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Correlates of Continued Tobacco Use and Intention to Quit Smoking Among Russian Cancer Patients

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Abstract

Background—Tobacco use among cancer patients is associated with adverse health outcomes. Little attention has been paid to tobacco use among cancer patients in developing countries, including Russia, where tobacco use is extremely high, and there is little public health infrastructure to address this issue.

Purpose—This study examined medical, socio-demographic, and psychological correlates of smoking status and intention to quit smoking among newly diagnosed Russian cancer patients.

Method—A cross-sectional study was conducted with 294 current or former smokers newly diagnosed with cancer.

Results—Compared with patients who quit smoking, patients who continued to smoke were more likely to report urges to smoke to satisfy positive reinforcing aspects of tobacco use. Compared with patients who were smoking and reported no intention to quit smoking in the next 3 months, patients who were smoking but intended to quit smoking reported higher levels of perceived risks associated with continued smoking and higher levels of self-efficacy to quit smoking.

Conclusion—As commitment to developing smoking cessation treatment programs for caner patients in Russia emerges, these data can help guide the development of behavioral interventions to assist patients with quitting smoking, enhancing their chances for improved clinical outcomes.

Keywords

Tobacco; Russia; Cancer patients; Smoking cessation

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Introduction

Despite the relatively well-known causal link between smoking and cancer risk, rates of current smoking among individuals diagnosed with cancer range from 46–75%, and 14%–58% continue to smoke after treatment [1]. Relapse rates among cancer patients increase after the completion of medical treatment as well [2] and about 14% of cancer survivors report current smoking [3]. Continued smoking by cancer patients and survivors can decrease survival time [4], increase risk for a second primary cancer [5], reduce medical treatment effectiveness [6,7], and diminish quality of life from complications following treatment, including pain [8,9].

Consequently, the commitment to developing and integrating smoking cessation treatment programs within the context of medical treatment for cancer patients has been steadily increasing [10]. The most effective treatment approach for nicotine dependence involves the use of pharmacotherapy to address the physical component of nicotine dependence (nicotine replacement therapy, bupropion, or varenicline) and behavioral counseling to address the psychological component of nicotine dependence [11]. To date, relatively few studies have evaluated behavioral and pharmacological smoking cessation interventions for cancer patients [10]. As researchers begin the development of smoking cessation interventions with cancer patients, these important efforts can be guided by descriptive studies that examine differences between patients who quit smoking and those who continue to smoke [2,12].

As new interventions for nicotine dependence are developed to assist cancer patients with quitting smoking, researchers should be mindful of the tobacco industry's focus away from developed countries and toward developing countries where there is often insufficient public health infrastructure to address nicotine dependence [13–15]. The Russian Federation, where the rate of smoking in the general population and among cancer patients far exceeds that reported in the USA and little is being done to address this public health problem [16,17], is an ideal country to focus efforts on smoking cessation intervention development. Only one previous study examined the prevalence and correlates of tobacco use among cancer patients in Russia [18]; this study indicated that 42% of patients were smokers and identified correlates of smoking, including being male, having lung cancer, and exhibiting low levels of knowledge concerning the negative effects of smoking, a low level of pros of quitting smoking, and a high level of cons of quitting smoking. This lone study with Russian cancer patients is insufficient to fully guide the development of smoking cessation treatment programs for this population of smokers. Indeed, one limitation of this previous study is that it did not focus on newly diagnosed patients.

Thus, this study examined differences between newly diagnosed Russian cancer patients who had quit smoking and newly diagnosed Russian cancer patients who continued to smoke and assessed differences between smokers who intended to quit smoking and those who did not intend to quit smoking. The selection of variables to examine as potential correlates of smoking behavior among Russian cancer patients was guided by previous research in this area [18] as well as by theories of smoking behavior. Consistent with the self-medication model of nicotine dependence [19], this study examined affect (e.g., depression) as a correlate of smoking behavior and intention to quit smoking. Likewise, consistent with social-cognitive models of nicotine dependence [20], we examined self-efficacy and perceptions of risk as correlates of smoking behavior and intention to quit smoking. Further, consistent with the trans-theoretical model of smoking [21], we assessed the pros and cons of quitting smoking as correlates of smoking behavior and intention to quit smoking. Lastly, consistent with neurobiological models of nicotine dependence [22], we assessed nicotine withdrawal and nicotine craving as correlates of smoking behavior and intention to quit smoking. Previous studies with cancer patients in the USA have associated

smoking behavior with negative effect, the pros and cons of quitting, risk perceptions, and self-efficacy [23,24].

The data that emerge from this exploratory, descriptive study may help guide the design of smoking cessation interventions for Russian cancer patients that are based on empirical data from this population. This study will complement our previous study with Russian cancer patients and, ultimately, will enhance efforts to lower the global rate of tobacco use and tobacco-related disease morbidity and mortality.

Method

Participants

Data were collected from 513 consecutive cancer patients attending a large cancer center in the Russian Federation for medical treatment. To be eligible for the study, patients had to have a diagnosis of head and neck, lung, or colorectal cancer, be age 18 or older, and be diagnosed within the past 30 days. Seventeen patients refused to participate in this study (participation rate=98%) and 219 patients indicated never smoking. These three tumor sites were selected since their etiology is associated with tobacco use and they represent relatively larger cohorts, versus other tumor sites. Data from the former and current smokers (*n*=294) were used for the present study since the constructs to be evaluated lacked relevance and meaning for patients who had never smoked (e.g., pros and cons of quitting, reasons for smoking) and the focus of this study was on differences between former and current smokers and current smokers who did or did not intend to quit smoking.

The sample was comprised of 102 head and neck cancer patients (25%), 65 lung cancer patients (22%), and 127 colorectal cancer patients (43%); 82% of the sample were male, 80% were married, and 48% of the sample had at least some college education. The average age of participants was 56.6 years (SD=12.1 years) and the average income of participants was $8,240 (US dollars; SD=$24,838).

Procedures

All materials, including informed consent forms and measures, were translated into Russian. Patients diagnosed with head and neck, lung, or colorectal cancer attending the N.N. Blokhin Russian Cancer Research Center in Moscow, Russia were approached in clinic by a trained research assistant (RA). The RA used a daily physician schedule to identify eligible patients in terms of disease site and time since diagnosis. The RA approached patients on a consecutive basis, collected written informed consent, and determined willingness to complete an assessment of tobacco use and potential correlates of tobacco use. Once the patient consented, the RA conducted the assessment in a private area of the clinic. Participants were given $5.00 US (~150 Rubles) for completing the assessment to compensate them for their time and effort. All smokers were given a smoking cessation brochure translated into Russian (e.g., Smoking: Facts and Tips for Quitting; [25]). The assessment took about 45 min to complete.

Measures

Demographic and Medical Data and Smoking-Related Data—Each patient was asked to complete a brief questionnaire which assessed tobacco use (i.e., age started, years smoked, level of nicotine dependence assessed with the Fagerstom Test for Nicotine Dependence [26], previous attempts to quit, current smoking rate), socio-demographic information (i.e., gender, marital status, income, education), and medical characteristics (i.e., tumor site, previous cancer diagnosis) as done previously [18].

Psychological Correlates of Smoking—These variables were selected based on their previous association with smoking behavior among cancer patients [2,18,23,24], based on theoretical models of tobacco use in a medical context [27], or based on general theoretical models of nicotine dependence [19–22]. Symptoms of depression and anxiety were assessed using the Center for Epidemiologic Studies Depression Scale (CES-D; [28]) and the Spielberger State-Trait Anxiety Inventory (STAI; [29]); each of these 20-item scales has been widely used in the oncologic context and have demonstrated good psychometric properties (e.g., [30]). In the present study, the ranges and internal consistencies (Cronbach's alpha) for the CES-D and the STAI were 0–48 and .89 and 24–73 and .84, respectively. We used the 21-item Post-Traumatic Growth Inventory (PTGI; [31]) to evaluate positive emotional reactions to the cancer diagnosis. The PTGI yields subscales for: Appreciation of Life, Relating to Others, New Possibilities, Personal Strength, and Spiritual Change. The PTGI has shown good psychometric properties in the oncologic context [32]. In the present study, the ranges and internal consistencies for the overall scale and subscales were as follows: 0–100, .95; 0–15, .84; 0–30, .86; 0–25, .83; 0–20, .85; and 0–20, .78, respectively.

The 10-item Reasons for Smoking Scale (RFS; [33]), used previously with cancer patients [18], was administered. The RFS has two subscales: smoking for stimulation (e.g., smoking helps me think and concentrate) and smoking to reduce negative affect (e.g., when I feel uncomfortable or upset about something, I light a cigarette). The range and internal consistency for the overall scale was 10–40 and .90 and for each subscale the range and internal consistency was 4–16 and .81 and 3–12 and .84, respectively. The 25-item Shiffman–Jarvik Withdrawal Scale [34] assessed if and to what degree individuals experienced nicotine withdrawal symptoms. Items from this scale were divided into three subscales that measured psychological withdrawal symptoms, craving withdraw symptoms, and physical withdrawal symptoms. The ranges and internal consistencies for these subscales were as follows: 5–31, .60; 5–35, .80; and 3–21, .43, respectively. The 32-item Questionnaire of Smoking Urges [35] was used to assess craving for nicotine (i.e., positive and negative reinforcement cravings), an important dimension of nicotine dependence. The scale yields two subscales, one for each aspect of nicotine craving. The ranges and internal consistencies for the subscales were 15–95 and .87 and 11–74 and .91, respectively. We used the trans-theoretical model decisional balance scale to assess the pros and cons of quitting smoking [36]. This scale consists of eight pros (range=10–43; internal consistency=. 78) and eight cons of quitting (range=10–50; internal consistency=.82). Self-efficacy was assessed using a 10-item self-efficacy measure used previously with cancer patients (e.g., I have confidence in my abilities to quit smoking for good; [2,12]). The range and the internal consistency of the self-efficacy scale were 10–40 and .96. Perceptions of risk was assessed using a seven-item scale used previously with cancer patients (e.g., smoking after a diagnosis of cancer will greatly increase the chance of a recurrence; [2,18]). The range was 7–28 and the internal consistency was .96.

Smoking Status and Readiness to Quit Smoking—Smoking status was defined as current (i.e., smokes regularly, or cut down, or once in a while), former (i.e., used to smoke, but no longer does), or never (i.e., never smoked even a puff of one cigarette) smoker as done previously [18] and recommended in the context of cancer patient smoking [37]. The never smokers were excluded from these analyses. Intention to quit was assessed as willingness (yes or no) to quit smoking in the next 3months.

Statistical Analyses

First, frequency distributions were constructed for smoking status and intention to quit smoking. Second, analysis of variance and chi-square tests were used to assess the association of each predictor (e.g., self-efficacy, age) with smoking status and intention to

quit smoking. Interval and/or ratio variables (e.g., perceived risk, age) were treated as continuous in the analyses, whereas ordinal or nominal predictors (e.g., gender, tumor site) were treated as categorical. Next, variables identified as related to the outcome variables in the univariate analyses ($p<.10$) were entered into separate multivariate logistic regression analyses for each outcome, controlling for type I error and multicollinearity. For the multivariate regression analyses, odds ratios, and 95% confidence intervals were computed. Although other options for missing data are possible (e.g., mean substitution), a list-wise deletion method was used to handle missing data (i.e., only participants with data on a given comparison were used for the respective analyses), given the exploratory and descriptive nature of this study. The entire sample was used for smoking status (n=294), but only smokers were used for intention to quit smoking (n=140).

Results

Frequency of Tobacco Use and Intention to Quit Smoking

Assessment of smoking status showed that of the 294 patients included in the present analyses (because of a history of tobacco use), 140 were smokers (47.6%) and 154 were former smokers (52.4%). With regard to intention to quit smoking among those patients identified as current smokers, 76 patients indicated that they intended to quit smoking in the next 3 months (67%), whereas 38 patients indicated that they did not intend to quit smoking in the next 3 months (33%); 26 current smokers did not indicate an intention to quit smoking.

Univariate Correlates of Tobacco Use and Intention to Quit Smoking

As shown in Table 1, the following variables were statistically associated with smoking status (current vs. former): age, level of education, cancer type, craving withdrawal symptoms, physical withdrawal symptoms, psychological withdrawal symptoms, smoking for stimulation, smoking for negative affect reduction, positive reinforcement craving, negative reinforcement craving, risk perceptions, and self-efficacy.

As shown in Table 1, the following variables were statistically associated with intention to quit smoking: craving withdrawal symptoms, positive reinforcement cravings, negative reinforcement cravings, smoking for negative affect reduction, risk perceptions, and self-efficacy.

Multivariate Models for Tobacco Use and Intention to Quit

One variable remained as a significant correlate of smoking status in the multivariable regression model: positive reinforcement craving (see Table 2). As shown in Table 1, compared to former smokers, current smokers report higher levels of positive reinforcement craving.

Likewise, two variables remained as significant correlates of intention to quit smoking in the multivariate regression model: risk perceptions and self-efficacy (Table 2). As shown in Table 1, patients who reported an intention to quit smoking reported higher levels of risk perceptions and higher levels of self-efficacy to quit smoking, compared with patients who reported no intention to quit smoking in the next 3 months.

Discussion

With a view toward the development of smoking cessation interventions for cancer patients in Russia, this study examined differences between cancer patients who smoke and cancer patients who had quit smoking and examined differences between cancer patients who

intend or do not intend to quit smoking. The complexities and challenges of cancer treatment and the negative attitudes associated with tobacco use among cancer patients [27,38], along with potential cultural differences between the USA and Russia, indicate the need to explore correlates of smoking behavior in this population instead of simply targeting this population with existing behavioral smoking cessation interventions. Below, we highlight the main findings from this study, the study limitations, and the directions for future research in this area.

First, as suggested by a previous study [18], smoking among cancer patients in Russia represents a serious public health problem. In the present study, almost one half of patients with a smoking history that were surveyed reported continued tobacco use. This rate is somewhat lower than reported in our previous study with Russian cancer patients [18] but still greatly exceeds the figure of about one third that is thought to represent the general smoking prevalence rate among US cancer patients [27]. Moreover, a third of Russian cancer patients who continue to smoke indicated in this study that they have no intention of quitting smoking. This rate is far greater than studies conducted with US cancer patients who smoke [23,24]. Overall, these data replicate our earlier findings and underscore the high rate of tobacco use and low rate of intention to quit smoking among Russian cancer patients [18]. Further, these results highlight that smoking cessation interventions are critically needed for this subgroup of smokers but that interventions may need to be specifically designed to promote motivation to quit smoking. For instance, motivational interviewing, which has been shown to be effective among numerous clinical populations, may be a useful therapeutic approach for Russian cancer patients [39].

Second, the present analyses revealed three variables that, controlling for numerous other predictors, differentiated between current and former smokers and patients who intend or do not intend to quit smoking. First, patients who continue to smoke report significantly higher levels of cravings to smoke for positive reinforcement, compared with former smokers. That is to say, that patients who continue to smoke persist in their endorsement, to a significantly greater extent, of the anticipation of pleasure from smoking, compared to patients who have been able to quit smoking. While this is the first time this form of nicotine craving has been associated with smoking behavior among cancer patients, this result converges with the general literature ascertained with US smokers on craving and smoking behavior [40]. But, this result suggests that craving for positive reinforcement (vs. craving for negative reinforcement) plays a larger role in continued smoking among Russian cancer patients. Therefore, interventions for Russian cancer patients who continue to smoke may need to consider procedures for addressing this unique aspect of craving in order to help patients quit smoking. Two components may be necessary to address this aspect of craving in order to promote abstinence. Pharmacotherapy, including nicotine replacement therapy and varenicline, help smokers quit by mitigating abstinence-induced cravings [41,42], so these medications would be expected to be an important part of helping Russian cancer patients to quit via craving reduction. But, behavioral interventions are also critical for addressing craving. In particular, cognitive strategies such as positive self-talk, understanding the time course of craving, and relaxation techniques and behavioral strategies such as developing activities to distract from craving or substitute for the perceived benefits of smoking have been found to be effective at reducing craving and preventing smoking behavior [40].

Second, patients with greater intentions to quit smoking exhibited higher levels of perceived risk of the adverse health effects from smoking. This result converges with our previous study with Russian cancer patients [18] and with a longitudinal study of American cancer patients [2]. The consistency of this link between perceived risk and smoking behavior among cancer patients further strengthens the rationale for smoking cessation interventions to target this psychological process with cancer patients in order to promote smoking

cessation. Cancer patients in Russia are likely unaware of the growing literature from the USA and Europe showing that continued smoking following a cancer diagnosis diminishes treatment efficacy, increases the risk for a recurrence or a second-primary tumor, and worsens quality of life and, as such, educational programs to enhance Russian cancer patient awareness of the health benefits of cessation among cancer patients are likely critical to increase motivation to quit and actual cessation [38]. Such an intervention could be integrated into formal smoking cessation treatment programs, delivered in conjunction with pharmacotherapy, or conveyed via self-help smoking cessation manuals or brochures.

Lastly, as with risk perceptions, patients who reported a greater sense of self-efficacy (i.e., self-confidence) to quit smoking exhibited a greater intention to quit smoking. Again, this result replicates our previous finding with Russian cancer patients [18] and converges with data collected from US cancer patients [23] and with non-cancer patients [20]. Smoking cessation interventions for Russian cancer patients should utilize techniques to strengthen patient self-efficacy to quit smoking in order to promote cessation. A recent review summarized various methods for promoting self-efficacy in the context of nicotine dependence that have been studied [43]. The goal of the intervention approach is the same: to develop within the smoker the firm conviction that they possess the ability to quit smoking. Self-help material with descriptions of previous patients who have successfully quit smoking can help build confidence. Brief advice to divide the process of cessation into smaller, more achievable components, may also help facilitate self-efficacy. More structured, multi-session interventions may offer the best chance to help the smoker develop self-efficacy since, in such a setting, the smoker can work with the counselor to devise and implement strategies to quit smoking and avoid relapse, reflect on their achievements, refine, replace, or strengthen the cessation plan, witness periods of abstinence, and experience the emerging confidence that accompanies incremental yet meaningful accomplishments.

The results from this study, however, should be viewed with consideration of study limitations. The study was cross-sectional and the analyses were correlational; as such, no causal interpretations are warranted from these data. In addition, patient reports of smoking status were not biochemically verified in this study. This may have led to an under-reporting of tobacco use and, compared with our previous study with Russian cancer patients, the rate of smoking reported here was lower (48% vs. 66%; [18]). Likewise, our simple categorical measure of intention to quit may not have captured the complexity of motivation to quit smoking. Further, the present study was conducted at a single institution in Moscow, used measures that have not been widely used in the Russian Federation, used certain measures that were different from past studies with US cancer patients, involved patients with tobacco-related cancers, and used a sample that was predominantly male. Thus, future studies designed to identify correlates of tobacco use and intention to quit smoking among Russian cancer patients should utilize a longitudinal design, use biochemical verification procedures, use standardized measures for constructs from US studies with cancer patients, utilize additional recruitment sites, and include a more heterogeneous sample of patients in terms of tumor site and gender in order to enhance generalizability of results to cancer patients in general.

Nevertheless, the present study is only the second study to attempt to address issues related to the smoking behavior of Russian cancer patients in hopes of stimulating efforts to develop smoking cessation interventions for this sub-group of smokers. The results of this study provide further evidence that there is a critical need for smoking cessation clinical interventions for cancer patients in Russia. Further, these findings, coupled with our previous studies of Russian cancer patients [18] and American cancer patients [2], identify several important targets for smoking cessation interventions. In addition to

pharmacotherapy to help manage the physical dimension of nicotine dependence and abstinence-induced craving, behavioral treatments for Russian cancer patients should target self-efficacy beliefs, perceptions of risk, and the use of nicotine for positive reinforcement to address the psychological dimension of nicotine dependence. The development and formal testing of this intervention approach, based on data accumulated from the target population, is needed in hopes of reducing the substantial public health problem of continued tobacco use by Russian cancer patients.

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Table 1

Summary of univariate analyses for smoking status (Top) and intention to quit (Bottom)

Predictor				***p* Value**
	Current Smokers N (%) or M (SD)	**Former Smokers N (%) or M (SD)**	**χ^2 or F**	
Cancer Type			17.98	<.01
Lung	35 (54%)	30 (46%)		
Head and Neck	62 (61%)	40 (39%)		
Colorectal	43 (34%)	84 (66%)		
Age (df=1, 292)	54.5 (11.9)	58.5 (12.0)	8.1	<.01
Education (df=1, 291)	4.2 (1.6)	4.5 (1.4)	3.3	.07
Withdrawal-Craving (df=1, 227)	17.1 (7.5)	9.1 (5.2)	84.9	<.01
Withdrawal-Physical (df=1, 231)	8.2 (3.7)	6.8 (3.4)	8.3	<.01
Withdrawal-Psychological (df=1, 220)	17.0 (5.7)	14.8 (5.7)	8.2	<.01
RFS-Stimulation (df=1, 227)	8.1 (3.2)	5.9 (2.7)	31.2	<.01
RFS-Reduce Negative Affect (df=1, 229)	7.8 (2.7)	5.0 (2.6)	61.3	<.01
Craving-Positive Reinforcement (df=1, 211)	54.5 (15.9)	31.0 (15.3)	118.7	<.01
Craving-Negative Reinforcement (df=1, 213)	30.5 (13.6)	21.6 (11.9)	61.4	<.01
Risk Perception (df=1, 162)	21.7 (4.6)	24.5 (4.0)	16.7	<.01
Self-efficacy (df=1, 142)	27.7 (5.9)	35.0 (5.2)	58.3	<.01
	Yes Intention M (SD)	No Intention M (SD)	F	
Withdrawal-Craving (df=1, 106)	16.3 (7.2)	19.6 (7.0)	5.0	<.05
RFS-Reduce Negative Affect (df=1, 79)	7.4 (2.8)	8.6 (2.5)	4.8	<.05
Craving-Positive Reinforcement (df=1, 105)	52.3 (14.6)	59.5 (16.2)	5.2	<.05
Craving-Negative Reinforcement (df=1, 105)	29.7 (12.5)	35.0 (15.7)	3.4	.07
Risk Perception (df=1, 83)	22.8 (4.0)	19.0 (5.2)	13.6	<.01
Self-efficacy (df=1, 76)	28.8 (5.6)	24.2 (5.5)	11.3	<.01
PTGI-Spiritual Change (df=1, 82)	14.7 (7.5)	13.6 (6.6)	2.8	.10

M = Mean; SD = Standard Deviation; df = Degrees of Freedom

Table 2

Summary of multivariate logistic regression analyses

Model	OR	95% CI	*p* Value
Smoking Status[a]			
Age	.99	.94–1.0	.64
Education	1.32	.90–1.9	.16
Cancer Type	.57	.18–1.8	.35
Withdrawal-Craving	.99	.89–1.1	.94
Withdrawal-Physical	1.0	.87–1.2	.65
Withdrawal-Psychological	1.0	.91–1.1	.67
RFS-Stimulation	1.0	.76–1.3	.93
RFS-Reduce Negative Affect	.88	.67–1.2	.35
Craving-Positive Reinforcement	.89	.85–.95	<.01
Craving-Negative Reinforcement	1.0	.98–1.1	.16
Risk Perceptions	1.1	.91–1.2	.45
Self-Efficacy	1.1	.98–1.2	.11
Intention to Quit[a]			
Withdrawal-Craving	1.0	.92–1.1	.68
RFS-Reduce Negative Affect	1.1	.85–1.5	.41
Craving-Positive Reinforcement	.99	.93–1.1	.75
Craving-Negative Reinforcement	1.0	.95–1.1	.74
Risk Perceptions	.83	.71–.97	.02
Self-Efficacy	.86	.71–.97	.03
PTGI-Spiritual Change	.92	.82–1.0	.16

OR odds ratio; *CI* confidence interval

[a]Participants classified as: current smoker (0) or former smoker (1)

[b]Participants classified as: yes (0) or no (1)