

Smoking and its psychiatric comorbidity among a sample of inpatients in a general hospital in Cairo

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Objectives

This study aimed at estimating the prevalence of smoking in patients who were admitted to departments of neurology, chest, oncology, and general surgery of a general hospital in Cairo over a 6-month period. It also aimed at determining the relationship between smoking, stress, anxiety, depression, and personality characteristics in those patients.

Patients and methods

A selective sample comprising patients who were admitted to departments of neurology, chest, oncology, and general surgery of a general hospital in Cairo every Tuesday over a 6-month period was included in the study. The patients were fully conscious and cooperative; their ages ranged from 18 to 60 years. The patients were classified into four categories: current, past, passive, and nonsmokers. The Smoking Questionnaire, The Symptom Checklist-90-R, the Eysenck Personality Questionnaire, the Social Readjusting Rating Scale, the Beck Anxiety Scale, and the Beck Depression Inventory were used.

Results

Most of the patients (64%) were admitted to neurology or chest departments (32.7 and 31.3%, respectively). The smoking groups (current and past smokers) showed a male predominance (90 and 93.1%, respectively) in comparison with passive smokers and nonsmokers (60 and 61.3%, respectively). Most of the current smokers belonged to the 'mild anxiety' and 'severe anxiety' categories (70 and 26%, respectively). Among the past smokers, 58.6% had mild anxiety, 27.6% had severe anxiety, and 13.8% had low anxiety. Eighty percent of current smokers had mild and moderate depression (62 and 18%, respectively), and 69% of past smokers had mild and moderate depression (55.2 and 13.8%, respectively), with a high statistical significance ($P < 0.001$). Most of the current smokers had mild or severe stress (54 and 28%, respectively), whereas most passive and nonsmokers had normal stress levels (55 and 61.3%, respectively). Current and passive smokers showed the highest mean levels on the symptom checklist (2.788 ± 0.467 and 2.825 ± 0.426 , respectively). Similarly, the highest mean levels of psychoticism were reported among current smokers (18.78 ± 3.259). The highest mean level of neuroticism was reported among current smokers (19.46 ± 2.032).

Conclusion

Current smokers have higher anxiety, depression, stress, and psychoticism personality characteristics.

Keywords:

personality, psychiatric comorbidity, smoking

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Introduction

Smoking is the act of burning dried or cured leaves of the tobacco plant and inhaling the smoke for pleasure or ritualistic purposes, or more commonly out of a habit and to satisfy addiction (Gately, 2001). Tobacco use is the primary predisposing cause of many diseases. In addition, smoking exacerbates many diseases. Cigarette smoking is the reason for ~90% of lung cancers in men and 80% of those in women. Tobacco use is the major cause of cancers of the head and neck, including cancers of the lips, tongue, mouth, salivary glands, pharynx, larynx, trachea, and esophagus. Cigarette smoking accounts for between 40 and 70% of bladder cancers

and ~30% of pancreatic cancers (Hamilton, 2003). Cigarette smoking is directly responsible for almost all cases of chronic obstructive pulmonary disease. Smoking also aggravates bronchial asthma; it also increases the risk of stroke to about three-folds. One-fourth of all strokes can be directly attributed to cigarette smoking (Rantakallio *et al.*, 1995). Smoking is associated with a wide variety of other diseases and adverse health effects (Caroline *et al.*, 2012).

Psychiatric disorders affect ~30% of patients admitted to medical or surgical wards and are a major cause of morbidity, mortality, low adherence, functional disability, and higher healthcare costs (Kouimtsidis *et al.*,

2003; Egede, 2007). Early diagnosis and treatment of psychiatric comorbidity can have a positive influence on these aspects (McCusker *et al.*, 2007; Strong *et al.*, 2008).

Smoking is related to stresses of life. Depression and anxiety are predisposing factors to smoking, and they can emerge on nicotine overdose or nicotine withdrawal (Brandton *et al.*, 2000). Tobacco smoking has been found to be more common among patients with major psychiatric disorders, such as schizophrenia and affective disorders (Breslau *et al.*, 1998), than in the general population (Goff *et al.*, 1992; De Leon *et al.*, 1995). The rate of smoking was highest (50–93%) among those with schizophrenia (Hughes *et al.*, 1986; Diwan *et al.*, 1998).

Aim of the work

This study aimed at estimating the prevalence of smoking in the patients who were admitted to departments of neurology, chest, oncology, and general surgery of a general hospital in Cairo over a 6-month period. It also aimed at determining the relationship between smoking, stress, anxiety, depression, and personality characteristics in those patients.

Patients and methods

After ethical and scientific approvals were obtained from Kasr El-Aini Psychiatry Ethical and Scientific Committee, a selective sample comprising patients who were admitted to departments of neurology, chest, oncology, and general surgery of a general hospital in Cairo every Tuesday over a 6-month period was included in the study. The patients were fully conscious and cooperative. Patients with mental retardation and disturbed conscious levels and those who were uncooperative were excluded from the study. Patients who were younger than 18 years or older than 60 years of age were also excluded. Written informed consent was obtained from each patient. To explore the effect of smoking, patients were classified into four categories: current, past, passive, and nonsmokers. The first group, namely, current smokers, referred to individuals who had smoked regularly during the past year. The second group, namely, past smokers, referred to individuals who had not smoked regularly during the previous year, but had smoked regularly in the past. The third group, namely, passive smokers, referred to respondents who were neither current nor past smokers but were exposed to cigarette (tobacco) smoke in the household as a result of another person smoking. The fourth group, namely, nonsmokers, referred to those who had neither smoked during the past year nor at any time before this period, nor were exposed to cigarette (tobacco) smoke as a result of a smoker in the household. This group was taken as the control group. All patients were subjected to the following measures:

(1) *Smoking Questionnaire*: It is a semistructured self-administered questionnaire that helps in collecting data on smoking.

- (2) *The Symptom Checklist-90-R (SCL-90-R)* (Derogatis, 1983 translated by El-Beheery, 1984): The Arabic version of SCL90 was used. It measures nine psychological symptoms on a five-point Likert-type scale, namely, somatization, obsession, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. It yields nine subscores and a total score of psychological distress. It is designed to evaluate a broad range of psychological problems and symptoms of psychopathology. It is also useful in measuring the progress and outcome of psychiatric and psychological treatments or for research purposes.
- (3) *Eysenck Personality Questionnaire (EPQ)* (Eysenck and Eysenck, 1968): The Arabic version of the EPQ was used (Abo-Nahya, 1989). It is composed of 90 statements to which individuals respond to by 'yes' or 'no'. It has five scales that measure the dimensions of extraversion–introversion, neuroticism, psychoticism, and psychopathic deviation, in addition to a Lie Scale.
- (4) *Social Readjusting Rating Scale*: This Social Readjustment Rating Scale was developed by Thomas Holmes and Richard Rahe, University of Washington School of Medicine, to provide a standardized measure of the impact of a wide range of common stressors. The scoring on this scale is as follows: a score of 300 + , at risk of illness; 150–299 + , moderate risk of illness; and 150–, only a slight risk of illness. It measures stressful life events to assess their correlation to morbidities (Holmes and Rahe, 1967).
- (5) *Beck Anxiety Scale (the Arabic version)* (Beck *et al.*, 1988): This inventory for measuring anxiety is a self-reported scale designed to assess the severity of anxiety symptoms over the past 2 weeks. The inventory is composed of 21 items that are scored on a 0–3 scale corresponding to no, mild, moderate, or severe anxiety symptomatology. The score varies from 0 to 63, wherein a higher score indicates greater anxiety severity. The scoring is as follows: A score in the range of 0–7 indicates no or minimal anxiety; 8–15 mild anxiety; 16–25 indicates moderate anxiety; and 26–63 indicates severe anxiety.
- (6) *Beck Depression Inventory (BDI) (the Arabic version)* (Beck *et al.*, 1988): It is a self-reported scale designed to assess DSM-IV-defined symptoms of depression such as sadness, guilt, loss of interest, social withdrawal, increase and decrease in appetite or sleep, suicidal ideation, and other behavioral manifestations of depression over the past 2 weeks. It can also be used over time to monitor symptoms and to assess the response to therapeutic interventions. The inventory is composed of 21 groups of statements on a four-point scale, with the individual selecting the one that best matches his or her present state. Each statement group corresponds to a specific behavioral manifestation. The responses are scored on 0–3, corresponding to no, mild, moderate, or severe depressive symptoms. The score range varies from 0 to 63, wherein a higher score indicates greater depression severity. According to Beck *et al.* (1988),

a score in the range of 0–13 indicates no or minimal depression, 14–19 indicates mild depression, 20–28 indicates moderate depression; and 29–63 indicates severe depression. It was translated to Arabic by Gharib abdel Fattah and has been used in many studies.

Statistical analysis

All the results were tabulated and statistically analyzed by means of suitable statistical tests using Statistical Package for the Social Science (SPSS Inc., Chicago, Illinois, USA) version 15 for Microsoft Windows. Relations between smoking and each of age, SCL-90-R scores, levels of psychoticism, neuroticism, and extraversion, and Lie Scale scores were presented in figures of mean, SD, minimum, and maximum, and the analysis of variance test was applied for test of significance. Relations between smoking and each of sex, presence of diseases, Beck Anxiety Scale scores, Beck Depression Scale scores, General Health Questionnaire scores, and Social Readjusting Rating Scale scores were cross-tabulated, and the χ^2 -test was applied for test of significance. A significant test was considered when the *P* value was less than 0.05, and when it was less than 0.001, the test was considered highly significant.

Results

The age of the patients ranged from 18 to 60 years, with a mean of about 40 years. Of these patients, 115 (76.7%) were males and 35 (23.3%) were females (Table 1). Current smokers comprised 50 patients (33.3%); their mean age was 38.78 ± 11.87 years. Past smokers comprised 29 patients (19.3%); their mean age was 39.17 ± 14.51 years. Passive smokers comprised 40 patients (26.7%); their mean age was 40.83 ± 12.72 years. Nonsmokers comprised 31 (20.7%) patients; their mean age was 45.06 ± 11.97 years (Table 2). Most of the patients (64%) were admitted to neurology or chest departments (32.7 and 31.3%, respectively), whereas only 36% were admitted to oncology or surgery departments (18% each) (Table 3). The smoking groups (current and past smokers) showed a male predominance (90 and 93.1%, respectively) in comparison with passive smokers and nonsmokers (60 and 61.3%, respectively), with a statistical significance ($P < 0.001$) (Table 4). Neurological patients were mostly past or passive smokers (32.7 and 30.6%, respectively), chest patients were mostly current or passive smokers (34% each), oncology patients were mostly current smokers or nonsmokers (33.3 and 37.1%, respectively), and surgery patients were mostly current smokers (59.23%), with a statistical significance ($P = 0.004$) (Table 5). Most of the current smokers belonged to the 'mild anxiety' and 'severe anxiety' categories (70 and 26%, respectively). Among the past smokers, 58.6% had mild anxiety, 27.6% had severe anxiety, and 13.8% had low anxiety ($P < 0.001$) (Table 6). Eighty percent of current smokers had mild and moderate depression (62 and 18%, respectively) and 69% of past smokers had mild and moderate depression (55.2 and 13.8%, respectively), with a high statistical significance

Table 1 Sex distribution among the studied group

	Frequency	%
Males	115	76.7
Females	35	23.3
Total	150	100

Table 2 Smoking state

	<i>N</i> (%)
Current smokers	50 (33.3)
Past smokers	29 (19.3)
Passive smokers	40 (26.7)
Nonsmokers	31 (20.7)

Table 3 Distribution of included patients according to the departments

	<i>N</i> (%)
Neurology	49 (32.7)
Chest	47 (31.3)
Oncology	27 (18.0)
Surgery	27 (18.0)
Total	150 (100)

Table 4 The relation between smoking state and sex

Smoking state	Sex [<i>N</i> (%)]		
	Males	Females	
Current smokers	45 (90)	5 (10)	$P < 0.001^*$
Past smokers	27 (93.1)	2 (6.9)	
Passive smokers	24 (60)	16 (40)	
Nonsmokers	19 (61.3)	12 (38.7)	
Total	35 (23.3)	115 (76.7)	

*Statistically significant.

($P < 0.001$) (Table 7). Most of the current smokers had moderate to high risk to illness (54 and 28%, respectively), whereas most of the passive and nonsmokers had a slight risk to illness (55 and 61.3%, respectively), with a statistical significance ($P = 0.002$) (Table 8).

Current and passive smokers showed the highest mean scores on the symptom checklist (2.788 ± 0.467 and 2.825 ± 0.426 , respectively), with a high statistical significance ($P < 0.001$) (Table 9). Similarly, the highest mean values were observed among the current smokers with regard to psychoticism (18.78 ± 3.259), with a highly statistically significant difference ($P < 0.001$). The highest mean level of neuroticism was observed among the current smokers (19.46 ± 2.032), with a high statistical significance ($P < 0.001$). As regards extraversion, the highest mean levels were observed among the current smokers (17.30 ± 2.787), with a statistical significance ($P < 0.001$). The highest mean values on the Lie Scale were observed among the current smokers (19.28 ± 2.416), with a highly significant difference ($P < 0.001$) (Table 10).

Discussion

In our study, the mean age of the patients included was 40.7 years; most of them (76.7%) were male, denoting

Table 5 The relation between smoking state and different diseases

Smoking state	Diseases [N (%)]				Total [N (%)]	
	Neurology	Chest	Oncology	Surgery		
Current smokers	9 (18.4)	16 (34)	9 (33.3)	16 (59.3)	50 (33.3)	<i>P</i> <0.04*
Past smokers	16 (32.6)	7 (14.9)	2 (7.4)	4 (14.8)	29 (19.3)	
Passive smokers	15 (30.6)	16 (34)	6 (22.2)	3 (11.1)	40 (26.7)	
Nonsmokers	9 (18.4)	8 (17.1)	10 (37.1)	4 (14.8)	31 (20.7)	
Total	47	47	27	27	150 (100)	

*Statistically significant.

Table 6 Smoking state and Beck Anxiety Scale scores

Smoking state	Beck Anxiety Scale [N (%)]			Total [N (%)]	
	Low anxiety	Mild anxiety	Severe anxiety		
Current smokers	2 (4)	35 (70)	13 (26)	50 (33.3)	<i>P</i> <0.001*
Past smokers	4 (13.8)	17 (58.6)	8 (27.6)	29 (19.3)	
Passive smokers	25 (62.5)	10 (25)	5 (12.5)	40 (26.7)	
Nonsmokers	13 (41.9)	10 (32.3)	8 (25.8)	31 (20.7)	

*Statistically significant.

Table 7 Smoking state and Beck Depression Scale scores

Smoking state	Beck Depression Scale [N (%)]				Total [N (%)]	
	Euthymic	Mild depression	Moderate depression	Severe depression		
Current smokers	7 (14)	31 (62)	9 (18)	3 (6)	50 (33.3)	<i>P</i> <0.001*
Past smokers	7 (24.1)	16 (55.2)	4 (13.8)	2 (6.9)	29 (19.3)	
Passive smokers	20 (50)	15 (37.5)	2 (5)	3 (7.5)	40 (26.7)	
Nonsmokers	25 (80.6)	3 (9.7)	2 (6.5)	1 (3.2)	31 (20.7)	
Total	59	65	17	9	150 (100)	

*Statistically significant.

Table 8 Smoking state and Social Readjusting Rating Scale scores

Smoking state	Social Readjusting Rating Scale [N (%)]			
	Slight risk	Moderate stress	At high risk	
Current smokers	9 (18)	27 (54)	14 (28)	<i>P</i> <0.002*
Past smokers	14 (48.3)	10 (34.5)	5 (17.2)	
Passive smokers	22 (55)	9 (22.5)	9 (22.5)	
Nonsmokers	9 (18)	8 (25.8)	4 (12.9)	

*Statistically significant.

Table 9 The relationship between smoking state and the Symptom Checklist-90-R scores

	Mean	SD	Minimum	Maximum	
Current smokers	2.788	0.467	2.0	3.7	<i>P</i> <0.001*
Past smokers	1.941	0.078	1.8	2.1	
Passive smokers	2.825	0.426	1.9	3.7	
Nonsmokers	1.332	0.271	1.0	1.7	

*Statistically significant.

a male predominance among patients admitted to the hospital because of smoking-related comorbidities. This can be explained by the fact that men have more freedom in our community to smoking; in contrast, female smoking is a more or less recent phenomenon. This finding is in agreement with the results of Celikel *et al.* (2009) and Botega *et al.* (2010).

In our study, the prevalence of smoking among the patients included was 86%, including the current, past, and passive smoker groups. This reflects the high

prevalence of smoking in our locality, which can be explained by the social and cultural acceptance of smoking in our communities and because of the influence of popular public figures who smoke, such as movie stars. Moreover, current smokers represented the largest number among patients admitted to hospital, reflecting the magnitude of danger that current smoking poses on health and hospital admission. Similar results were obtained by Sitas *et al.* (2004). Moreover, Carvajal *et al.* (2000) and Crone and Reijneveld (2007) reported found that the prevalence of smoking is still high among young adults. The prevalence of smoking among Turkish youths ranges between 30 and 63% (Erdogan and Erdogan, 2009). The prevalence of nicotine dependence ranges from 17 to 21% in Brazil (Oliveira *et al.*, 2008), with reports suggesting that the rate tends to increase among university students (Akvardar *et al.*, 2004; Senol *et al.*, 2006).

In our study, most of the patients with smoking-related diseases presented to neurology and chest departments. This reflects the direct hazards of smoking on the central nervous system and lungs. Smoking can cause many central nervous system and lung diseases. Similar results were obtained by Wagena *et al.* (2005) and Lawrence *et al.* (2009).

We found that most of the current smokers and past smokers showed mild to severe anxiety, whereas most of the passive smokers showed low anxiety. This is in agreement with the results of Baker-Morissette *et al.* (2004), Zvolensky *et al.* (2008), and Lawrence *et al.*

Table 10 The relation between smoking state and the Eysenck Personality Questionnaire dimensions

	Current smokers		Past smokers		Passive smokers		Nonsmokers		P
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Psychoticism	18.78	3.259	11.90	0.976	15.70	1.572	7.87	3.1	0.001*
Neuroticism	19.46	2.032	16.45	1.378	13.42	3.210	7.65	3.282	0.001*
Extraversion	17.30	2.787	8.28	1.251	12.80	2.738	4.84	2.865	0.001*
Lie Scale	19.28	2.416	9.86	4.086	14.93	3.025	5.74	3.386	0.001*

*Statistically significant.

(2010), who reported this positive association between smoking and anxiety disorder. In addition, nicotine might trigger and increase anxiety symptoms (Zvolensky and Bernstein, 2005; Zvolensky *et al.*, 2005).

However, Jeffrey *et al.* (2000) reported that cigarette smoking may not be associated with a risk of anxiety disorder. Moreover, Dierker *et al.* (2001), Lopes *et al.* (2002), and Rohde *et al.* (2003) did not find any correlation between cigarette smoking and anxiety disorder.

In addition, we found anxiety more common among current smokers compared with other groups. This is in agreement with the results of Bradley *et al.* (2009), who reported that current regular smokers had greater anxiety when compared with former and nonsmokers.

In our study, past smokers had anxiety levels ranging from mild to severe. This is in contrast to the results of West and Hajek (1997), who reported that cessation of cigarette smoking was associated with a decline in anxiety over a 4-week period of smoking abstinence.

In this study, the current and past smokers had mild and moderate depression, whereas most of the passive and nonsmokers had euthymic or mild depression. A similar result on the association between smoking and depressive symptoms was reported by Zvolensky *et al.* (2008). Moreover, Joseph *et al.* (2010) reported a cause and effect relationship between smoking and depression, in which cigarette smoking increased the risk of symptoms of depression. However, Lopes *et al.* (2002) found no correlation between smoking and depression.

In our study, 80% of current smokers had mild and moderate depression, whereas 80.6% of nonsmokers were euthymic. This indicates that smoking is associated with an increased risk of developing depression and underlines the potentially harmful consequences of smoking for mental health and supports efforts to prevent and stop smoking.

Similar to our results, Acton *et al.* (2001) reported that current smokers had higher depressive symptoms compared with nonsmokers.

An explanation to the above observations can be found in the study by Herrán *et al.* (2000), who reported a strong association between smoking and mental disorders. Nicotine interferes with the functioning of neurotransmission systems and exerts various neuroendocrine effects, which, together with the other effects of

nicotine, can influence the psychopathological profile of the patient.

Our study showed that most (82%) of the current smokers showed a moderate to high risk of illness on the 'social readjustment rating scale' (i.e. moderate to high susceptibility to illness and mental health problems) and higher stress. Moreover, nonsmokers showed low susceptibility to mental health problems. This is in agreement with the results of Heiligenstein and Smith (2006). In addition, Rondina *et al.* (2007) reported that smoking is highly prevalent and is associated with mental health problems. This finding is in agreement with those of Leung *et al.* (2010), who reported that psychological distress is strongly associated with current smoking. However, Todorova *et al.* (2010) reported that smoking has no role in perceiving stress.

Our results showed that psychoticism and extraversion were most prevalent among current smokers, followed by passive smokers, then past smokers, and lastly nonsmokers. This finding can be explained again by the social acceptance of the habit of smoking compared with that of other substances of abuse and dependence, or by the rewarding effect of nicotine that makes the smoker more social and extraverted. A comparable result was obtained by Arai *et al.* (1997), who reported that current and ex-smokers had an increased prevalence of psychoticism and extraversion compared with nonsmokers. Many studies support our results. Spielberger and Jacobs (1982) reported that smokers had significantly higher scores compared with nonsmokers as regards psychoticism and extraversion on the 'EPQ'. In addition, Hopper *et al.* (1992) and Rondina *et al.* (2007) reported that smokers present more traits of psychoticism and tend to be more extroverted.

During the past decades, most studies demonstrated that smokers tend to achieve higher scores in terms of extroversion when compared with nonsmokers (Spielberger and Jacobs, 1982). However, in some studies, and in contrast to our results, this association was not confirmed (Kubička *et al.*, 2001).

Gilbert (1997) reported that the association between smoking and extraversion has decreased in the recent decades, possibly because smoking has become a socially undesirable habit in many countries. Smokers might have been punished in situations of interaction, reversing the tendency toward association with this personality trait. This may explain why some studies found an association between smoking and extraversion and others did not.

Our study revealed that current smokers showed highly significant levels of neuroticism, followed by past smokers, and the lowest levels were observed among the nonsmokers. Passive smokers showed intermediate results. This is in agreement with the results of Bergen and Caporaso (1999), who reported a positive association between smoking and neuroticism. Our results are in agreement with those of Rondina *et al.* (2007), who reported that smokers tend to show more traits of neuroticism than do ex-smokers or nonsmokers.

Data in the literature on neuroticism are inconsistent. Numerous studies published during past decades showed a relationship between smoking and neuroticism (Spielberger and Jacobs, 1982). However, this association was not detected in some studies (Seltzer and Oechsli, 1985).

The controversy among the results on the relationship between smoking and neuroticism remains, probably because of the fact that smokers are not a homogenous group (Arai *et al.*, 1997; Rondina *et al.*, 2005). People smoke for different reasons and therefore can be influenced simultaneously by individual variables and situational factors. Nevertheless, in contrast to the extraversion factor, the relationship between neuroticism and smoking is more consistent and seems to have grown considerably during recent decades (Gilbert, 1997). In our study, current smokers showed highly significant higher scores on the Lie Scale, followed by passive smokers, then past smokers, and lastly nonsmokers. This is in contrast to the results of Spielberger and Jacobs (1982), who reported that smokers had significantly lower scores on the Lie Scale compared with nonsmokers.

Acknowledgements

Conflicts of interest

There are no conflicts of interest.

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