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Effect of Smoking on Glycemic Status

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ABSTRACT
BACKGROUND: Smoking is one of the modifiable risk factors for many chronic diseases like cancer and cardiovascular diseases.
However,the adverse effects of smoking on diabetes have been under-recognised.Smoking is associated with insulin resistance,inflammation and dyslipidemia, but its exact influence on diabetes is not known. This study aims to know the impact of smoking on glycemic status.
METHODS:A total of 100 patients(50 smokers,50 non-smokers) between ages 18 to 60 years were selected for the study who attended outpatient and inpatient department of government general hospital, Kakinada. Exclusion criteria: Known diabetics,alcoholics,use of drugs like steroids. Various parameters like height,weight,waist circumference, hip circumference, fasting and postprandial blood sugars and fasting lipid profiles were collected.
RESULTS:p value <0.05 was considered as significant. There was a positive association between smoking and glucose intolerance, number of pack years and glucose intolerance, smoking and body mass index.
CONCLUSION: Smoking has a negative effect on glucose control. Educating patients on importance of smoking cessation is an important is an important strategy in the prevention and management of diabetes.

I. INTRODUCTION

Smoking remains the most important cause of preventable morbidity and early mortality. Nicotine is the principle constituent of tobacco responsible for its addictive character.Smoking has a negative impact on almost every organ in human body.In addition to smoking, another devastating pandemic looms: Diabetes Mellitus.

Diabetes Mellitus is a metabolic disorder characterised by hyperglycemia resulting from defects in insulin secretion, action or both.The chronic hyperglycemia in DM causes irreversible damage to blood vessels, leading to microvascular and macrovascular complications of the disease.So, public health programs must address the main modifiable risk factors for DM to prevent its onset and delay the complications.
Cigarette smoking is one of the most important modifiable risk factor for DM.

SMOKING AND DIABETES

There is a growing body of evidence that smoking is an independent risk factor for diabetes, and that among people with diabetes, smoking aggravates the risk of serious disease and premature death.
The findings from these studies are consistent with a positive association between the number of cigarettes smoked per day and the incidence of diabetes mellitus in both men and women. On quitting smoking, rates of diabetes fell.

There was a **'dose-response relationship between hemoglobin A1C levels and both the number of cigarettes smoked per day and with total smoking as measured by pack-years'.**
Smoking has also been identified as a risk factor for insulin resistance which can lead to diabetes. Smoking may directly increase insulin resistance. Furthermore, smokers had features of insulin resistance syndrome, including low HDL cholesterol and high fasting glucose.

II. MATERIALS AND METHODS

A total of 100 patients (50 smokers and 50 non-smokers) aged 18-60 yrs who attended the outpatient and inpatient department of General Medicine, Govt. General Hospital, Kakinada are included in the study between January 2021 to June 2021.
Design of study: Cross-sectional.

Methods of collection:After taking informed consent from all patients, history, physical examination including height, weight, hip circumference, waist circumference were collected.
Laboratory tests included: fasting and post-prandial blood sugars, fasting lipid profiles.
INCLUSION CRITERIA: all smokers between ages 18-60 yrs who attended General medicine, GGH, KKD.
EXCLUSION CRITERIA:
Known diabetics, alcoholics, use of drugs like steroids.

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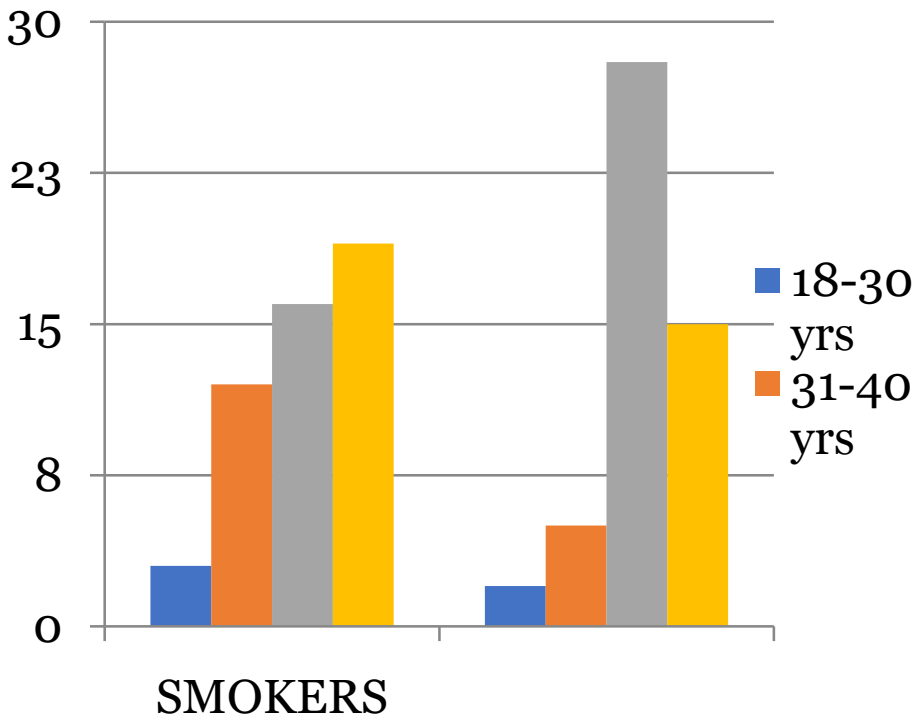
III. RESULTS

AGE GROUPS	Smokers-50		Non-smokers-50	
	No	%	No	%
< 30 yrs	3	6	2	4
31-40 yrs	12	24	5	10
41-50 yrs	16	32	28	56
51-60 yrs	19	38	15	30
Total	50	100	50	100
Mean	41.02 yrs		42.08 yrs	
S.D	9.7802		7.8242	
p value	0.55			



Family history of diabetes

Family history	Cases(smokers)		Controls(non-smokers)	
	No	%	No	%
yes	2	4	-	-
no	48	96	50	100
p	0.29			

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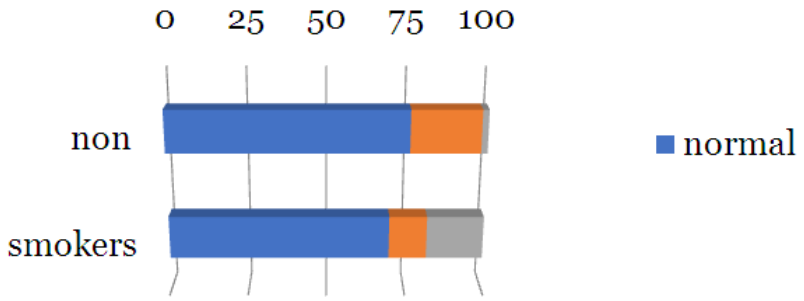
Body mass index	Cases(smokers)		Controls(non-smokers)	
	No	%	No	%
Normal(<25)	35	70	45	90
Over-weight(25-29.9)	12	24	4	8
Obese(30 and above)	3	6	1	2
p value	0.043			

Blood pressure	smokers		Non-smokers	
	No	%	No	%
normal	40	80	43	86
abnormal	10	20	7	14
p value	0.42			

Waist circumference	smokers	Non-smokers
Normal Male <102cm, female<88cm	48	50
Abnormal Male >102cm Female >88cm	2	0
P value	0.2909	

Fasting blood sugar	smokers		Non-smokers	
	No	%	No	%
normal	35	70	38	76
impaired	6	12	11	22
diabetes	9	18	1	-2
p value	0.018			

Glycemic status and smoking



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IV. DISCUSSION

Among the 100 participants in my study, 50 are smokers and 50 non-smokers.

The mean age of the participants was 41.5 yrs.

In my study, out of 50 smokers, 6 had impaired glucose tolerance and 9 had diabetes, the prevalence of diabetes was also more among smokers than non-smokers.

Carolie et al conducted asystematic review and meta-analysis of studies describing the association between active smoking and incidence of diabetes or other glucose intolerance which also indicated that active smokers had 44% increased risk for developing type 2 diabetes compared with non-smokers.

In another study by Sulander T. et al, they found that heavy smokers and current smokers were at risk of obesity and diabetes.

A study Beziaud et al (2004) also concluded that current and past smoking were associated with a risk of diabetes mellitus essentially in men.

Thus the statistical association between former smokers & glycemic status was supported by the above studies.

Thus, my study clearly correlates with many trials, which showed an increased risk of developing diabetes among smokers.

We found that among participants, smoking had a significantly higher incidence of obesity compared to never smokers.

In a study by Sulander T et al(2007) , they found that, “compared to non-smokers, ex-heavy smokers had higher and current light smokers lower relative risk of obesity”.

In another study by ArnaudChiolero et al (2007), obesity was associated in a graded manner with the number of cigarettes daily smoked, particularly in men.

Thus, the present study correlates that smoking is positively related to body weight. Most of the participants in our study also found to smoke a lot, which also favors our study of increased BMI

V. CONCLUSION

Tobacco smoking showed a significant positive association with glucose intolerance/diabetes, the possible operative mechanisms being

1. Smoking stimulates sympathetic system, which in turn leads to elevated catecholamine levels and thereby insulin resistance.
2. Smoking influences visceral adipose tissue and thereby insulin resistance.
3. Smokers(especially heavy smokers) are prone for unhealthy food habits and low physical activity which in turn leads to visceral fat accumulation and insulin resistance.
4. Smoking directly influences insulin sensitivity and impairs insulin action.

This study adds that

A strong positive association exists between tobacco smoking and glucose intolerance / frank diabetes.

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