

Research Article

Assessment of Modifiable Risk Factors Among Type 2 Diabetes Mellitus Patients

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ABSTRACT:

Background: With the evidences available in the ancient literature of Sanskrit, diabetes mellitus (DM) could possibly be termed as 'honey-urine disease' which is associated with gross emaciation and wasting. DM is the most commonly referred metabolic disorder that affect majority of the people globally. Hence, the present study was conducted for assessing modifiable risk factors among type 2 DM patients.

Materials & Methods: Patients were evaluated by history taking, examination and performing relevant investigations. For each subject a separate clinical proforma, incorporating detailed history with duration, clinical examination and relevant information was used. Lipid profile was evaluated. Fasting and PPG were defined as value of plasma glucose measured after overnight (8–12 h) fasting and after 2 h of meals respectively. Pharmacological intervention is required in clients with HbA1c levels greater than 7.0%. The HbA1c test is recommended for the diagnosis of diabetes mellitus and can also guide appropriate ongoing management of patients with diabetes.

Results: 71.5% of the subjects were non-smokers (143 subjects) while 15.5% were smokers (31 subjects) and 13.0% had quit smoking (26 subjects). 58.0% of the subjects did not use tobacco (116 subjects) while 31.0% used tobacco (62 subjects) and 11.0% had quit using tobacco (22 subjects). 75.0% of the subjects did not consume alcohol (150 subjects) while 8.5% consumed alcohol (17 subjects) and 16.5% had quit consuming alcohol (33 subjects). 49.0% of the subjects were vegetarians (98 subjects) while 46.0% were non-vegetarians (92 subjects) and 5.0% had a mixed diet (10 subjects). 48.5% of the subjects engaged in 50-100 minutes of physical activity per week (97 subjects) while 24.0% engaged in less than 50 minutes per week (48 subjects) The least number of subjects reported no physical activity (1 subject, 0.5%). 53.0% of subjects had low density lipoprotein (LDL) dyslipidaemia (106 subjects) while 47.0% had normal LDL levels (94 subjects) The highest dyslipidaemia was observed in triglyceride (TG) (45.0%) and the lowest in TC (35.0%).

Conclusion: Our study's findings unequivocally demonstrate that HbA1c, the established benchmark for evaluating glycemic control, exhibits a robust association with the lipid profile. The study among subjects with HbA1c levels exhibited a favorable lipid profile of TG, total cholesterol (TC), LDL and high density lipoprotein (HDL). These findings suggest a positive correlation between normoglycemic HbA1c levels and a desirable lipid profile, indicative of reduced risk. This characteristic renders it an optimal indicator for predicting dyslipidemia in individuals with type 2 diabetes mellitus.

KEY WORDS: Risk factor, Diabetes mellitus, Diabetes Mellitus, Lipid, Blood sugar

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INTRODUCTION:

With the evidences available in the ancient

literature of Sanskrit, diabetes mellitus (DM) could possibly be termed as 'honey-urine disease' which is

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associated with gross emaciation and wasting. DM is the most commonly referred metabolic disorder that affects majority of the people globally.^[1]

It is the most frequent global endemic entity that has rapidly increasing prevalence in both the developing as well as the developed countries. DM is the group of metabolic diseases that is characterized by increase in the level of blood glucose that is most commonly results due to defects in the insulin secretion or insulin action or both. When considering the global arena, with the advent of newer discoveries in the field of DM, great hopes seems to be motivating and continued efforts in research have been shown to minimize morbidity and mortality rates.^[2]

The metabolic dysregulations associated with the DM majorly causes various secondary pathophysiological changes in various organs and systems that greatly impose a huge burden on the individuals suffering from type – 2 DM. As per the available evidences, type – 2 is more commonly reported than type – 1 DM. Diabetes is greatly associated with the higher risk of morbidity and mortality due to cardiovascular diseases. Serum lipids are frequently abnormal and are more likely to be associated with the risk of developing coronary arterial disease. Worsening of the glycemic control majorly deteriorates lipids and lipoprotein abnormalities more specifically DM.^[3,4]

A diabetic individual should be considered in good control of his/her blood glucose level when their fasting and post-prandial blood glucose (PPBG) values are as much close to those of the non-diabetic individuals as possible. This concept is actually difficult to be followed practically since even with quite good control of diabetes, fluctuations in the level of blood glucose might be marked exponentially from day to day and from hour to hour. Worsening of the glycemic control rapidly deteriorates lipid and lipoprotein abnormalities which suggests that dyslipidemia is secondary to insulin resistance and the unique combination of hyperlipidemia and dyslipidemia generates and enhanced atherogenic ambience within the circulation which then aggravates the progression to atherosclerosis. Atherosclerosis is characterized by the deposition of cholesterol from plasma lipoproteins onto the arterial walls.^[5-7] Hence, the present study was conducted for assessing modifiable risk factors among type 2 diabetes mellitus patients.

MATERIALS & METHODS:

The present study was conducted for assessing modifiable risk factors among T2DM patients.

After obtaining approval from the institutional ethic committee, study was conducted in the department of internal medicine of our institute. The study sample constituted of 200 patients. A written informed consent was obtained from the patients who were enrolled in the present study. Patients willing to participate in the study were included. Patients with heavy debilitating diseases were excluded. Patients were evaluated by history taking, examination and performing relevant investigations. For each subject a separate clinical proforma incorporating detailed history with duration, clinical examination and relevant information. Lipid profile was evaluated. Fasting and PPBP were defined as value of plasma glucose measured after overnight (8–12 h) fasting and after 2 h of meals respectively. A random venous blood glucose or above 11.1 mmol/L (≥ 200 mg/dL) or a fasting blood glucose at or above 7 mmol/L (≥ 126 mg/dL) on two or more separate occasions indicates the patient is likely to have DM. Normal HbA1c: 3.5% to 5.6% or 15 to 42 mmol/mol. A HbA1c result $>6.5\%$ usually confirms the presence of DM. Pharmacological intervention is required in patients with HbA1c levels greater than 7.0%. The HbA1c is the recommended diagnostic test for DM and can also inform the appropriate ongoing management of the diabetic patient. The data was analyzed using IBM SPSS version 20 s/w. frequency distribution and cross tabulation was performed to prepare tables using PRISM and Microsoft Excel to prepare the tables. The quantitative data was expressed as mean and standard deviation. The categorical data was expressed as number and percentage. ANOVA using simple mean was performed to compare the mean whereas chi square test to compare the categorical data.

RESULTS:

71.5% of the subjects were non-smokers (143 subjects) while 15.5% were smokers (n=31) and 13.0% had quit smoking (n=26) (Table 1).

Table 1: Smoking.

Smoking	Frequency (n)	Percent
Yes	31	15.5
No	143	71.5
Left	26	13.0

Table 2: Smokeless Tobacco.

Tobacco use	Frequency (n)	Percent
Yes	62	31.0
No	116	58.0
Left	22	11.0

58.0% of the subjects did not use smokeless tobacco (n=116) while 31.0% used it (n=62) and 11.0% had quit the habit (n=22) (Table 2). 75.0% of the subjects did not consume alcohol (n=150) while 8.5% consumed alcohol (n=17) and 16.5% had quit consuming alcohol (n=33) (Table 3). 49.0% of the subjects were vegetarians (98 subjects) while 46.0% were non-vegetarians (n=92) and 5.0% had a mixed diet (n=10) (Table 4). 48.5% of the subjects engaged in 50-100 minutes of physical activity per week (n=97) while 24.0% engaged in less than 50 minutes per week (48 subjects) The least number of subjects reported no physical activity (1 subject, 0.5%) (Table 5). 53.0% of subjects had LDL dyslipidaemia (106 subjects) while 47.0% had normal LDL levels (n=94). The highest dyslipidaemia was observed in TG (45.0%) and

Table 3: Alcohol habit.

Alcohol Status	Frequency	Percent
Yes	17	8.5
No	150	75.0
Left	33	16.5

Table 4: Diet.

Diet	Frequency	Percent
Veg	98	49.0
Nonveg	92	46.0
Mixed	10	5

Table 5: Physical activity.

Physical Activity	Frequency	Percent
No activity	1	.5
<50 min / week	48	24.0
50-100 min / week	97	48.5
100-150 min / week	17	8.5
150 min / week	37	18.5

Table 6: Dyslipidemia.

	Frequency	Percent
TC		
Dyslipidaemia	70	35.0
Normal	180	65.0
TG		
Dyslipidaemia	90	45.0
Normal	110	55.0
HDL		
Dyslipidaemia	92	46.0
Normal	108	54.0
LDL		
Dyslipidaemia	106	53.0
Normal	94	47.0

the lowest in TC (35.0%) (Table 6).

DISCUSSION:

The prevalence of DM is on the rise, primarily due to changing lifestyles, excessive consumption of fats and refined sweets, and a lack of physical activity. Lifestyle changes are linked to insulin resistance, which is related with glucose intolerance, hyperinsulinemia, hypertension, dyslipidemia, and visceral obesity (also known as apple-shaped obesity). These conditions increase the risk of both microvascular and macrovascular diseases, as well as complications. This is associated with a high prevalence of cardiovascular disease. The quantity of LDL receptors rises in response to an increase in insulin levels. Consequently, a decrease in insulin levels leads to a reduction in LDL receptor levels, resulting in elevated levels of LDL cholesterol in individuals with T2DM. Dyslipidemia in T2DM is a controllable risk factor for cardiovascular disease, as it speeds up the advancement of atherosclerosis. HbA1c level is a more reliable measure for assessing the mean blood glucose level during a 3-month period. To make a timely and appropriate decision, it is crucial to assess the lipid profile of patients with T2DM.^[8-10]

Out of the total respondents, 71.5% were categorized as non-smokers, 15.5% were smokers, and 13.0% had successfully stopped smoking. The act of smoking cigarettes is directly linked to the occurrence of DM.^[1] Smoking has the potential to disrupt the balance of glucose in the body and may also impact the concentration of HbA1c. Smoking-induced oxidative stress might potentially impact blood glucose levels and disrupt the body's ability to regulate blood glucose, leading to insulin resistance.^[12] However, no such findings were seen in our study. In the present study 58.0% subjects did not use tobacco, whereas 31.0% subjects used tobacco and 11.0% had stopped using tobacco. 75.0% of the subjects did not consume alcohol while 8.5% consumed alcohol and 16.5% had quit consuming alcohol. Regular alcohol consumption has a variety of consequences on blood lipid levels. Drinkers tend to have higher levels of HDL-C and triglycerides compared to non-drinkers, but their levels of LDL-C are lower.^[13]

In our study we found that 49.0% of the subjects were vegetarians while 46.0% were non-vegetarians and 5.0% had a mixed diet. We found that 48.5% of the subjects engaged in 50-100 minutes of physical activity per week while 24.0% engaged in less than 50 minutes per week 48.5% of the subjects engaged in 50-100 minutes of physical activity per week while 24.0% engaged in less than 50 minutes per

week. Modifications in diet and physical activity are regarded as the initial treatment approach for those with prediabetes.^[14] Pan X.R et al reported that the implementation of both dietary modifications and regular physical activity resulted in a significant decrease in the occurrence rate of T2DM within a span of 6 years among individuals with prediabetes^[15].

71.5% of the subjects were non-smokers (143 subjects) while 15.5% were smokers (31 subjects) and 13.0% had quit smoking (26 subjects). 53.0% of subjects had LDL dyslipidaemia (106 subjects) while 47.0% had normal LDL levels (94 subjects) The highest dyslipidaemia was observed in TG (45.0%) and the lowest in TC (35.0%).Phan DH et al estimated the prevalence of type 2 DM and prediabetes among adult from 30 to 69 years old and assess the association of risk factor with the conditions. The prediabetes prevalence was in 17.9% and diabetes in 7.3%. Patients who were male, in the 50 to 59 years old group, have hypertension and waist hip ratio (WHR) risk have higher prevalence to have prediabetes. Male patients, patients who were in 40 to 49; 50 to 59; 60 to 69 years old, those who were housewife. Diabetes has significant associated with participants have hypertension. The common factor directly related to prediabetes and diabetes in both genders is age. Other factors directly associated with prediabetes and diabetes include BMI, WHR, hypertension, educational level, and job.^[16]

CONCLUSION:

Our study's findings unequivocally demonstrate that HbA1c, the established benchmark for evaluating glycemic control, exhibits a robust association with the lipid profile. The study among subjects with HbA1c levels exhibited a favorable lipid profile of TG,TC,LDL and HDL. These findings suggest a positive correlation between normoglycemic HbA1c levels and a desirable lipid profile, indicative of reduced risk. This characteristic renders it an optimal indicator for predicting dyslipidemia in individuals with type 2 diabetes mellitus.

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Nil.

Conflicts of Interest

There are no conflicts of interest.

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