0.0	0.5	0.0	9.0	0.0	7.3
Cancer prevention possible?**							
No	28.7	30.8	29.7	42.3	49.3	30.0	27.6
Yes	68.9	69.2	67.7	50.0	47.8	65.8	69.1
Missing	2.4	0.0	2.6	7.7	3.0	4.2	3.3
Years since diagnosis							
Less than 1 year	11.4	0.0	8.3	42.3	13.4	13.3	n/a
1-5 years	20.3	6.4	24.0	15.4	25.4	29.2	n/a
6 - 10 years	18.2	5.1	20.3	15.4	14.9	26.7	n/a
11 - 20 years	18.5	19.2	23.4	11.5	17.9	21.7	n/a
Over 20 years	20.7	57.7	16.7	11.5	13.4	2.5	n/a
Missing	10.8	11.5	7.3	3.8	14.9	6.7	n/a

TABLE 2. Weighted regression models predicting likelihood of cancer survivors being current smokers, by sociodemographic characteristics

Variable	β	SE	95% CI	OR	p
Education ***(vs. college graduate)***					
High school incomplete	0.99	0.43	1.11, 8.19	3.02	**
High school complete	1.11	0.30	1.34, 6.85	3.03	***
Vocational training^	1.01	0.29	0.79, 4.01	1.79	*
Postgraduate	0.78	0.31	0.37, 3.29	1.10	ns
Income ***(vs. < $35,000)***					
35,000 - 49,999	-0.87	0.31	0.17, 0.97	0.41	*
50,000 - 99,999	-0.24	0.24	0.25, 0.82	0.45	**
> 100,000	-0.47	0.37	0.21, 0.88	0.43	*
Gender					
Male (vs. female)	-0.37	0.24	0.31, 0.87	0.52	*
Marital status ***(vs. married)***					
Single	0.13	0.38	0.99, 5.95	2.44	*
Separated/divorced	1.22	0.45	1.52, 4.83	2.71	***
Widowed	1.21	0.38	0.72, 3.29	1.54	*
Cancer beliefs					
Impossible to prevent (vs. possible)	0.42	0.23	0.95, 1.81	1.52	*
Health Insurance					
Yes (vs. no)	0.81	0.33	0.68, 1.54	1.27	***
Census area					
Metro (vs. rural)	0.76	0.21	0.65, 2.26	1.21	*
Body Mass Index# ***(vs. normal)***					
Underweight	0.52	0.37	0.43, 3.93	1.30	ns
Overweight	-0.21	0.29	0.41, 1.30	0.73	*
Obese	-0.38	0.22	0.25, 0.93	0.48	**
Ethnicity ***(vs. white)***					
Black	0.71	0.24	0.68, 2.76	1.37	*
Hispanic/other	-0.11	0.31	0.27, 2.64	0.76	ns

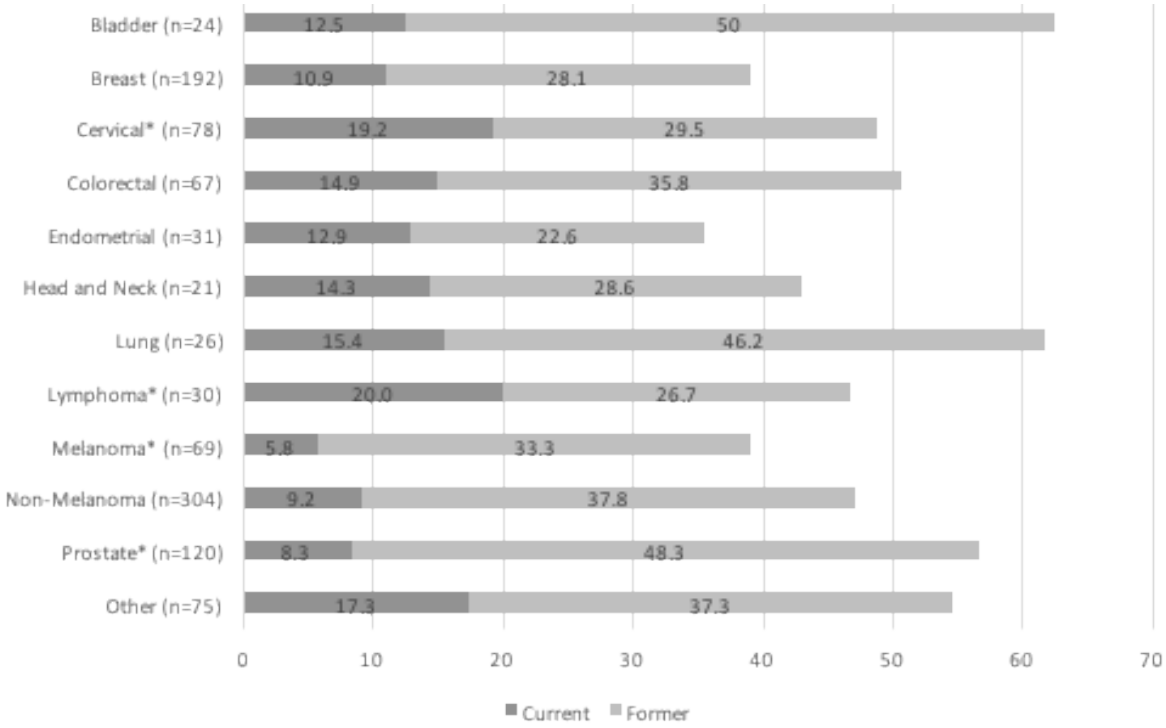
Note. n = 941 obtained from respondents to the 2014 and 2017 HINTS survey, excludes respondents with inconsistent cancer diagnosis, undetermined smoking status, and incomplete survey response.

^ Includes incomplete college or university education

*# BMI categorisation; underweight < 19; normal 19 - 25; overweight 26 - 30; obese > 30 * p ≤ 0.05; ** p ≤ 0.01; *** p ≤ 0.001; ns, p > 0.05*

The likelihood of survivors of each cancer type currently smoking compared to the whole CS group was calculated by logistic regression after controlling for variables. Results were considered significant if the p-value was less than 0.05 and the odds ratio (OR) was less than 0.80 or greater than 1.20; these cut-offs were chosen to enable greater distinction between risk and protective factors. Additionally, the dual criteria allowed for preservation of both practical and statistical significance, particularly as methods for control of Type 1 errors are poorly developed for binary single-group analysis and several cancers types had small sample size.

FIGURE 1. Percentage of current and former smokers for all cancer types with minimum 20 respondents, data obtained from HINTS 5 cycle 1 (2017) and HINTS 4 cycle 4 (2014)



**p < 0.01 compared with all other cancers.*

RESULTS

Participant data

Personal characteristics for the NC and CS groups, and for the five most common cancer types observed in the study population are reported in Table 1 [12]. These five cancer types did not include the highest prevalence (lymphoma; 20%) or lowest prevalence (melanoma; 5.8%) of current smokers among the respondents. On average, CS group respondents were aged 60-70 years (mean 66), married, female and white, with a level of education greater than high school.

Smoking rates of cancer-free respondents versus cancer survivors

Of the 941 respondents in the CS group, 11.4% reported a current smoking status, which was similar but statistically significant ($p < 0.01$) when compared to the current smoker rate of 14.3% in the NC group (n=5,272). The proportion of former smokers in the CS group (35.6%) was significantly higher than the NC group (24.7%). However, the proportion of respondents who had never smoked was significantly higher in those without cancer (54.1%) than those with self-reported cancer diagnosis (46.1%).

Likelihood of cancer survivors being current smokers based on sociodemographic predictors

The likelihood of current smoking status in the CS group based on sociodemographic and health behavioural characteristics is displayed in Table 2. Controlling for variables including education level, marital status, ethnicity and beliefs regarding cancer prevention affected likelihood of smoking. As education increased, likelihood of current cigarette use decreased, and respondents with only high school education were over three times more likely to smoke than college graduates (OR [95% CI]: 3.03 [1.34, 6.85]). As observed in other literature, income was a strong predictor of health behaviours. Cancer survivors with household income under $35,000, the lowest income category measured, were more than twice as likely to smoke than those earning over $35,000. However, higher income brackets displayed a similar reduced likelihood of smoking compared to the lowest income group, suggesting a confounding factor in the lowest income category or behavioural modification threshold near $35,000.

Unexpectedly, given higher rates of cigarette smoking in men, male cancer survivors were half as likely to smoke as females (OR [95% CI]: 0.52 [0.31, 0.87]). Married cancer survivors were less than half as likely to smoke as those identifying as single, while respondents who were

separated (OR [95% CI]: 2.71 [1.52, 4.83]) or widowed (OR [95% CI]: 1.54 [0.72, 3.29]) were significantly more likely to be current smokers than married cancer survivors. Adjusting for all other variables, if a cancer survivor believed prevention of cancer was impossible, they were 52% [95% CI: 0.95, 1.81] more likely to continue to smoke cigarettes than survivors who believed prevention was possible. Non-Hispanic black respondents (CS) had a 37% higher likelihood of currently smoking than white respondents, and while respondents identifying as Hispanic or Asian saw a lower likelihood of smoking than white respondents, this observation was not statistically significant (p = 0.63).

The percentages of current and former smokers for cancer types with over 20 respondents are displayed in Figure 1. Current smoking rate varied considerably, ranging from 5.8% (melanoma) to 20% (lymphoma). After controlling for variables known to bias the likelihood of smoking status, cervical cancer (OR [95% CI] = 1.96 [1.07, 3.59]) and lymphoma (OR [95% CI] = 1.80 [0.72, 4.49]) had a significantly higher proportion of current smokers compared to the entire CS group. Conversely, prostate cancer (OR [95% CI] = 0.69 [0.35, 1.37]) and melanoma (OR [95% CI] = 0.48 [0.17, 1.34]) had significantly lower proportions. Statistical power differed between tests as the number of respondents for each cancer type varied, however in two-sided tests with 80% power and Type 1 error limits (5%), differences were no higher than 12%.

Limitations

The NIH HINTS survey relies on the accuracy of respondents in reporting their health status, and previous studies have indicated patient recall may be inaccurate when self-reporting medical conditions [13]. Thus, while the size of the dataset may minimise the effect of individual errors, reporting errors may bias analysis in smaller groups. Given that several confidence intervals intersect 1, a larger sample size may be required to increase generalisability of results. While it is possible to categorize respondents into tobacco use categories, no HINTS questions address time since smoking cessation, thus it is impossible to determine whether cessation occurred prior to, or after, cancer diagnosis. HINTS is intended to yield representative samples of the general, non-institutionalised U.S. population, not cancer survivors, thus some facets of the survey may have limited transferability or relevance to cancer survivors, and certain questions may be better observed through a cancer survivor-specific survey. Additionally, in recent years the response rate has steadily decreased, highlighting a declining trend in phone survey response rates. Though such a trend may create bias due to inherent traits of respondents, the dataset was adjusted for nonresponse, but nonetheless highlights the developing need to create a more modern, targeted survey method. Furthermore, as a cross-sectional survey, it is impossible to conclusively establish a temporal relationship between smoking status and cancer diagnosis.

Cancer survivors represent approximately 18.5% of the combined HINTS survey respondents, however prevalence of cancer survivors in the U.S. is approximately 4.6% [3, 14]. The overrepresentation of survivors may indicate a desire for cancer survivors to participate in health services research, including the NCI HINTS survey. While cancer survivors themselves were overrepresented within the survey, some cancers were underrepresented, particularly lung cancer, reported by only 2.76% of HINTS cancer survivors, versus the U.S. prevalence of 12.3% [15]. The underrepresentation of lung cancer may be, in part, due to low survival rates when compared to other cancers reported in the survey. Most major forms of cancer were within 5% of the estimated U.S. prevalence, with risk of major misrepresentation only occurring in cancers with small sample size.

DISCUSSION

This nationally-representative cross-sectional analysis of tobacco usage behaviours in cancer survivors revealed that cancer survivor groups have lower proportions of current and never smokers, but a higher proportion of former smokers, than those who have never had cancer. These findings support the notion cancer diagnosis as a teachable moment; a specific event capable of facilitating greater health behavioural change [16]. Most variations in smoking status were decreased once variables shown to affect tobacco usage were included, however even when demographic variables were controlled, lymphoma, melanoma, and cancers of the cervix and prostate, showed significant disparities in the prevalence of current smokers when compared to non-smokers and all cancer survivors.

Educational level, age, marital status, ethnicity and beliefs surrounding cancer prevention influenced the likelihood of tobacco use among respondents. Compared with non-smokers, it was more likely that smokers had attained a lower education, were separated, divorced or widowed, believed cancer was impossible to prevent, and identify as white and female. Many of these characteristics, including gender, ethnicity, and educational level are commonly observed variables influencing health behaviours within the general U.S. population [3]. Even when these variables were controlled, cancer type acted as an independent risk factor for likelihood of tobacco use. Cervical cancer (19.2%) and lymphoma (20%) had the highest prevalence of current smokers, whereas melanoma (5.8%) and prostate (8.3%) had the lowest prevalence of current smokers. However, despite a greater proportion of current smokers in lymphoma survivors, cervical cancer survivors were more likely to be current smokers than

lymphoma survivors (OR [1.96 vs 1.80]). Similar to point observations in national databases, gynaecological cancer survivors had one of the highest prevalence of current smokers, supported by evidence from cervical and endometrial cancer survivors from this analysis [7]. Though database analysis indicates breast and colorectal cancer survivors may have lower smoking rates when compared to all cancer survivors, our analysis indicated a slightly reduced proportion of breast cancer survivors (10.9% vs 11.4%) but higher proportion of colorectal cancer survivors (14.9% vs 11.4%) were current smokers. In a study of over 800 gynaecological cancer survivors, though prevalence of tobacco use varied markedly by cancer site, cervical cancer rates were greatest, at a proportion comparable to the results of this study (20.9% vs 19.2%) [17]. However, recent data from the Gynaecological Oncology Group Study indicated smoking rates as high as 42% for cervical cancer survivors, and also concluded current smokers were more likely to live with other active smokers [18].

A conclusion similar to that of other research can be made from this analysis; the likelihood of cervical cancer survivors being current smokers is greater than that of other cancer survivors, and those without cancer. These survivors may have poorer outcomes and be at a significantly increased risk of developing secondary cancers [19]. One of the more startling discoveries from this analysis, however, is that over 30% of cervical cancer survivors believed prevention of cancer is impossible. This finding suggests a high proportion of women still lack sufficient understanding of both cancer prevention and of HPV vaccination [20]. Thus, the risk of further health conditions in this group is twofold; from both HPV and tobacco usage. This conclusion may also have significant correlation with clusters of high-risk health behaviours, including alcohol consumption and unprotected sex. These findings, alongside evidence of clustered risk behaviours in cervical cancer survivors supported by literature highlight the high-risk nature of this population, yet also suggest a great benefit may be received from tobacco cessation interventions [21].

Recent data from an analysis of multi-year cross-sectional surveys revealed that, in line with our initial findings, cervical cancer survivors are at greatest risk of smoking, however, this analysis did not include data from the 2017 HINTS survey [22]. The findings from our analyses of the 2017 data extend and complement those of the aforementioned study, and suggest that despite being identified as an at-risk group in 2011, initiatives involving cancer education, pap screening, and HPV vaccinations have failed to reduce the prevalence of tobacco smoking in cervical cancer survivors [9]. It is critical to utilise current data to inform policy, practice and improve transferability of findings to the general public. Many recent studies have used inappropriate data, and despite increasing sample size, can offer misleading conclusions, particularly regarding cervical cancer. Given the rapid decrease in HPV prevalence following the passing of the Gynaecologic Cancer Education and Awareness Act in 2005, and addition of the HPV vaccine to the national vaccine schedule in 2007, it is essential to segregate data into the pre-vaccine era (prior to 2007) and the post-vaccine era (2007 onwards) when discussing data pertaining to cervical cancer [23].

Almost 10% of cancer survivors currently have, or have previously developed at least one other major cancer, many of which may be related to tobacco use, and the lower self-reported quality of life by cancer survivors who smoke compared with those who do not [24][25]. Being diagnosed with cancer has been described in literature as an event where people are more receptive to behavioural and lifestyle change [26]. Despite a lack of data indicating when smoking cessation occurred, the proportion of former smokers for some cancers (prostate, lung) were far greater than in all cancers and those without cancer. Thus, being diagnosed with cancer may increase the likelihood of a patient ceasing tobacco use, highlighting the potential for marked lifestyle and behavioural change in this moment.

Though the small sample size prevents formulating conclusions of the relationship between health insurance and smoking status, our analysis revealed a low frequency of health service use was a factor in current tobacco use. While disparities in health status are often attributed to demographic and personal variables, access to healthcare may help to explain some of the observed disparities. A study of cancer survivors and health care providers in 2009 found that while survivors were interested in ceasing tobacco use, it was uncommon to actively seek help and when help was offered, the type and amount of help offered by providers varied greatly [27]. Further studies have indicated over one quarter of cancer survivors who currently smoke do not receive advice to cease tobacco use from their primary health provider, potentially missing the opportunity for positive behavioural change [8]. Thus, the combined effect of low healthcare utilisation and low rates of cessation aid consolidate an even greater reduction of intervention opportunities. Furthermore, cancer survivors with a household income of less than $35,000 were more than twice as likely to continue smoking than any other income group, strongly supporting the role that healthcare affordability plays in increasing health education exposure to the public. These observations also highlight the importance of offering community-based, inexpensive health education programs to socioeconomically disadvantaged populations.

Tobacco use interventions in cancer survivors is a challenging but critical endeavour. Of the 1,800 cancer survivor respondents to the 2005 NHIS, cervical cancer survivors reported the highest current smoking rates at 42.5%, with 28% of those cases not receiving a recommendation to cease tobacco use [8]. Furthermore, among the smokers trying to quit, only one-third (33.8%) used pharmaceutical or behavioural treatments backed by evidence, and over

half of those attempting to quit smoking did not receive any support [8, 28]. Despite some survivors' expressing interest in ceasing tobacco use, many were reluctant to disclose smoking status to their regular healthcare provider [27, 29].

An assessment of tobacco intervention programs for cancer survivors identified significant issues faced in competent execution of the programs, notably target population, program implementation, and assessment of smoking status [30]. These shortfalls highlighted several essential characteristics of cessation programs, including but not limited to; attention to health risk behaviours affecting likelihood of tobacco use, modifying interventions to suit survivors' willingness to modify behaviours, and the use of high-intensity, scientifically-proven therapeutic strategies and behavioural intervention sessions. Though reviews of tobacco interventions have been published, and the Office of the Surgeon General provides evidence-based guidelines, it is important to consider how personal characteristics of cancer survivors in a dynamic setting may not fit a prescribed intervention [31]. It is also important for the continued analysis of data as it becomes available, to best guide policymaking and evidence-based practice.

CONCLUSIONS

Cigarette smoking in cancer survivors is less prevalent than in the general population, however one in nine survivors currently smoke. This rate increased as high as two in five survivors of cervical cancer, but is much lower for other cancers, including prostate and melanoma. Smoking rates varied by gender, educational level, cancer type and beliefs surrounding cancer prevention. All cancer survivors who currently use tobacco products should be offered personalised cessation interventions, but those fitting higher-risk categories identified by this analysis should be targeted for intensive programs. However, it is important to focus interventions on women, due to the increased risk from tobacco-linked cancers and high prevalence of smoking in cervical cancer survivors, and those with lower educational and income levels. Healthcare and primary care providers must increasingly utilise the role of allied health professionals in the implementation of tobacco cessation programs to facilitate positive behavioural and lifestyle change in those with cancer who currently smoke.

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