Smoking Abstinence Rates and Reasons for Failure to Quit Smoking in Cancer Patients in Jordan

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Key Words

Smoking cessation · Cancer patients · Abstinence rates

Abstract

Background: Failure to quit smoking in cancer patients is associated with the development of a second primary tumor and a suboptimal response to chemotherapy. However, data characterizing cancer patients' ability to quit is scarce, particularly in developing countries. Such information is valuable in highlighting the potential of cessation interventions in countries where smoking rates are high and antismoking policies are not yet fully implemented. **Objectives:** To measure the abstinence rates and identify reasons for the failure to quit smoking in patients visiting a smoking cessation clinic in a comprehensive cancer center in Jordan. **Methods:** Through retrospective medical chart review and prospective follow-up by phone, we studied long-term abstinence rates and reasons for the failure to quit smoking in 156 cancer patients referred to the smoking cessation clinic to receive counseling and pharmacological treatment. Patient demographics, clinical and smoking characteristics and long-term abstinence at 12 months were recorded, as were reasons for the failure to quit smoking. **Results:** The 12-month abstinence rate was 21.2%. The main reasons for failing to quit smoking included personal or professional stressful situations, not being able to handle withdrawal and the belief that quitting had no value. **Conclusion:** Abstinence rates in

Jordanian cancer patients fall at the lower end of the range that has been reported in the literature for cancer patients. Efforts to improve these rates should focus on assisting patients in handling stress, and in adjusting medications to improve withdrawal symptoms.

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Introduction

Smoking is a leading cause of many cancers and the single most preventable cause of death and disease in the world [1]. For many reasons, smoking cessation must be considered an integral step in the management of patients diagnosed with cancer. Smoking has been associated with poor nutrition, comorbidities, impaired immune function and accelerated carcinogenesis and disease progression [2–6]. Smoking has also been associated with decreased survival in patients with a variety of cancers such as head and neck, breast and colorectal cancer [7]. Furthermore, patients who continue to smoke while receiving chemo- and radiotherapy are at risk of receiving suboptimal therapy for their cancer as a result of smoking-related comorbidities that preclude certain therapies [8]. Such patients also have a higher chance of developing adverse effects related to these modalities of treatment [9–11]. Finally, the development of a second malignant primary tumor and the lower survival, in cancer survivors

who continue to smoke, are significant additional risks which can occur as a result of smoking [12–14].

Despite the above-stated risks, studies have shown that at least 30% of smokers continue to smoke after being diagnosed with cancer [15, 16] and more than 40% of patients diagnosed with non-small-cell lung carcinoma resume smoking within 12 months of undergoing surgery for their cancer [17]. These figures highlight the need for routinely incorporating smoking cessation in the overall management programs of patients diagnosed with cancer as well as the need for research that addresses the characteristics of such patients [18]. However, there is limited research concerning smoking cessation in cancer patients, particularly in understudied developing countries. Clinicians can use the results of such studies to better anticipate the performance of cessation interventions when the latter are administered in cancer patients from varying cultural backgrounds, healthcare systems and settings, in order to realistically forecast how, as well as to what extent, cessation success can be improved.

Jordan, in the Middle East, is a low- to middle-income country with high reported smoking rates, particularly in men; 48% of men are smokers, and among women the reported figure of 5% is likely an underestimate (women in Jordan tend to underreport smoking for cultural and social reasons that make smoking less acceptable for women) [19]. Although Jordan has ratified the Framework Convention on Tobacco Control (FCTC) agreement, and antismoking policies exist, the latter have not yet been fully implemented. As a result, public smoking and exposure to second-hand smoke in both public venues and homes remains a concern that impacts on non-smokers as well as smokers desiring to quit. Nevertheless, in order to improve tobacco control, Jordan has initiated smoking cessation services, making it one of the few countries in the region to be able to provide data on the impact of such services.

We conducted an observational study on cancer patients who were smokers and were referred to a smoking cessation clinic in a comprehensive cancer center in Jordan. We present abstinence rates and reasons for the failure to quit smoking.

Subjects and Methods

Study Design

The study was a retrospective medical chart review with prospective patient follow-up via phone calls. We studied all cancer patients at the King Hussein Cancer Center referred to the smoking cessation clinic from February 2008 to October 2009. The In-

stitutional Review Board at the King Hussein Cancer Center approved the study and waived the requirement for informed consent as the study was deemed to be of minimal risk.

Patient characteristics were obtained from patients' medical records. Demographic characteristics included age, gender, level of education and marital status. Clinically related characteristics included type and stage of cancer, age of the onset of smoking, smoking status and habits, exhaled carbon monoxide (CO) levels measured in part per million (ppm) at the first visit, and assigned antismoking regimen (varenicline-based, bupropion-based, nicotine replacement therapy (NRT)-based, or counseling only). In addition, we prospectively collected other variables that indicated the level of tobacco dependence. Specifically, two items were measured: the 6-item Fagerström score, and the subject's perception of his/her motivation to quit smoking.

Abstinence at 12 months was documented based on patient reports 1 year after the starting date chosen by patients (in the first session, patients were encouraged to set a target quit-date falling approximately a week from the first visit). Patients who relapsed were asked about the most important factor/s that caused them to smoke again.

Methods

The cessation clinic offers services in the form of counseling and pharmacological management. With regards to pharmacological management, the smoking cessation program uses a fixed protocol to treat cancer patients who smoke. In brief, smokers are started on varenicline (for 12 weeks, titrated from 0.5 mg per day for 3 days to 0.5 mg twice a day for the following 4 days, then 1.0 mg twice daily through to week 12) in combination with NRT in the form of nicotine patches (NRT is prescribed for 3–6 weeks, starting with a high dose proportional to the number of cigarettes smoked by the patient, titrating down over the 3- to 6-week period) as a first line of therapy. We combine NRT in the form of nicotine patches to help patients during the initial phase of titrating the dose of varenicline. A similar approach has been used in a residential smoking cessation program elsewhere [20]. Should patients have any contraindication to varenicline, then bupropion (for 12 weeks, titrated from 150 mg per day for 3 days, then increased to 300 mg per day) and NRT are used. Patients who cannot use NRT are placed on single-agent varenicline or bupropion if varenicline is contraindicated. Finally, patients who are not eligible to receive varenicline or bupropion receive NRT alone in the form of nicotine patches for 12 weeks. All patients receive medical counseling.

Patient counseling is provided largely by the managing physician who also provides pharmacotherapy when appropriate. Although counseling by a psychiatrist is offered to patients visiting the clinic, patients do not typically select such counseling, more often requesting that the overseeing physician (regarding drug and overall management of the patient) also provides the necessary counseling. On their first visit, patients are measured for CO levels and level of dependence, and also counseled for approximately 20 min. Counseling involves understanding various patient characteristics including smoking history and habits, extent of physiological and psychological addiction and emotional triggers, motivation and readiness to quit, externalities such as the patient's family/work environment, and available resources and support. During the session, addiction and the rationale for drug therapy is explained to the patient and mechanisms relevant to the

patient's situation are suggested to address potential barriers to compliance with cessation. Self-help brochures are also distributed to patients. Follow-up counseling sessions lasting approximately 10 min are also incorporated in each subsequent patient visit and these address patient progress or relapse and mechanisms to maintain or improve cessation efforts.

Analysis

Patient characteristics, abstinence rates and reasons for failure were presented as counts and percentages. A comparison of patients who succeeded in quitting smoking and those who did not was carried out using χ^2 and t tests for the following variables: gender, level of education, marital status, type of cancer (diagnosis), Fagerström scores, baseline exhaled-CO level in ppm, age of the onset of smoking, a history of previous attempts to quit smoking, and the patient's perception of his/her level of motivation to quit smoking. A significance criterion of $p < 0.05$ was used in the analysis. All analysis was performed using SAS version 9.1 (SAS Institute Inc., Cary, N.C., USA).

Results

A total of 156 patients enrolled in the smoking cessation clinic program from February 2008 to October 2009. Table 1 shows the characteristics of these patients. The majority were males (71.8%). Most patients were married (86.5%) and approximately 60% of them had a level of education of high school or less. Less than 40% of referred patients had smoking-related cancers such as urinary bladder, head and neck, and lung cancers.

More than 60% of patients had begun smoking at the age of twenty or younger, but the majority had attempted to quit in the past and were motivated to attempt quitting again. In the initial evaluation, patients presented with average CO levels of 17.8 ppm and average Fagerström scores of 5.6. In addition, patients, on average, were smoking 16.6 cigarettes daily at the time of seeking cessation treatment. After clinical evaluation, more than 80% of the patients received some drug treatment for smoking cessation (varenicline, bupropion, NRT).

One year after beginning cessation therapy, only 33 patients (21.2%) had successfully quit smoking, the rest either failing to quit ($n = 103$) or being lost to follow-up or dead ($n = 20$). In table 2, patient characteristics are compared between those who succeeded in quitting versus all others. Having a high Fagerström dependence score (>6) was significantly associated with a failure to quit smoking. Specifically, among those with a high score, only 8.7% succeeded in remaining abstinent for 1 year, whereas 26.4% of those with a low Fagerström score succeeded ($p = 0.017$). Furthermore, frequency of smoking was significantly associated with the likelihood of ab-

Table 1. Characteristics of patients enrolled in the smoking cessation clinic

Variable	Percentage (n = 156)*
Average age at clinic visit	50.3 years
Gender	
Male	112 (71.8)
Female	44 (28.2)
Education	
High school or less	93 (59.6)
College/university	61 (39.1)
Marital status	
Married	135 (86.5)
Single/other	21 (13.5)
Cancer diagnosis	
Hematologic cancer diagnosis	25 (16)
Smoking-associated cancer diagnosis	54 (34.6)
Bladder/renal	26 (16.7)
Head and neck	19 (12.2)
Lung	9 (5.8)
Other solid tumor diagnosis	77 (49.4)
Number of cigarettes per day	
1–10	72 (46.2)
11–20	50 (32.1)
21–30	6 (3.8)
>30	28 (17.9)
Fagerström score	
≤ 6	110 (70.5)
> 6	46 (29.5)
Baseline CO (ppm)	
≤ 10	38 (26.0)
> 10	108 (74.0)
Age of smoking onset	
≤ 20	97 (62.2)
> 20	59 (37.8)
Previous attempts to quit	
Never attempted	25 (16)
Attempted at least once	129 (82.7)
Motivated to quit	
Very motivated	123 (80.4)
Somewhat motivated	21 (13.7)
Not motivated or neutral	9 (5.8)
Treatment received	
Counseling	25 (16)
Bupropion + NRT	22 (14.1)
Bupropion alone	3 (1.9)
Varenicline + NRT	91 (58.3)
Varenicline alone	14 (9)
NRT	18 (11.5)

* Column totals may not add up to 100% as a result of missing data.

Table 2. Characteristics of patients enrolled and the corresponding correlation of these characteristics with the success or failure to quit smoking at 12 months, using the χ^2 test

Variable	Success at 1 year (n = 33)	Failure/dropout (n = 123)	Total (n = 156)
Average age at clinic visit, years	49.9	50.4	50.3
Gender			
Male	23 (20.5)	89 (79.5)	112
Female	10 (22.7)	34 (77.3)	44
Education			
High school or less	18 (19.4)	75 (80.6)	93
College/university	15 (24.6)	46 (75.4)	61
Marital status			
Married	29 (21.5)	106 (78.5)	135
Single/other	4 (19.0)	17 (81.0)	21
Diagnosis			
Smoking-associated cancer ^a	14 (25.9)	40 (74.1)	54
Other cancers ^b	19 (18.6)	83 (81.4)	102
Number of cigarettes per day*			
1–10	32 (44.4)	40 (55.6)	72
11–20	1 (2.0)	49 (98.0)	50
21–30	0	6 (100)	6
>30	0	28 (100)	28
Fagerström score*			
≤6	29 (26.4)	81 (73.6)	110
>6	4 (8.7)	42 (91.3)	46
Baseline CO (ppm)			
≤10	12 (31.6)	26 (68.4)	38
>10	19 (17.6)	89 (82.4)	108
Age of smoking onset			
≤20	19 (19.6)	78 (80.4)	97
>20	14 (23.7)	45 (79.7)	59
Previous attempts to quit			
Never attempted	8 (32.0)	17 (68.0)	25
Attempted at least once	23 (17.8)	106 (82.2)	129
Motivated to quit			
Very motivated	29 (23.6)	94 (76.4)	123
Somewhat motivated	2 (9.5)	19 (90.5)	21
Not motivated or neutral	0	9 (100)	9
Treatment received			
Counseling	2 (8.0)	23 (92.0)	25
Bupropion ± NRT	6 (27.3)	16 (72.7)	22
Varenicline ± NRT	22 (24.2)	69 (75.8)	91
NRT	3 (16.7)	15 (83.3)	18

Percentages from row totals are shown in parentheses.

* Significant χ^2 statistic ($p < 0.05$).

^a Bladder/renal, head, neck, lung; ^b other solid tumors; hematologic cancers.

staining from smoking at 1 year ($p < 0.005$). Among heavy smokers (21 or more cigarettes daily), none had successfully quit smoking at the 1-year follow-up (and only 2% of those who smoked 11–20 cigarettes daily at baseline were abstinent at 1 year). However, among the least frequent smokers (1–10 cigarettes daily), 44.4% were

abstinent at 1 year. Finally, while not reaching statistical significance, there was a higher proportion of subjects who successfully abstained from tobacco use among patients with a higher educational attainment and patients with a lower CO level at baseline; patients who had attempted to quit in the past had a lower proportion of suc-

cessful abstinence relative to patients for whom the study was their first cessation attempt.

Reasons for failure according to the patients' own perceptions are shown in figure 1. The most common reason reported by patients who failed was an external stressor in almost 35% of cases (36/103 patients). Other major reasons included not being able to handle withdrawal (30.1%) and not seeing any value in quitting (24.3%).

Discussion

This study presents abstinence rates and reasons for the failure to quit smoking in cancer patients treated at a comprehensive cancer center. Three pharmacological regimens were available for smoking cessation at the time of the study: NRT, bupropion and varenicline. All patients who were diagnosed with cancer and referred to the smoking cessation clinic were followed up for 1 year. Only the Fagerström score and the daily number of cigarettes smoked had a significant correlation with the success of quitting smoking at 12 months.

The data demonstrate that the overall 1-year abstinence rates in cancer patients fall within the range of long-term abstinence rates reported in the general literature [21–23]. Abstinence rates specific to cancer patients are less documented and vary widely with high rates (greater than 50%) reported in a few studies and relatively low rates (20% or lower) in others [24].

Our data also showed that the regimens we used were well tolerated: less than 5% of our patients reported adverse effects related to medication as a reason to fail to quit smoking. Despite the fact that cancer patients are at increased risk for depression and suicide [25], none of our patients reported severe depression associated with suicidal ideation with the use of either varenicline or bupropion.

The most commonly reported reasons for failing to abstain were facing a challenging stressful situation and being unable to handle withdrawal symptoms, indicating that perhaps the provision of more focused interventions to control withdrawal symptoms or assist patients in managing their stress (e.g. by offering support such as quit lines) may be needed. The diagnosis of cancer did not seem to be an added motivational factor for patients to quit smoking. Approximately 24% of patients reported not seeing any value in quitting, suggesting that more intense motivational counseling may be needed to emphasize the implications of smoking on the cancer patient's treatment and prognosis.

Fig. 1. Reasons for the failure to quit smoking as reported by patients.

Patient-related factors that led to a failure to abstain were reported, but provider-related reasons may have contributed to the abstinence rates we observed. For example, the effect of combining varenicline with NRT has not been studied in clinical trials, although the rationale for this combination has proven valid in other combinations such as bupropion and NRT. Furthermore, another possible factor may have been that the use of NRT in the smoking cessation protocol was not optimal. Smith et al. [26] showed that combining different forms of NRT yielded better abstinence rates. Unfortunately, we were limited to one type of NRT available on the market (the nicotine patch). Nevertheless, while a suboptimal NRT was selected, our study reflected the 'real world' situation as it pertains to Jordan, and we reported results that can be achieved given the constraints in a developing country.

Our study has some limitations. It is a descriptive one, designed to provide preliminary results for one of the first operational smoking cessation clinics in the country. We could not make definitive statements about the effectiveness of different modalities of treatment and short-term (3-month or 6-month) abstinence information was not available. We provided only patient-reported 12-month abstinence rates. In addition, our study sample was not representative of all smoking cancer patients in the center, it reflected only patients who were willing and well enough to visit the clinic and begin cessation therapy. Specifically, our patient sample represented no more than 11% of patients visiting the King Hussein Cancer Center from February 2008 to October 2009. This low figure suggests a need, among clinicians managing can-

cer treatment in smokers, to organize and enforce a patient referral system for smokers who begin treatment at the center. Finally, the small sample size of our population may have prevented us from demonstrating a significant correlation of certain factors with patients' success in quitting smoking, such as their level of education and motivation and age at the onset of smoking.

Nevertheless, we now have more insight regarding 12-month abstinence rates in cancer patients who were willing to attempt cessation, bearing in mind that the availability of smoking cessation programs in cancer centers is low and data regarding such cohorts of patients are scarce and difficult to obtain [26]. Our results can be used both to inform clinical practice as well as provide insight for further studies to more rigorously evaluate therapies and improve abstinence rates.

Conclusion

In a sample of Jordanian cancer patients who smoked and received cessation therapy, the 1-year abstinence rate in patients was 21.2%, with common reasons for the failure to quit being personal or professional stressful situations and an inability to handle withdrawal symptoms. Efforts to improve these rates should focus on assisting patients in handling stress and in adjusting medications to improve withdrawal symptoms.

Financial Disclosure and Conflicts of Interest

None of the authors has any conflicts of interest.

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