

Original Research Article

Evaluation of Smoking Status among Diabetes Patients in the State of Penang, Malaysia

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Abstract

Purpose: To determine the prevalence of smoking among diabetes patients attending Diabetes Outpatient Clinic at Penang General Hospital, Penang, Malaysia.

Methods: A cross-sectional study was undertaken to assess the smoking status of all the patients that registered at the above clinic. The data were extracted from the diabetes patients' medical records. Between June 1st 2010 and June 30th 2011, all medical records of type 1 and 2 diabetes patients were reviewed to assess the prevalence of smoking.

Results: Of 2547 diabetes patients, 447 patients were excluded from the analysis as their smoking status was unknown, leaving 2100 diabetes patients whose smoking status was determined. The prevalence of smoking in diabetes patients was estimated at 8 %. Smokers had shorter duration of diabetes mellitus than non-smokers (6.70 ± 5.16 vs. 8.42 ± 6.66 ; respectively, $p = 0.001$). Smoking was significantly associated with male gender and younger age ($p < 0.0001$). Chinese diabetes patients were the most prevalent race among smokers, compared with Malay and Indian (50.3, 30.5 and 19.2 %, respectively); however, the differences were statistically not significant, $p = 0.219$.

Conclusion: The prevalence of smoking among diabetes patients of the Malaysian clinic at Penang studied was low. On the other hand, smoking status was inadequately documented and no information was available on the history of tobacco use in diabetes smokers.

Keywords: Prevalence, Smoking status, Diabetes mellitus, Malaysia.

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INTRODUCTION

Tobacco smoking is a reprehensible habit that has spread all over the world as an epidemic. It is one of the main risk factors for a number of chronic diseases, including cancer, lung diseases, and cardiovascular diseases [1].

In diabetes mellitus (DM), several prospective studies found that cigarette smoking acts as independent contributors to the occurrence of cardiovascular disease (CVD) [2-4]. Smoking

increases the risk of microvascular complications in diabetes patients (i.e., nephropathy, retinopathy, and neuropathy) probably due to its metabolic effects by worsening diabetes control and insulin resistance, beside that it can increase inflammation and endothelial dysfunction which later contribute to the complications. In addition, tobacco use promotes macrovascular diseases including coronary heart disease (CHD), stroke, and peripheral vascular disease in type 2 diabetes patients [5].

There are more than one billion smokers worldwide; of these 125.8 million reside within South East Asian countries. In Malaysia, it has been estimated that 21.5 % of the adult in the country are current smokers. In addition, about 10-20% of all death reported are attributed to smoking [6].

There is a dearth of information about the prevalence of smoking in patients who are at greater risk of the complications due to smoking habit, including diabetes patients. Few studies documented the prevalence of smoking in specific groups in Malaysia [7-9]. The current study was aimed at determining the prevalence of smoking among type 2 diabetes patients in Penang Island, Malaysia.

METHODS

Study design

Penang General Hospital is the largest tertiary public hospital in the state of Penang. It provides health care, emergency treatment for all illnesses and accidents, and primary and advanced medical health care.

A cross-sectional study design was used to gather the required data. The medical records were reviewed for all diabetes patients who had attended the Outpatient Clinic of Penang General Hospital between June 1st 2010 and June 30th 2011.

Additionally, specific demographic and diabetes-related information were collected. Any medical record which did not contain information about smoking status was considered missing. The study was approved by the ethics committee of the Clinical Research Centre, National Institutes of Health (NIH), Ministry of Health, Malaysia.

Statistical analysis

All analyses were performed using SPSS version 18.0 (SPSS Inc, Chicago, IL). The significance level was set at $p < 0.05$. Descriptive analyses were performed for quantitative (continuous) variables by calculating mean \pm standard deviation (SD), while percentages and frequencies were determined for qualitative (categorical) variables. To compare the proportions between smoker and non-smokers, Chi square (χ^2) test was applied, while Mann-Whitney U test was used to evaluate statistical differences for quantitative variables that were not normally distributed.

Table 1: Demographics and other characteristics of smoking vs. non-smoking diabetes patients

RESULTS

Two thousand five hundred and forty-seven (2,547) medical records of type 1 and 2 diabetes patients were reviewed to assess the prevalence of smoking between June 1st 2010 and June 30th 2011. Of these, 447 medical records were excluded from analysis as their smoking status was unknown, giving rise to 2100 records of diabetes patients whose smoking status was determined.

The ages of patients in the included records ranged from 18 to 96 years old (mean = 63.5 years old). There were just 39.5 % type 1 DM patients compared to 60.5 % type 2. The Chinese race was the predominant race in the whole diabetes patients compare to Malay and Indian races (54, 25 and 21 %, respectively). The duration of diabetes ranged from less than one year to 48 years. Most of the patients were using oral anti-diabetes agents as against other types of treatment (diet, insulin or oral agent + insulin). The study identified that 167 (8 %) of the patients whose records were included were smokers (Table 1).

In our cohort, Chinese diabetes patients (50.3 %) were the most prevalent race among smokers compared with Malay (30.5 %) and Indian (19.2 %); however, the difference were statistically insignificant ($p = 0.219$). Smoking was significantly associated with male gender compared to female (88 % vs. 12 %, respectively, $p < 0.0001$). Smoking was significantly associated with the younger age of diabetes patients compared to age of non-smoker (61.32 ± 11.380 vs. 63.66 ± 10.783 , $p = 0.007$). Additionally, there was significant association between smoking status and the duration of DM following diagnosis. Non-smokers had longer duration of DM than smoking patients (8.42 ± 6.66 vs. 6.70 ± 5.16 ; respectively, $p = 0.001$).

DISCUSSION

Results from the national Behavioural Risk Factor Surveillance System show that the prevalence of smoking in young adults with diabetes mellitus is similar to the prevalence in the general population [10]. Our finding is not consistent with the general thought that the prevalence of smoking among diabetes patients is a mirror of the general population. Other studies in the United States found the age-adjusted prevalence of smoking was 27.3 and

| Characteristics | Smoking status N = 2100 | | P value |
|-----------------------------------|-------------------------|-------------------------|-----------------------|
| | Smoker N = 167 | Non-smokers N = 1933 | |
| Age | 61.32 ± 11.380 | 63.66 ± 10.783 | 0.007 ^a |
| Gender | | | < 0.0001 ^b |
| Male | 147 (88%) | 917 (47.4%) | |
| Female | 20 (12%) | 1016 (52.6%) | |
| Race | | | 0.219 ^b |
| Malay | 51 (30.5%) | 473 (24.5%) | |
| Chinese | 84 (50.3%) | 1050 (54.3%) | |
| Indian | 32 (19.2%) | 410 (21.2%) | |
| Duration of DM^c | 6.70 ± 5.16 | 8.42 ± 6.66 | 0.001 ^a |
| Type of DM treatment | | | 0.639 ^b |
| Diet | 1 (0.6%) | 17 (0.9%) | |
| Oral agents | 137 (82%) | 1530 (79.2%) | |
| Insulin | 6 (3.6%) | 113 (5.8%) | |
| Oral agents + Insulin | 23 (13.8%) | 273 (14.1%) | |

^a Mann-Whitney U test, ^b Chi square (χ^2) test, ^c Duration of diabetes following diagnosis

25.9 % among people with and without diabetes, respectively. It did not differ significantly between participants in both groups when they were stratified by age, sex, race, or education [11].

Unfortunately, there were 17.6 % diabetes patients with unknown smoking status during the period of the study which may reflect the differences observed in the prevalence of smoking with the general population of Malaysia. Additionally, among the 2100 subjects whose smoking status was determined, there was no recorded information about smoking history. Another study also reported that smoking status is under-recorded among patients with DM; suggesting that health care professionals do not assess and treat all modifiable risk factors [12]. Inadequate documentation of risk factors may hamper the achievement of optimal diabetes care on an individual level [13].

For primary prevention of diabetes complications, it is recommended to record smoking status as a part of routine evaluation including current and past smoking history, smoking duration, dose (number of cigarettes smoked per day), and even the passive exposure to smoke (i.e. at home and work). Primary care clinician should strongly encourage diabetes smokers and their family to quit smoking by providing counselling, pharmacotherapies, and formal cessation program as appropriate to achieve complete cessation [14]. Furthermore, the current update of Tobacco Use and Dependence Clinical Practice Guideline provides clear evidence of the effectiveness of encouraging primary care clinicians to expand the vital signs (blood pressure, temperature, and pulse rate) by document smoking status in primary practice [15].

Male gender was associated to smoking which reflect the differences in prevalence of smoking in the two sections of the general population in Malaysia [6]. However; it was unknown whether smoking status was recorded truthfully among female due to cultural constraints in Penang Island. With regard to prevalence of diabetes smokers, there was no significant difference between the 3 races. An earlier study conducted in Penang island, Malaysia among tuberculosis patients found significant differences in prevalence according to race - 51.6, 34.8 and 7.2 % ($p = 0.008$) for Chinese, Malay and Indian, respectively [7]. Furthermore, the duration of DM was longer among smokers, probably due to probably to the fact that smoking in our cohort is significantly associated with younger age.

Limitations of the study

This study was subject to a number of limitations. First, there was information bias such as missing, unreported or incomplete data in the medical records; also it was unknown whether smoking status was recorded truthfully which may affect the differences observed between male and female gender. Secondly, the results of the current study may not be generalizable to all diabetes patients in Malaysia since the study patients were selected from a single tertiary care referral hospital.

CONCLUSION

The prevalence of smoking among diabetes patients in Malaysia was low and did not reflect the prevalence in the general population. Smoking status should be evaluated as a routine care and advice should be given to those who are smokers on the way and steps they should

follow to stop smoking; alternatively, they might be referred to smoking cessation program which is already available in the hospital studied.

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