Original Article

Smoking dependence and common psychiatric disorders in medical students: Cross-sectional study

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ABSTRACT

Objectives: Exploring the variable effect of the degree of smoking dependence on the level of anxiety and depression symptoms among medical students.

Methodology: This cross-section study, conducted in the Department of Pharmacology, College of Medicine, Al-Mustansiriya University, Baghdad-Iraq from December 2010 to May 2011, involving 300 medical students selected by cluster random sampling techniques. Those students completed the Hamilton rating scale for anxiety, Zung self-report depression scale and the Fagerstrom test for nicotine dependence with a value of six or more regarded as heavy smokers, and a value less than six considered as light smokers.

Results: The response rate was 89%, heavy smokers were significantly older and start smoking at an earlier age than non- and light smokers (p=0.001). Heavy smokers associated with high chance of depressive symptoms in comparison with non-smokers (OR=4.8, C.I.=1.752-13.677) and light smokers (OR=4.2, C.I.=1.042-17.161). Regarding anxiety symptoms, heavy smokers demonstrate high chance of anxiety symptoms in comparison with non-smokers (OR=5.2, C.I.=1.826-15.176), and light smokers (OR=4.5, C.I.=1.318-15.526).

Conclusions: Heavy smokers differ from non- and light smokers, associated with high risk of anxiety and depression, therefore heavy smoking tends to deteriorate rather than ameliorate these symptoms.

KEY WORDS: Anxiety, Depression, Medical Students, Nicotine Dependence.

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INTRODUCTION

Smoking is considered as the most common cause of mortality that can be prevented.[1] Compared to non-smokers, smokers have higher rates of cancer, heart disease, stroke, lung infections, and chronic lung disease, as well as decreased life expectancy.[2] Population-based and clinical studies demonstrate a significant link of smoking with psychiatric illness.[3] The prevalence of smoking in psychiatric outpatients were found to be 52% in comparison with only 33% in the general population; moreover, the rate of smoking differ according to the diagnosis, 88% in schizophrenia, 70% in manic disorders, 49% in depressive disorders, and 45% in anxiety disorders.[4]

Researchers explain the co-occurrence of tobacco smoking with mental illness by two different mechanisms. First, direct causative relationship, which means that patient with psychiatric illness have higher risk for smoking and less ability to stop smoking or that continues smoking eventually leads to psychiatric illness. Second, non-causative relationship and the seen co-incidence of smoking with psychiatric illness are due to shared environmental or genetic factors.[5]

Despite the arousing effects of nicotine, smokers report that cigarettes have a calming influence and relieve their anxiety.[6] Nevertheless, smokers display higher levels of anxiety symptoms than non-smokers.[7]

There is controversy regarding the relationship of smoking with depression. Diaz et al claims that no causative relationship occurs between smoking and depression and explains the co-incidence of both illnesses due familial and genetic factors.[8] On the contrary to the above, Patton et al demonstrate that depressive symptoms may enhance smoking initiation.[9] However, Goodman and Capitman show the reverse to the above study, that smoking increase the risk of depressive symptoms.[10]

The aim of the present study was to explore whether there is variable risk for common psychiatric disorders (anxiety and depression) among three different groups: non-smokers (never smoke before); light smokers (score less than six on The Fagerstrom Test for nicotine dependence FTND) and heavy smokers (six or more on FTND score).

METHODOLOGY

A cross sectional study was conducted in Al-Mustansiriya Medical College from December 2010 to May 2011. Students from all the academic years were involved in the study by selecting a sample of medical students from each academic year. A total of 300 medical students were registered in the study. Participants completed the following questionnaires:

1. The Hamilton Rating Scale for Anxiety (HAM-A): One of the commonest scales used in the clinical diagnosis of generalized anxiety disorders (GAD).[11] The internal consistency for this scale ranges from adequate (α = 0.77) to excellent (α = 0.92), test re-test reliability (α = 0.96) with inter-rater reliability of (α = 0.89). A total score of more than 16 is indicative of GAD.[12]
2. Zung Self-Report Depression Scale (Zung SDS): This scale composed of 20 items that covers a wide range of symptoms that occur in depressive patients like psychological, affective, cognitive symptoms. The Zung SDS composed of 10 positive and 10 negative statements. Each of these questions is scored on a 1 to 4 (a little of the time, some of the time, good part of the time, and most of the time). Zung SDS report 97% sensitivity and 63% specificity, a score of more than 50 regarded as depression.[13]
3. Fagerstrom Test for Nicotine Dependence (FTND): This is regarded as a good tool for measuring the degree of smoking dependence, because, as well as recording the number of cigarettes smoked per day; it measure many behavioral effect of nicotine dependence. A value of six or more regarded as heavy smokers, while a value of less than six considered as light smokers.[14]

The investigators spent about 45 to 60 minutes in each class. The investigators summarize the goals of the study to students and encourage them to participate by ensuring the anonymity and confidentiality of the questionnaire. Fully informed verbal consent was obtained from those who are willing to participate.

Statistical Analysis: The results are expressed as mean±SD for numerical variables, while expressed as number (%) for categorical variables. Statistical

Table-I: Students Demographic Data.

	Non-Smokers	*Light Smokers*	*Heavy Smokers*	*P Value*
Number	216/269 (80.6)	34/269 (12.6)	19/269 (7.1)	-
Gender (male/female)	102/114	28/6	17/2	0.0001*
Age	21.05 ± 1.75	21.6±1.83	22.53±1.47	0.001**
Age of start smoking	-	18.51±2.40	16.52±1.71	0.003†
FTND score	-	1.55±1.67	7.15±1.01	0.0001†

* Significant difference using chi-squared test.

** Significant difference using ANOVA test.† significant using independent sample t-test.

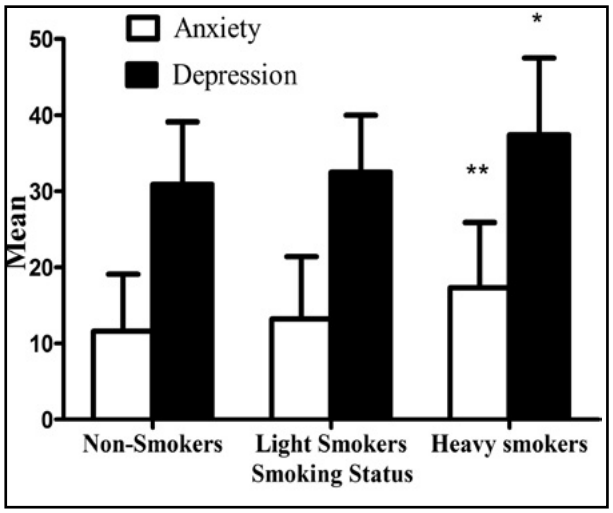

Fig.1: The mean difference of anxiety and depression of the three compared groups (non-, light and heavy smokers). *significant difference (p=0.004),
** significant difference (p=0.008).

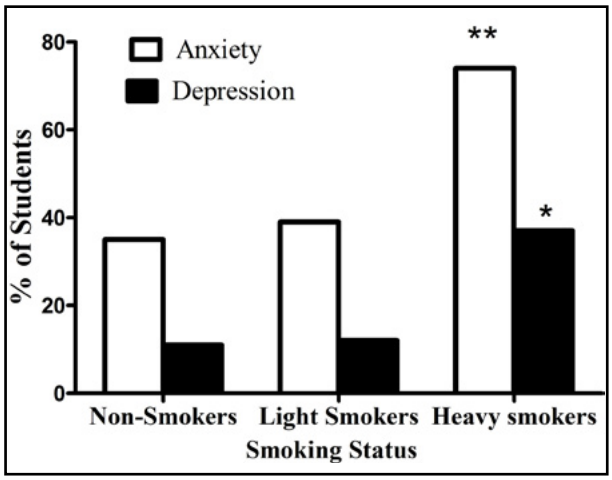

Fig.2: Percent of students with anxiety and depressive symptoms according to their smoking status. *significant difference (p=0.004),
** significant difference (p=0.004).

analysis was carried out using the PASW Statistics 18 software (SPSS Inc., Chicago, IL). Regarding numerical variables, independent sample T-test used for comparison between two groups, ANOVA test used for comparison of more than two groups, and post hoc analysis by Tukey test for the significance between groups. Categorical variables analyzed by using Pearson's chi square test (95% was assumed for P-value for all the tests mentioned above).

RESULTS

Two hundred and sixty nine medical students completed the study with a response rate of 89%, 54.6% of them are males and the other 45.4% are females. The prevalence of smoking among females was 6.6%, while among males was 30.6%, and the total prevalence of smoking among medical students was 19.7%. Regarding the age of participants, Table-I illustrates that heavy smokers had a statistically significant older age than non-smokers. Additionally, heavy smokers demonstrate statistically significant earlier age of onset of smoking than light smokers.

Moreover, Fig.1 below demonstrates that heavy smokers show significantly higher scoring of anxiety and depression in comparison with the other two groups.

Fig.2 display that within the non-smokers, the prevalence of anxiety disorder was 34.7%, while depression among the same group was 10.6%. Light smokers demonstrate higher prevalence than non-smokers in regard to anxiety and depression (38.2%, 12.1% respectively) but these changes were non- significant ($p > 0.05$). Heavy smokers in contrast to non- and light smokers, show very high prevalence of anxiety and depression than the above two groups. About 73.7% of heavy smokers express anxiety symptoms while 36.8% of them exhibit depressive symptoms ($p < 0.05$).

Table-II indicate that heavy smoking is significantly associated nearly 5 times higher risk than non- and light smokers in the incidence of anxiety disorder (odd: 5.26, C.I. 1.83-15.17). The same thing is shown regarding depression, heavy smoking display a statistically significant higher risk of depressive symptoms in comparison with non-smokers and light smokers (odd:4.8, C.I. 1.75-13.68) Table-III.

Table-II: The association of smoking status with Depression.

	X^2	*P Value*	*Odd Ratio*	*Class interval for the Odd*
Non-Smokers vs. Light Smokers	0.064	0.80	1.16	0.373-3.59
Light Smokers vs. Heavy Smokers	4.418	0.036*	4.229	1.042-17.161
Non-Smokers vs. Heavy Smokers	10.760	0.001*	4.895	1.752-13.677

* Significant difference using Chi-squared test.

Table-III: The association of smoking status with Anxiety.

	X^2	*P Value*	*Odd Ratio*	*Class interval for the Odd*
Non-Smokers vs. Light Smokers	0.159	0.690	1.164	0.552-2.455
Light Smokers vs. Heavy Smokers	6.129	0.013*	4.523	1.318-15.526
Non-Smokers vs. Heavy Smokers	11.267	0.001*	5.264	1.826-15.176

* Significant difference using Chi-squared test.

DISCUSSION

Conflicting results were seen from prior studies regarding the relationship between the degree of smoking dependence and common psychiatric disorders.[15] For example, Breslau and his colleagues in their study demonstrate significant correlation of smoking with depression and some anxiety disorders, but no difference were reported regarding the degree of smoking dependence.[16] Likewise, Farrell et al found a significant association of smoking dependence with psychiatric illness, but they did not differentiate between smokers according to their level of dependence.[17] Yet, Martinez-Ortega et al reported that high nicotine dependence associated with both high general health questionnaire-28 score and psychiatric morbidities.[18]

In the present study, we found that heavy smoking (high nicotine) in contrast to non- and light smoking associated with nearly five times increase in the risk of anxiety and depression among medical students.

Concerning smoking among medical students, recently, a multicenter study in European countries found that the prevalence of smoking was 29.3% which is higher than the general population.[19] Additionally, a study in Saudi Arabia found that medical students smoke more than the general population (39.8% had smoked before, 17.6% current smokers).[20]

Many published articles assert that anxiety and depression are very common in medical students.[21-24] The challenges of the rigorous medical curriculum and continuous exposure to human suffering makes medical students more liable for mental illness than the general population.[25]

The above triad of stress, smoking, and psychiatric disorders are highly dominated among medical students and it represents a vicious cycle.[26] Exposure to stress make smokers crave more for cigarette and smoke at higher intensity and rate. This high intensity and rate of smoking eventually leads to increase the sympathetic activity and the secretion of stress hormones.[27]

A previously published study demonstrate that cigarette smoking associated with (5.5), (6.8), (15.5) times risk of generalized anxiety disorder , agoraphobia, and panic disorder respectively.[28] In contrast to that, several studies show that patients with anxiety disorders tend to smoke more than the general population, those patients claims that smoking relief their stress and anxiety.[7]

A study done by Breslau et al found that history of major depression significantly increase the chance of future daily smoking by 3 times, while history of smoking at start associated with (1.9) chance of depression later on.[29] Another study demonstrate that smokers with prior history of nicotine dependence had a 7.5% incidence of first-episode major depression (OR=2.45), while those with no history of nicotine dependence showed an incidence of 3.2%.[2]

The implications gained from our study are that heavy smoking (high nicotine intake) tends to deteriorate rather than ameliorate the symptoms of depression and anxiety. Additionally, the behavior of nicotine in anxiety and depression may follow an inverted U shape simulating its effect in cognitive function i.e. with higher dose nicotine may have aversive rather than positive effect,[30] finally, it is well-known to medical students that smoking physically unhealthy, but incorrectly believe it has positive psychological effects.

The limitation of the present study includes: first, small sample size, second, symptoms-based depression self-report scale rather than diagnostic interview, third, depending on FTND score rather than measuring serum cotinine level. Prospective studies are required to further clarify the association between the degree of smoking dependence with anxiety and depression.

Our conclusions are that heavy smokers, differ from non- and light smokers, associated with very high risk of anxiety and depression. Smoking plus anxiety and depression form a vicious cycle leading to higher psychiatric morbidities among medical students, therefore to broke that cycle we need extensive education of medical students about the danger of smoking on their mental and

physical health. Starting smoking at an earlier age may increase the chance of heavy smoking later in life. Prospective studies among medical students are mandatory to measure the chronological development of both smoking from one side and psychiatric illness from the other side in the various stages of medical study.

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