Influence of smoking on duration and recurrence of hospitalization

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الخلاصة

الهدف من هذه الدراسة هو تقييم العلاقة بين تدخين السكائر والتغيير الحاصل في دخول المرضى الى المستشفى.ان للتدخين تاثيرات موثقة على معظم اعضاء الجسم اذ ت هناك بعض الدراسات التي بحثت العلاقة بين التدخين وبعض الامراض بصورة فردية في حين لم تكن هنالك دراسات كثيرة ركزت على العلاقة بين التدخين والتغير في دخول المرضى للمستشفى.

في هذه الدراسة تم حساب المعدلات السنوية لدخول المرضى للمستشفى لثلاث أمراض قلبية وعائية (احتشاء العضلة القلبية،الذبحة الصدرية،والجلطة الدماغية) وكذلك ثلاث أمراض تنفسية(الربو القصبي، مرض المجاري التنفسية ألانسدادي المزمن،والالتهابات التنفسية) للفترة من شهر آب 2007 إلى تموز 2010 وقد من البحث دراسة مجموعتين من المرضى:المجموعة الأولى (المجموعة الفعالة)شملت اخذ 164 مريض مدخن للسكائر اما المجموعة الثانية فقد ضمت 856 مريض غير مدخن.

ت الدراسة علاقة قوية بين التدخين ومدة بقاء المريض في المستشفى حيث كان معامل الثقة للرجال 2.77 والنساء 3.06 للمجموعة الفعالة مقارنة بمجموعة السيطرة كذلك وجدت الدراسة زيادة معنوية في معدلات تكرار دخول المرضى للمستشفى في المجموعة الفعالة بالمقارنة بمجموعة السيطرة.

Abstract

This study aimed to assess the relation between cigarette smoking and changes in hospitalization for some common cardiovascular and respiratory diseases. Cigarette smoking has well-documented effects on most organs of the body. Previous studies have linked smoking consumption to a considerable disease burden and large healthcare expenditures. However, findings from studies based on individual level data were sparse and inconclusive.

Few studies have examined the relation between smoking and patterns of admission to hospital.

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The annual rates of hospital admission attributable to three cardiovascular conditions (myocardial infarction, angina, and ischemic stroke) and three respiratory conditions (asthma, chronic obstructive pulmonary disease, and chest infection) were studied during the period from August 2007 to July 2010, 1164 smoker patients were taken as active group and 856 nonsmoker patients were regarded as never smoker group (control group).

Smoking status was strongly associated with increased duration of hospitalization. For smoking-related admissions (active group), odds ratios (OR) of 2.77 (95% CI 2.13–3.59) in men and 6.30 (95% CI 4.80–8.26) in women were observed among smokers compared to never-smokers. The study also showed a significant increase in the rate of recurrence of admission to the hospital ($p<0.05$) while nonsignificant changes in the control group. In addition the study revealed a significant association between smoking and increased rates of duration and recurrence of admission to hospital in women in comparison to men. The results of this study serve to expand the list of health outcomes that may be ameliorated by avoiding smoking .

Introduction

Tobacco has a negative effect on almost every organ of the body, tobacco use is the leading preventable cause of death in the United States, resulting in about 400,000 deaths each year. Worldwide, recent studies have shown that tobacco is responsible for about 6 million deaths each year (1).

The effects of smoking varies from person to person because it depends on the person's vulnerability to the chemical in cigarette or tobacco smoke. It will also depend on the number of cigarette that a person smokes per day, the age when the person first started to smoke, and the number of years the person has been smoking (2).

Active smoking is a well-established cause of acute myocardial infarction (AMI), and exposure to environmental tobacco smoke is estimated to increase the risk of AMI in nonsmokers by about 30% compared with no exposure. Even at low doses, environmental

tobacco smoke increases cardiovascular disease risk. It may also increase the risk of stroke in both men and women (3;4).

Effects of smoking on the body can be divided into short-term and long –term effects. The short-term effects of smoking include more frequent respiratory illnesses such as coughs, colds, bronchitis, and pneumonia. The long-term effects of smoking are extensive. There are numerous diseases linked to smoking. Smoking can cause cancer of the mouth, throat and lung cancer, and can increase the risk of stomach (gastric), kidney, bladder, cervical, and pancreatic cancer. About one third of all cancers are linked to tobacco use—and 90% of lung cancer cases are linked to smoking (*5*;6;7**;**8).

Previous studies have identified a relation between smoking and individual diseases such as myocardial infarction (MI), but there were few studies that focused on the association between smoking and changes in hospitalization for some cardiovascular and respiratory diseases taken together in a single study. This study was performed after observing increased duration and recurrence of admission to this general hospital for many cardiovascular and respiratory diseases, most of those patients were heavy smokers.

This study aims to assess the association between smoking and patterns of hospitalization including duration and recurrence of hospitalization.

Patients and Methods

This prospective cohort study was conducted in Al-Hashimiya general hospital in Babylon Province in the period from August 2007 to July 2010.It included 1164 patients who were heavy active smokers,856 patients were never smokers, their ages ranged from 20-80 years and most of patients were women in both groups. The study involved follow up of the patients who were divided into those who were heavy smokers (active group) and those who were never smoke (control group).

Patients who were passive and ex-smokers were not included in the study, in addition the patients selected were not obese as measured by body mass index (calculated as weight (kg) divided by height squared (m^2), not hypertensive, and not diabetic.

Those patients were assessed for three cardiovascular conditions (myocardial infarction, angina and ischemic stroke) and three respiratory conditions (asthma, chronic obstructive pulmonary disease, and chest infection) because these diseases are usually affected by smoking and represent the most common conditions leading to admissions to this general hospital. The annual rates of duration and recurrence of admission to the hospital that were attributable to each one of these conditions were determined during the period of study. Electrocardiography, chest x-rays, random blood sugar and blood cultures were done for all the patients.

Statistical analysis

Statistical analysis was performed using SPSS programme. T test was used for comparison between active and control groups. P values of less than or equal to 0.05 were considered to indicate statistical significance (9).

Results

Table (1) showed the ages and sex distributions of the patients´ groups. The ages of patients in both groups ranged from 20-80 years The mean age ±standard deviation (SD) of patients was 58±14.8 years in the active group while it was 61±12 in the control group, most of patients were women (56.18% in active group and 52.2% in control group). There was no significant difference in ages and sex between the studied groups ($p > 0.05$).

Table (1): Demographic characteristics of the patients

characteristic	smoker group	Never smoker group
Number	1164	856
Mean age (years) ±SD*	58±14.8	61±12
sex	Men:43.82% (510 patients) Women:56.18% (654 patients)	Men:47.7% (409 patients) Women:52.2% (447 patients)

*SD=Standard deviation (p >0.05).

Table (2) showed the distribution of diseases between patients in active and control groups. As shown in the table, the numbers of patients admitted due to respiratory conditions were more than the numbers of patients admitted due to cardiovascular conditions.

Table (2):Distribution of diseases among patients of active group and control group

Total number	Types of disease conditions					
	*CV conditions			*Resp. conditions		
Active group (1164 patients)	*MI	Angina	IS	Asthma	*COPD	*CI
	130	184	206	167	248	224
Control group (856 patients)	105	137	139	177	123	175

*CV: cardiovascular *Resp.: respiratory *MI: myocardial infarction

*IS: ischemic stroke *COPD: chronic obstructive airway disease

*CI: chest infection.

The annual rates of duration of admission to the hospital that were attributable to each cardiovascular and respiratory condition during the 3-year period of this study were calculated as apparent in table (3) which shows increased period of admission in almost all the cases that were studied with significant differences between active and control groups ($p \leq 0.05$) except in case of asthma.

Table (3): Annual Rates of duration of admission to hospital for cardiovascular and respiratory conditions

Condition	Annual rates of duration of hospital admission (days) active group control group	P value
MI	6 3	≤0.05
Angina	4 2	≤0.05
Ischemic stroke	7 3	≤0.05
Asthma	5 4	>0.05
COPD	7 3	≤0.05
Chest infection	5 2	≤0.05

The annual rates of recurrence of admission to hospital for cardiovascular and respiratory conditions were shown in table (4). It reveals that there is increased numbers of recurrence of admission that were recorded each year with significant difference between active and control groups ($p \leq 0.05$) in almost all the diseases studied except asthma.

Table (4): Annual rates of recurrence of admission to hospital for cardiovascular and respiratory conditions

Condition	Annual rates of recurrence of admission (no./year) active group control group	P value
MI	4 1	≤0.05
Angina	4 2	≤0.05
Ischemic stroke	4 1	≤0.05
Asthma	5 4	>0.05
COPD	6 3	≤0.05
Chest infection	3 1	≤0.05

The study also revealed that women have higher rates of duration and recurrence of hospitalization than men with significant difference ($p \leq 0.05$). For smoking-related admissions (active group), odds ratios (OR) of 2.77 (95% CI 2.13–3.59) in men and 6.30 (95% CI 4.80–8.26) in women were observed among smokers compared to never-smokers.

Discussion

Currently, evidence is strongest for a relationship between smoking and rates of admission to hospital for acute myocardial infarction. However, a smaller number of studies has explored the impact of smoking on other ischemic conditions, including angina and stroke. We included respiratory conditions because evidence also exists for an association between cigarette smoking and respiratory symptoms.

During the 3-year period of this study, there was significant difference between active and control group regarding rates of duration and recurrence of hospital admission for the cardiovascular and respiratory conditions.

This effect can be explained according to smoking facts. In case of cardiovascular diseases, mechanisms that cause increased rates of duration and recurrence of hospitalization for cardiovascular diseases is that smoking cause increased platelet adhesion and subsequent thrombosis, changes in vascular endothelial functioning, and impaired arterial dilatation capacity, which have implications for reducing vascular flow and development of atherosclerosis (10;11;12;13).In addition, cigarette contains nicotine that increases cholesterol levels in the body and carbon monoxide, which decreases the amount of oxygen within the body and this decreases the levels of oxygen reaching tissues, giving rise to different health problems such as stroke and heart attack (14;15;16;17).

Smoking also caused increased rates of duration and recurrence of hospitalization for respiratory diseases and the mechanism behind this is that cigarette smoke depress motility of cilia and increase activity of mucus glands resulting in accumulation of secretions, it also substantially changes the immune response to bacteria, which means that patients who smoke are weakening their body's ability to deal effectively with bacterial invaders (18; 19).

The nonsignificant difference between active and control groups in case of asthma is due to there were only slight changes in duration and recurrence of admission between both groups and the possible cause behind this is asthma is affected by other multiple factors which are divided into external and internal factors like

mite, airway pollution, infections and many other triggers of asthma attacks.

Women had higher rate of duration and recurrence of admission than men. A possible cause of the sex difference is due to hormonal factors. Estrogen deficiency is associated with cardiovascular disease: rates of ischemic heart disease increase sharply in women after menopause; young women with bilateral oophorectomy have an increased risk of ischemic heart disease; and accumulating epidemiological data show that women who use hormone replacement therapy after menopause have lower rates of ischemic heart disease. This mechanism may be by lowering low density lipoprotein and fibrinogen, increasing high density lipoprotein cholesterol, increasing blood flow, and reducing atherosclerosis. Thus it is possible that tobacco smoke interacts with sex hormones and thus increases risk of ischemic heart disease relatively more in female smokers than in men (20). In support of this, Criqui *et al* (1998) (21) found that hormone replacement therapy was protective only in smokers, and in a study based on the Copenhagen city heart study Lindenstrøm *et al* (1993) (22) found that hormone replacement therapy reduced the risk of stroke only in smokers. In case of respiratory diseases it also may be due to female sex hormones because about 40% of women report a premenstrual increase in asthma symptoms and also they have a regulatory role in β2-adrenergic function, abnormal regulation may be a possible mechanism for premenstrual asthma (23).

Conclusions

Cigarette smokers had higher rates than never smokers for duration and recurrence of hospitalizations. Females were more affected than males and this gender difference meaning that females are more susceptible to the effects of smoking than males. The difference was significant between the active and control groups.

Recommendation

Recommendation is advised for health authority to apply smoking ban in formal and nonformal places as done in many countries nowadays to avoid the various harmful effects of smoking.

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