

The Relationship between Smoking, Alcohol Consumption and Development of Complication in Patients Having Type 2 Diabetes Mellitus, a Cross-Sectional Study

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Abstract: The aim of this study was to identify the relationship between smoking status, alcohol consumption and, the development of complication in patients having type 2 diabetes attending (ACTH) hospital.

Methods: We included all diabetic patients attending (ACTH) in study period having type II diabetes and we measured patients' Blood Pressure and assess complications of diabetes along with obtaining the investigations for the patients (FBS, HbA1c, and cholesterol and LDH levels).

Results: we found that there were 28 patients having high blood pressure, 70% of patients had high HbA1c (uncontrolled). Again, 60% of them had high levels of cholesterol and 46% of them had high levels of HDL. On the other hand, 30% of the patients developed retinopathy, 25% of them had neuropathy, 13% of them had CVS diseases and 6% of them had nephropathy complications. Regarding the smoking habit, 8% of them were smokers while nearly a fifth of them drink alcohol. Again, we noticed that the development of the complications in smokers and alcohol consumers was more than patients without smoking or alcohol consumption.

Conclusion: Diabetes mellitus continues to produce a wide variety of complications in patients with poor control and especially in patients with smoking habits and drinking alcohol.

Keywords: Alcohol Consumption; Complication of DM; Smoking.

1. INTRODUCTION

Diabetes Mellitus (DM) known as a group of chronic diseases recognized by hyperglycemia state. Therefore, it is a serious chronic disease affecting the pancreas, leading to either a decrease in the production of enough insulin or by affecting the body's ability to use the insulin. In 2014, more than 422 million adult people are living with diabetes in comparison to 108 million in the year 1980. There is an increase in risk factors like a sedentary lifestyle, obesity, and overweight. Consequently, the prevalence of diabetes (age-standardized) increased twice since 1980; it increased in the adult population from 4.7% to 8.5%. In 2012, diabetes causes 1.5 million deaths globally. Moreover, diabetes leads to various complications affecting many organs in the body and increasing in the year lost and premature deaths. For instance, the possible complications of diabetes include heart attack, stroke, vision loss, leg amputation, and kidney failure and possible nerve damage. However, in pregnancy uncontrolled diabetes increases the risk of maternal complications and fetal death [1]. So, DM holds great challenges to public health worldwide [2]. In order to avoid the economic burden and loss of health caused by complications of DM, primary prevention and early intervention can play an important role in the management of DM [3, 4].

Complications of Diabetes: Diabetic retinopathy is regarded as the most common micro-vascular complication of diabetes. For instance, in the United States, it is responsible for new cases of blindness in more than 10,000 every year, mainly among adults aged (20 –74 years). Studies showed that retinopathy accounted for 60% of the middle age group in patients having type2 diabetes (T2DM). Consequently, one-third of the cases of blindness developed retinopathy [5]. So, the prevention of diabetic retinopathy is a priority to prevent visual impairment, especially in the working-age population [6]. Diabetic neuropathy is defined by the American Diabetes Association (ADA) as “the presence of symptoms and/or signs of peripheral nerve dysfunction in people with diabetes after the exclusion of other causes.” [7]. The magnitude and duration of hyperglycemia both affect the risk of developing diabetic neuropathy along with the genetic attributes of some people in determining their predisposition to develop the neuropathy. Neurological dysfunction may appear as gastroparesis, diarrhea, constipation, bladder dysfunction, anhidrosis, erectile dysfunction, exercise intolerance, silent ischemia, resting tachycardia, sudden cardiac arrest [8] and silent myocardial ischemia and mortality [9]. Another complication of diabetes is diabetic nephropathy which leads to renal failure and it is defined as a state of proteinuria of more than 500 mg in 24 hours. The problem is that more than 7% of patients having T2DM had micro-albuminuria when they are diagnosed with diabetes [10]. The other complications of diabetes include macro-vascular complications in which the process of complications passes through atherosclerosis leading to narrowing of arterial walls and gives the chance to oxidized lipids derived from LDL to accumulate in the arterial wall [11]. Consequently, it increases the risk of cardiovascular disease (CVD) mostly coronary heart disease as reported in the Framingham study [12]. To prevent this complication LDL level should be less than 100 mg/dl, fasting triglycerides more than 150 mg/dl and HDL more than 50 mg/dl [13]. The relation between diabetes and alcohol consumption is well established; it may produce an adverse effect on the pancreas [14] moreover indirectly by increasing fattiness [15, 16]. Globally, both DM and alcoholism affect a large number of people [17]. Some studies showed that moderate and reasonable alcohol consumption decreases the risk of T2DM [18] on the other hand, heavy alcohol consumption increases the risk of T2DM along with the poor glycemic control [19], while other studies suggested that there no effects [20]. But, there is a consensus that heavy consumption of alcohol has adverse effects on the pancreas along with obesity, disturbance of glucose metabolism and liver function impairment [21]. On other hand, smoking is stand as a modifiable risk factor for cardiovascular diseases, atherosclerotic moreover; it increases thrombosis formation, inflammation, and oxidation of LDL [22]. In many guidelines, smoking cessation is recommended to prevent CVA complications of diabetes [23]. Evidence from previous studies showed that smoking increases the risk of diabetes [24-27]. Moreover, smoking affects blood lipid profile leading to lower HDL cholesterol levels and higher triglyceride levels [28]. Thus, alteration in the lipid profile is also thought to promote atherosclerosis in smokers. Consequently, smoking leads to a more atherosclerotic formation in patients having diabetes [29]. The aim of this study was to identify the relationship between smoking status, alcohol consumption and development of complication in patients having T2DM attending the Academy Charity Teaching Hospital (ACTH) in Khartoum State, Sudan 2015.

2. SUBJECTS AND METHODS

This is a cross-sectional hospital based study conducted during June-July 2015 in (ACTH) Khartoum, Sudan. We included all diabetic patients attending (ACTH) in the study period and who met the inclusion criteria: Adult >20 years, patient having type II diabetes (fasting blood glucose 126 ml/dl, or if he/she on oral anti-diabetic drugs). We performed direct interviews with patients in the outpatient clinic using a pre-coded questionnaire that includes Socio-demographic data, duration of the diseases, and the smoking status and alcohol consumption of the patients. We measured patients' Blood Pressure and assess complications of diabetes and obtained the investigations for the diabetic patients (FBS, HbA1c, and cholesterol and LDH levels) to assess the health status of the patients.

Statistical analysis:

We collect data directly from the patients and checked it for errors and analyzed it by using a statistical package of social sciences SPSS version 19. Frequency tables and cross tabulation were obtained along with the presentation of data. Chi Square Test and Fisher's Exact Test were performed to show the relationship between study variables.

Ethical Issue:

We obtained the approval letter from research committee of the community department at University of Medical Sciences and Technology. We obtained informed consent from all patients before interviewing them and we kept their data confidential.

3. RESULTS AND DISCUSSION

In this research, we found that most of the participants were female (52%) with age more than 60 years. There were 28 patients having high blood pressure while the remaining 72 patients had normal blood pressure. Regarding the blood glucose level, more than 60% of the patients had high blood glucose (uncontrolled). Among the patients who performed HbA1c, 70% of them had high HbA1c (uncontrolled). Again, 60% of the patients who performed a total cholesterol test had a high level of cholesterol. Also, 46% of them had high levels of HDL as shown in table 1.

Table 1: The blood pressure and blood tests for patients having type 2 Diabetes Mellitus: (Total No. of patients = 100)

| | BP | Blood Glucose Level | HbA1c | Total Cholesterol | HDL |
|---------------|-------|---------------------|-------|-------------------|-------|
| High | 28.0 | 61.0 | 28.0 | 29.0 | 13.0 |
| Normal | 72.0 | 39.0 | 12.0 | 19.0 | 15.0 |
| Test Not done | 0.0 | 0.0 | 60.0 | 52.0 | 72.0 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

Regarding the complications of diabetes, 30% of the patients developed retinopathy, 25% of them had neuropathy, 13 of them had CVS diseases and 6% of them had nephropathy complications, while 17% of them had no obvious complications as shown in table 2.

Table 2: The complications of diabetes in patients having type 2 Diabetes Mellitus: (Total No. of patients = 100)

| Complications | Percent |
|-----------------|---------|
| Retinopathy | 30.0 |
| Neuropathy | 25.0 |
| CVS diseases | 13.0 |
| Blood vessels | 9.0 |
| Nephropathy | 6.0 |
| No complication | 17.0 |
| Total | 100.0 |

We found that a few number of the patients (8%) had the smoking habit and nearly a fifth of them drink alcohol as shown in table 3.

Table 3: The state of smoking and alcohol consumption of patients having type 2 diabetes: (Total No. of patients = 100)

| | Smoking | Alcohol Consuming |
|-------|---------|-------------------|
| Yes | 8.0 | 19.0 |
| No | 92.0 | 81.0 |
| Total | 100.0 | 100.0 |

Regarding the relationship between development of diabetes complications and smoking habit, we found that there was no statistical significance between smoking and development of the complications of DM in patient having type DM (P value for Fissure's Exact Test = 0.621) and this may be due to the small sample size and if we have a look at the relationship between two groups we will notice that the development of the complications in smoking patients was more than patients without smoking as shown in figure 1.

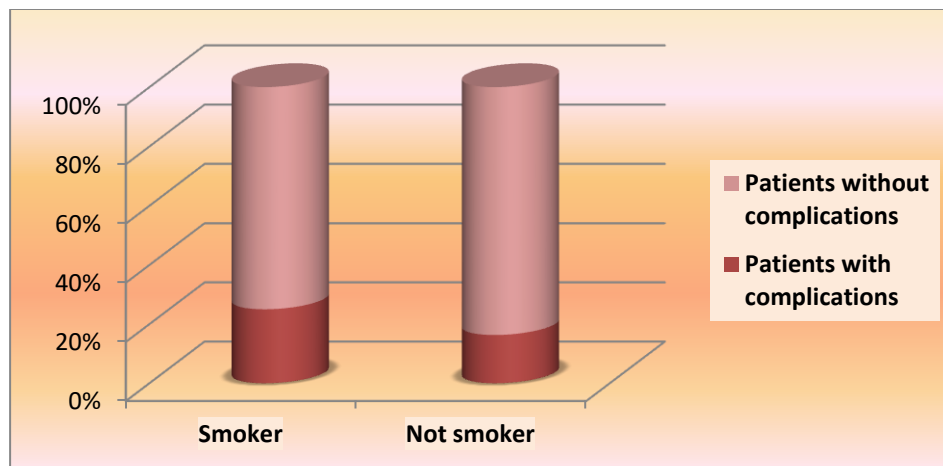


Fig. 1: The relationship between smoking and complication of diabetes. (Total no. of patients = 100).

Also, we found that there was no statistical significance between drinking alcohol and development of the complications of DM in a patient having type DM (P value for Fissure's Exact Test = 0.516) and this may be due to the small sample size. Again, if we follow the relationship between two groups, we will find that the development of the complications in patients drinking alcohol was more than patients' not consuming alcohol as shown in figure 2.

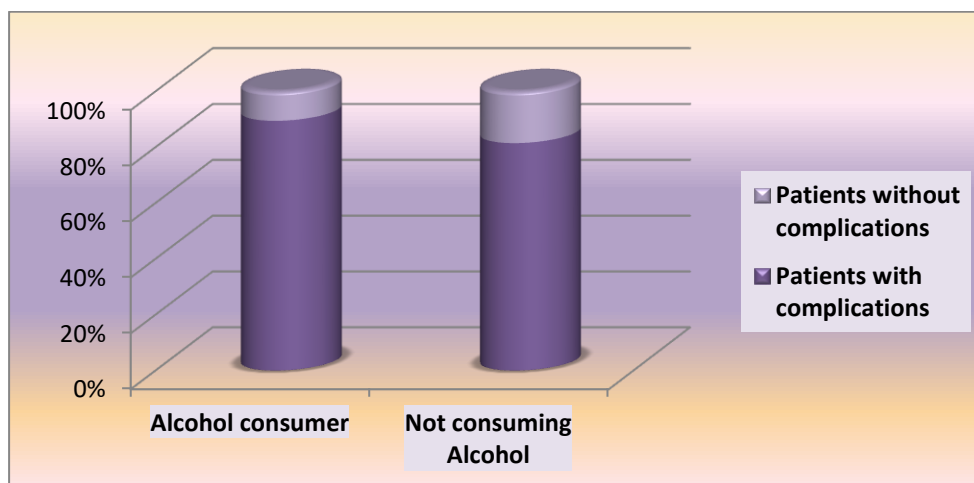


Fig. 2: The relationship between alcohol consumption and complication of diabetes. (Total no. of patients = 100).

4. CONCLUSION

Diabetes mellitus continues to produce a wide variety of complications in patients with poor control and especially in patients with smoking habits and drinking alcohol. Retinopathy and neuropathy appear to be the most common complications in patients having diabetes.

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