

RESEARCH ARTICLE

Smoking Habits of Relatives of Patients with Cancer: Cancer Diagnosis in the Family is an Important Teachable Moment for Smoking Cessation

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Abstract

Background: In this study we aimed to determine the rate and habitual patterns of smoking, intentions of cessation, dependence levels and sociodemographic characteristics of relatives of patients with a diagnosis of cancer. **Materials and Methods:** This study was designed by the Turkish Oncology Group, Epidemiology and Prevention Subgroup. The relatives of cancer patients were asked to fill a questionnaire and Fagerstrom test of nicotine dependence. **Results:** The median ages of those with lower and higher Fagerstrom scores were 40 years and 42 years, respectively. We found no evidence of variation between the two groups for the remaining sociodemographic variables, including the subject's medical status, gender, living in the same house with the patient, their educational status, their family income, closeness to their cancer patients or spending time with them or getting any help or wanting to get some help. Only 2% of the subjects started smoking after cancer was diagnosed in their loved ones and almost 20% of subjects had quit smoking during the previous year. **Conclusions:** The Fagerstrom score is helpful in determining who would be the most likely to benefit from a cigarette smoking cessation program. Identification of these people with proper screening methods might help us to pinpoint who would benefit most from these programs.

Keywords: Cancer - smoking habits - fagerstrom score - relatives of cancer patients

Asian Pacific J Cancer Prev, 14 (1), 475-479

Introduction

Cancer is a significant shock to relatives of cancer patients just as it is to cancer patients themselves. Therefore, relatives of cancer patients themselves should adopt a healthier lifestyle both as a precaution for themselves and also as a good example for their loved ones with cancer.

Tobacco consumption is a major health problem for both the cancer patients themselves, and also for their relatives. But, smoking cessation is a challenging course and management of these people is important because of their social and psychological vulnerability. Unfortunately, there is limited data about this group of smokers in the literature. We found only three studies regarding the smoking status of the relatives of lung cancer patients, and there was no study that was conducted in people with other cancer types (McBride et al., 2003; Bousman et al., 2010; Butler et al., 2011).

According to the results of Global Adult Tobacco Survey (2008) smoking incidence in Turkey is about 31.2% of the young and adults over 15 years of age [Global Adult Tobacco Survey, Turkey Report]. Furthermore, according to GLOBOCAN 2008 report of International Agency for Research on Cancer (IARC), the age standardized cancer incidence in Turkey for both sexes is 144.8/100,000 [<http://globocan.iarc.fr/factsheets/populations/factsheet.asp?uno=792>]. As can be seen in these reports, both incidences of smoking and cancer are relatively high in Turkey. It might be anticipated that cancer patients and their relatives could have higher smoking incidences when compared to the general population.

In the present study we aimed to determine the rate and habitual patterns of smoking, intentions of cessation, dependence levels and socio-demographic characteristics of relatives of patients with a diagnosis of cancer. The idea was to explore the possibility of using the occasion of a diagnosis of cancer for cessation efforts.

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Materials and Methods

This study was designed by the Turkish Oncology Group, Epidemiology and Prevention Subgroup, and carried out with the cooperation of seven centers in Turkey. Participant centers were medical, preventive, and radiation oncology clinics of Universities of Elazig, Sivas, Ankara, Adana Baskent, Hacettepe, Marmara, and Gazi. The subjects of the study were the relatives of cancer patients, who were accompanying the treatment course of their patients, either in outpatient or inpatient settings. Participant were asked to fill a questionnaire which consists questions about demographics of both themselves and their patients; the rest of the survey was only about themselves and consisted questions about their former and current smoking habits, intentions of cessation, and general perceptions about smoking bans. Also, Fagerstrom test of nicotine dependence was embedded into the survey for determining the level of addiction. Support staff of the clinics helped for filling the questionnaire when the relatives were disabled for any reason.

Statistical analysis

We used SPSS version 13.0 (SPSS Inc., Chicago, IL, USA) for the statistical analysis. Data were presented as mean, median, or percent where appropriate. For the non-normally distributing numerical data, Mann-Whitney U test and Wilcoxon Signed Ranks test were utilized for the comparisons of independent and dependent groups, respectively. Between-group comparisons of categorical variables were analyzed with Chi-Square test. A binomial test was used for comparing the quit rates of the relatives of the cancer patients with the rates (5%) declared in the literature [Hughes et al. 2004, Center for Disease Control and Prevention]. A p value of <0.05 was accepted as statistically significant for all analyses.

Results

A total of 560 subjects who have relatives of patients with cancer were evaluated in this study. Characteristics of cancer patients of this study are presented in Table 1, and characteristics of relatives of these patients are

Table 1. Baseline Demographics Of Cancer Patients

	N	%	
Sex	Male	298	54
	Female	262	46
Age	Overall (Mean±SD)	57.0±12.7	p <0.001
	Male (Mean±SD)	59.2±12.9	
	Female (Mean±SD)	55.2±12.3	
Cancer site	Breast	114	20.4
	Lung	80	14.3
	Colorectal	65	13.4
	Non-colorectal GIS	75	11.6
	Hematological	42	7.5
	Gynecological	14	2.5
	Head and Neck	12	2.1
	Other	40	7.1
Not specified	118	21.1	

*GIS: Gastrointestinal system

Table 2. Baseline Demographics of Cancer Patients' Relatives

		n	%
Age (Mean ± SD)		47.6±12.4	
Sex	Male	322	57
	Female	238	43
Marital Status	Married	390	70
	Single	126	22
	Widow	12	2
	Not specified	32	6
Relationship	Mother-Father	12	2.1
	Sibling	60	10.7
	Child	241	43
	Spouse	137	24.5
	Other	86	15.4
	Not specified	24	4.3
Living in the same house	Yes	320	57.2
	No	236	42.1
	Not specified	4	0.7
How often together with the patient	Every day	379	67.7
	Few times a week	86	15.4
	Once a week	25	4.5
	Less	70	12.4
Level of education	Literate	35	6.3
	Primary	216	38.6
	High	142	25.4
	University	165	29.5
Household income	<1000 TL	225	40.2
	1001-3000 TL	209	37.3
	>3000 TL	77	13.8
	Not specified	49	8.7
Smoking status	Yes	242	43.2
	No	315	56.3
Tobacco use other than cigarette	Yes	23	4.1
	No		
Being aware of nicotine level	Low	40	7.1
	Moderate	82	14.6
	High	41	7.3
	Don't know	76	13.6
	Not specified	321	57.3

represented in Table 2. The median number of cigarettes used by smokers was 15. The median number of years of cigarette smoking was 25 years. Each subject was also scored according to the Fagerstrom Scale. Age varied significantly with Fagerstrom score. Thus, the median age of those with lower and higher Fagerstrom scores were 40 years and 42 years, respectively (p<0.001).

Sociodemographic characteristics of subjects that were based on their smoking status varied with sex and with educational status, as expected (Table 3). However, we found no evidence of effects on sociodemographic characteristics of subjects due to marital status, living in the same house, family income, closeness to the cancer patient (i.e., as a first or second degree relative), or the amount of time spent with the cancer patients (Table 3).

Sixty-six percent of subjects reported that they had some sort of a plan to quit smoking. However, twenty-three percent of subjects had no plan to quit smoking and 33% were slightly interested in quitting smoking. Only 14% of subjects said that they were seriously considering quitting smoking. However, 33% of subjects reported that

Table 3. Socio-demographic Characteristics According to the Smoking Status

	Smoker		Non-Smoker		p
	n	%	n	%	
Marital status					
Married	170	75	217	72	0.538
Single	49	22	77	26	
Widow	6	3	6	2	
Sex					
Male	64	27	169	54	<0.001
Female	177	73	143	46	
Living in the same house					
Yes	138	57	182	58	0.913
No	102	43	132	42	
Educational level					
Literate	9	4	25	8	0.009
Primary	94	39	122	39	
High	76	31	66	21	
University	63	26	102	32	
Household income					
<1000 TL	102	44	123	44	0.977
1001-3000 TL	93	41	116	41	
>3000 TL	34	15	43	15	
Relationship					
Primary	188	78	261	83	0.126
Secondary	54	22	54	17	
Time spent together					
Few times a week	198	82	267	85	0.354
Lesser	44	18	48	15	

they very much wanted to quit smoking and 28% reported that they would like to quit smoking. Thus, more than 60% of subjects believed that quitting smoking was desirable. Only 8% of the subjects reported that they had some help for quitting smoking but 52% said that they would like to get some help. Recently there have been important legislative restrictions on smoking in public places and when we asked whether these restrictions had any effect on their quitting smoking, 50% answered 'yes,' 29% did not respond, and only 20% answered 'no'.

We divided the subjects between two groups: those with low and high Fagerstrom scores based on their smoking. Only three sociodemographic variables differed between the two groups: (1) whether the subject accepted legislation that restricted smoking (2) the strength of the subject's willingness to quit smoking, and (3) the extent of the subject's plans to quit smoking (Table 4). We found no evidence of variation between the two groups for the remaining sociodemographic variables, including the subject's medical status, gender, living in the same house with the patient, their educational status, their family income, closeness to their cancer patients or spending time with them or getting any help or wanting to get some help. Only 2% of the subjects started smoking after cancer was diagnosed in their loved ones and almost 20% of subjects had quit smoking during the previous year. Subjects were most likely to have quit smoking during the previous year if their loved ones had been diagnosed with lung cancer or with breast cancer and this was highly significant comparing to people who quit smoking for more than one year.

We classified subjects into three groups: those who

Table 4. Fagerstrom Score and Smoking

		Low		High		p
		n	%	n	%	
Sex	Female	33	27	18	21	0.358
	Male	89	73	66	79	
Living in the same house	Yes	76	62	44	52	0.156
	No	46	38	40	48	
Educational level	Literate	4	3	4	5	0.183
	Primary	45	37	33	39	
	High	34	28	30	35	
	University	39	32	18	21	
Household income	<1000 TL	58	49	31	39	0.266
	1001-3000 TL	43	36	38	47	
	>3000 TL	18	15	11	14	
Relationship	Primary	101	83	68	80	0.61
	Secondary	21	17	17	20	
Spending time together	Few times a week	103	84	69	81	0.539
	Lesser	19	16	16	19	
Effectiveness of smoking bans	No	44	36	44	48	0.028
	Yes	77	64	41	52	
Seeked for professional aid	No	113	94	75	92	0.458
	Yes	7	6	7	8	
Wanting professional help	No	55	46	37	45	0.86
	Yes	65	54	46	55	
Obeying smoking bans	No	10	8	17	20	0.012
	Yes	112	92	67	80	
Planning to quit in near future	No	33	27	34	41	0.045
	Yes	87	73	49	59	
Thoughts of quitting	Don't want to	38	31	31	36	0.001
	Indecisive	6	5	5	6	
	Want to	77	64	49	58	

never smoked cigarettes, those who had quit smoking and those who were already smoking (Table 5). We then evaluated whether the cancer diagnosis had made any difference in each of the three groups. Lung cancer and breast cancer appeared to have the greatest effects. Their ages were different. Subjects who had quit smoking were significantly older, they were more frequently male, and they were better educated, their marital status, living in the same house with the patient, the family income, or closeness to the cancer relative, or spending time with them did not vary in any of the three groups.

As a final analyze, we compared the quit rates of the relatives of the cancer patients with the spontaneous quit rates that reported in the literature. When we searched the relevant articles, we found that quit rates were approximately 5% for spontaneous quitting. We concluded to accept a cut-off value of 10% for spontaneous quitting, and to compare our spontaneous quit rates with this value. We over-estimated this value as 10% because we wanted to show the significance of the effect of a cancer diagnosis in the relatives for quitting smoking. Then we utilized a

Table 5. Socio-demographics According to Smoking Status

	Never-smoker (%)	Ex-smoker (%)	Smoker (%)	p
Relatives' age				
Median	40	48	40.5	<0.001
Diagnosis of patient				
Breast	20.5	25	31.2	0.047
Lung	14.5	16.7	22	
Colorectal	13.3	25	11.3	
Non-colorectal GIS	21.7	11.9	15.6	
Hematological	12	6	8.6	
Gynecological	3	4.8	2.2	
Head and Neck	3.6	3.6	1.6	
Other	11.4	7.4	7.5	
Sex				
Female	62.5	37.4	26.8	<0.001
Male	37.5	62.6	73.2	
Marital Status				
Married	65.2	86.7	75.3	
Single	34.3	8.6	21.9	
Widow	0.5	4.7	2.8	
Living in the same house				
Yes	58.7	56.5	58.1	0.932
No	41.3	43.5	41.9	
Educational level				
Literate	8.2	8.4	3.8	0.019
Primary	37.5	40.7	39	
High	20.2	23.1	30.9	
University	34.1	27.8	26.3	
Household income				
<1000 TL	44.1	43.8	44.4	0.999
1001-3000 TL	40.3	41.7	40.4	
>3000 TL	15.6	14.6	15.2	
Relationship				
Primary	83.3	80.6	77.1	0.258
Other	16.7	19.4	22.9	
Spending time together				
Few times a week	83.3	85.2	82.6	0.839
Lesser	16.7	14.8	17.4	

Binomial test and compared this cut-off value with the quit rates of our study group. Our rate was 20%, and this value was significantly different from the value declared in the literature ($p < 0.001$, Binomial test).

Discussion

Among the relatives of cancer patients, the fraction that consisted of those who were planning to quit smoking but who were not actively doing anything about it totaled 66%. Although they wanted to quit smoking or very much wanted to quit smoking, they were not getting any help with that, but they would like to get some help with that. Subjects tended to believe that the legislation that restricted tobacco use had some effect on their attitude towards smoking. Subjects with a high Fagerstrom score were less inclined to quit smoking.

Web-based automated programs and mobile phone-based interventions may be useful cost effective for smoking cessation (Myung et al., 2009; An et al., 2010). But, physicians believe that advice to quit is least irritating and most effective when a patient has a diagnosis of smoking-related illness (Coleman et al., 2000). Moreover, some studies have shown patients receptivity

to addressing preventive health behaviors among their families at the time of the cancer diagnosis (Kristeller et al., 1996; Schilling et al., 1997). But, the results published by Schilling et al showed that 91% of smoking family members still smoked following an educational intervention about the benefits of smoking cessation.

Diagnosing a patient with cancer and the subsequent events that the patient experiences are described as "teachable moments" for smoking cessation (Gritz et al. 1993; Demark-Wahnefried et al., 2000; Ostroff et al., 2001). In a public health perspective, teachable moment can be described as negative health events that can prompt individuals to adopt risk-reducing behaviors (Patterson et al. 2010). A negative health event such as cancer can both encourage the patients themselves, and their relatives to gain an attitude against cancer, and can lead to positive activities such as referring to a physician for cancer screening, or activities like smoking cessation.

A diagnosis of cancer may be an opportunity to quit of smoking among patients and their families. The diagnosis may be teachable moments for smoking cessation in relatives of patients with cancer (McBride et al., 2003; Fiore et al., 2008). Although a number of studies have suggested that family members of patients who have diagnosed cancer are impacted (Baider et al., 1998; Sarna 1998; Fang et al., 2001), the diagnosis of cancer alone may not motivate relatives to spontaneously quit for family members. Nearly three fourths of smoking family members of lung cancer patients stated that their motivation to quit smoking had increased after diagnosis of the lung cancer in their family members, and they planned to quit in the next 6 months (Butler et al., 2011).

When evaluating the smoking cessation behaviors of individuals we preferred the relatives of cancer patients for two main reasons. First, they were more willing to quit smoking as a "teachable moment" because of their relatives' cancer diagnoses, and secondly they were in a more complex psychological condition that can challenge their quitting status. We believe that this second condition balances the bias for quitting that was born by the first situation. Although more than 40% of smokers make a quit attempt each year, only about 5% experience long-term success (3-12 months) (Hughes et al., 2004, Center for Disease Control and Prevention). But nevertheless, as our binomial comparisons showed the significance, the spontaneous quit rates are higher than the normal population.

The two main indices for assessing a smoker's addiction level are Fagerstrom test of nicotine dependence, and pack-year calculation of smoking exposure. Absolute pack-year assessment can be confusing in many situations like changes in smoking habits over years. So, we generally prefer to assess Fagerstrom tests for deciding the dependence levels. In our study we divided our study group according to higher and lower Fagerstrom test scores (scores over 6 was considered as highly dependent group). These groups did not significantly differ for their sociodemographic characteristics. The main differences were for personal attitudes like subject's willingness and planning for cessation, and the effects of smoking restrictions in public areas. Subjects with

higher Fagerstrom scores were less willing and planning to quit smoking, and less compatible to smoking bans in public areas. These data were irrespective from any other personal characteristics. This finding is precious, because it suggests that self-administered Fagerstrom test of nicotine dependence can be useful for determining the individuals that can be most benefit from smoking-cessation interventions.

This is the first study that evaluates Fagerstrom test of nicotine dependence scores in a population of cancer patients' relatives. When the global burden of cancer across the world is considered, and when most of the cancer patients' being bound to their relatives' help for accessing health services is taken in to account, we can presume that health professionals can promote smoking cessation in these population in a health-facility setting by evaluating their dependence level with a brief self-administered form. Identification of people that should have most benefit from smoking-cessation therapies and interventions by Fagerstrom scaling would serve for the health-service providers to achieve a notable awareness for a non-smoking population. Also, as an important point of view, diagnosis of a cancer in the relatives is one of the major motivations for smoking cessation.

In conclusion, the Fagerstrom score is helpful in determining who would be the most likely to benefit from a cigarette smoking cessation program. Identification of these people with proper screening methods might help us to pinpoint who would benefit most from these programs. Cancer diagnosis is a major teachable moment for quitting smoking.

Acknowledgements

This study was designed by the Turkish Oncology Group, Epidemiology and Prevention Subgroup, and carried out with the cooperation of seven centers in Turkey.

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