

EVALUATION OF CHARACTERS AND WBC DIFFERENCES BETWEEN DIABETES - COMPLICATIONS AMONG WORKERS OF FIRE AND MATCH FACTORIES IN SIVAKASI AREA

STUDY CONDUCTED & PRESENTED

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Introduction

- Diabetes is a group of chronic diseases characterized by hyperglycemia.
- Generally the injurious effects of hyperglycemia are separated into Micro and Macro vascular complications
- Diabetics is a disease that is strongly associated with both micro vascular and macro vascular complications, including retinopathy, nephropathy, neuropathy, peripheral vascular disease, and cerebral vascular disease resulting organ and tissue damage in approximately one third of people with diabetes (UKPDS, 1990).
- Aldose reductase an initial enzyme in the intracellular polyol pathway is said to participates in the development of diabetic complications.

Introduction

- It has suggested that a chronic low grade activation of the immune system may play a role in the pathogenesis of type 2 diabetes.
- Altered markers of inflammation such as high WBC, Plasma fibrinogen, PAI-1, gamma globulin & lower globulin are associated with later development of type 2 diabetes.

Complications of Diabetes

Microvascular Complications

Diabetic Retinopathy

Leading cause of blindness in working-age adults



Diabetic Nephropathy

Leading cause of end-stage renal disease



Diabetic Neuropathy

Leading cause of nontraumatic lower extremity amputations



Macrovascular Complications

Stroke

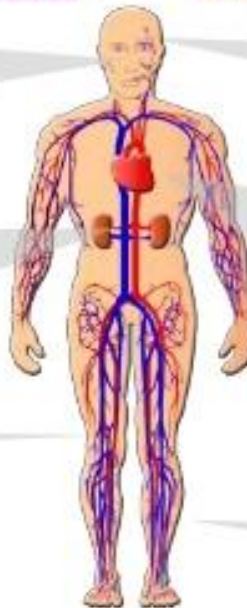
2- to 4-fold increase in cardiovascular mortality and stroke



Heart Disease



Peripheral Vascular Disease



AIM & OBJECTIVE

This study was done to analyse the difference between various diabetic complications and to find difference in WBC count in subjects with diabetic complications.

Design and Method of the study

AREA

Sivakasi, Virudhunagar district of Tamilnadu.

PARTICIPANTS

173 subjects of 99 male and 74 female having diabetes along with diabetic complications such as diabetic nephropathy, diabetic cardiopathy, diabetic neuropathy & diabetic retinopathy were selected.

Clinical Analysis

1. BMI
2. Hemoglobin
3. Random blood glucose
4. Cholesterol
5. Creatinine
6. Urea
7. Total WBC count
8. Differential count



RESULTS

DIFFERENCE BETWEEN THE BEHAVIOURAL AND CLINICAL FACTORS AMONG THE DIABETIC COMPLICATIONS

SL. NO	PARAMETERS	NEPHRO	CARDIO	NEURO	RETINO	P-VAL
		28	50	48	47	
1	Male %	42.9	44	47.9	36.2	0.709
	Female %	57.1	56	52.1	63.8	
2	Age (yrs)	51.9	51.5	54.9	52.6	0.928
3	Detected age(yrs)	46.8	46.3	50	44.9	0.69
4	Duration(yrs)	5.1	5.2	4.8	7.7	0.018
5	BMI (kg/m ²)	24.7	25.8	25.9	25.5	0.459
6	SBP(mmHg)	134	135	134.9	133.3	0.247
7	DBP(mmHg)	83.7	84.6	85	81.2	0.308
8	HB(gm)	11	11.4	10.6	11.5	0.226
9	Glucose(mg/dl)	171.8	200.1	189.1	178.3	0.757
10	Cholesterol mg/dl	182.8	230.4	197.3	200.1	<0.001
11	Creatinine(mg/dl)	2.74	1.23	1.39	1.27	<0.001
12	Urea(mg/dl)	72.8	40.8	46.6	42.3	<0.001
13	Married %	75	76	79.2	85.1	0.754
	Unmarried%	3.6	4	0	2.1	
	Widow%	21.4	20	20.8	12.8	
14	Non veg%	78.6	76	81.3	59.6	0.083
	Veg%	21.4	24	18.7	40.4	

DIFFERENCE BETWEEN THE BEHAVIOURAL AND CLINICAL FACTORS AMONG THE DIABETIC COMPLICATIONS

CONTD...

13	Married %	75	76	79.2	85.1	0.754
15	Smoking					
	No%	60.7	48	60.4	51.1	0.535
	Yes%	39.3	52	39.6	48.9	
16	Alcoholic					
	No%	57.1	62	64.6	70.2	0.693
	Yes%	42.9	38	35.4	29.8	
17	Physically					
	Inactive%	25	30	39.6	23.4	0.334
	Active%	75	70	60.4	76.6	
18	Education					
	Primary%	35.7	42	47.9	38.3	0.299
	Secondary%	46.4	48	50	44.7	
	Higher%	17.9	10	2.1	17	
19	Income					
	Low%	53.6	56	58.3	46.8	0.747
	Medium%	32.1	32	35.4	44.7	
	High%	14.3	12	6.3	8.5	
20	FH_ %	64.3	66	77.1	59.6	0.321
	FH+%	35.7	34	22.9	40.4	
21	Hypertension					
	No%	39.3	10	41.7	42.6	0.001
	Yes%	60.7	90	58.3	57.4	

OBSERVATIONS

- The food habit revealed significant difference ($p=0.083$) with various complications.
- Other behavioural and socio economic factor not showed any significance.
- Duration of diabetes ($p=0.018$) found to be significant. Retinopathy was found in workers with longer duration (7.7yrs) of diabetes.
- Cholesterol, Creatinine and urea showed ($p=0.001$) significant difference between the complications.
- Cholesterol amount (230.4 mg/dl) was high, but Creatinine (1.23 mg/dl) and urea (40.5 mg/dl) level was less in workers with cardio vascular complications.
- At the same time Creatinine and urea level was found more in workers with Nephropathy.
- All Workers with cardiovascular complication (90%) were found to be hypertensive.
- Primary education (47.9%) and low income level (58.3%) workers were found to have Nephropathy in contrast higher education and high income level diabetic workers were having Neuropathy.
- Almost 50 % Workers with smoking habit were found with cardio vascular complication

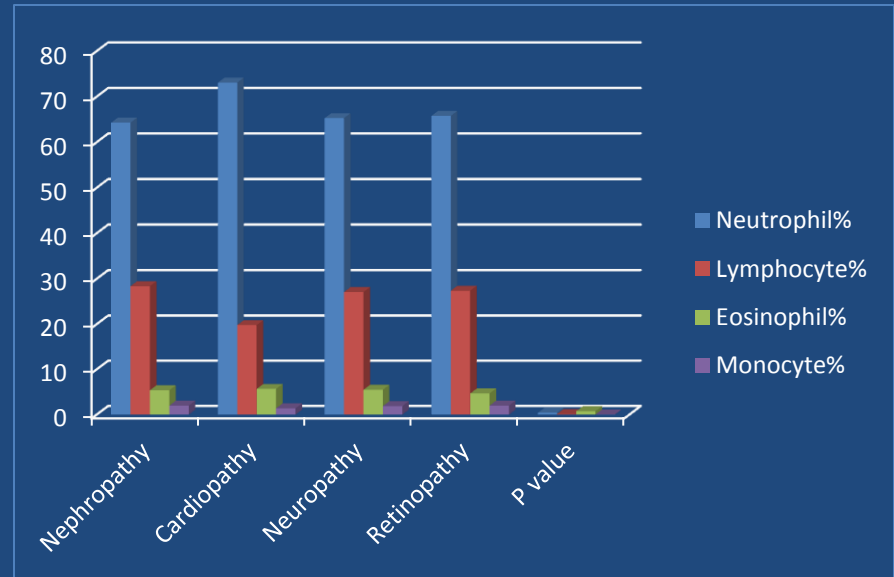
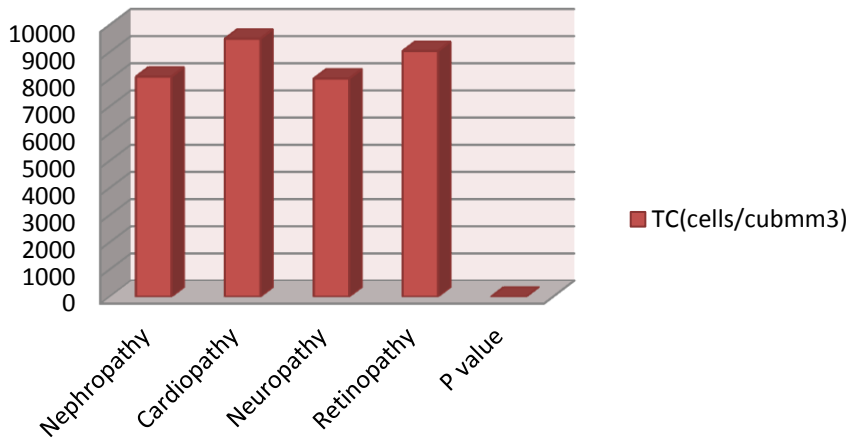
Total & Differential Count between various Complications

Parameters	Nephropathy	Cardiopathy	Neuropathy	Retinopathy	P value
No of subjects	28	50	48	47	
TC(cells/cubm m3)	8103.6	9498	8031.3	9047	0.049
Neutrophil%	64.3	73.1	65.3	65.8	0.431
Lymphocyte%	28.4	19.8	27.1	27.4	0.143
Eosinophil%	5.4	5.7	5.5	4.7	0.764
Monocyte%	2	1.4	1.9	2	0.055

- Total WBC count ($p=0.049$) and Monocyte count ($p=0.055$) showed significant difference between the diabetic complications.
- TC was high in workers with cardiovascular disease compared to other diabetic complications.
- Neutrophil count was more and lymphocyte count was less in workers with cardiovascular disease concurrently
- Neutrophil count was less and lymphocyte count was more in workers with Nephropathy.

Graphical representation of the total and differential count between various Complications

TC(cells/cubmm3)



Discussion

- Neuropathy was found common in physically inactive persons. Because of their nerve related problem, they were not doing any physical activity. Out of all diabetic complication, cardiovascular disease was found more among fire and match factory workers. It is evident that Diabetic patients carry an increased risk for cardiovascular disease, compared to the general population (Hanefeld *et al.*, 1996).
- Previous epidemiologic studies documented (Turner *et al.*, 1996 and Lehto *et al.*, 1997) by the ARIC Study found that among adults with diabetes, cigarette smoking, hypertension, and total cholesterol were associated positively and independently with incident coronary heart disease.
- In accordance with previous results, the present study found more diabetic complications in males than females, but it did not find significant differences in the prevalence of complications between men and women. UKPDS (1995) and Turner *et al.*, (1996) also reported the same result.
- WBC count is significant among all the diabetic complications demonstrates that the role of inflammation in the development of diabetes mainly type 2, Barbora vozarova et al.

Conclusion

- This data indicates that there are certain characters that is significant among particular complications of diabetes.
- The match factory and the fire work workers of the industries in and around sivakasi, Tamil Nadu, India have poor life style with sedentary work.
- The chemical pollution, unhealthy diet, smoking habit, stress due to uncertainty in life were few major contributory factors for the diabetes and its complications.
- Untreated long duration diabetes has lead to cardiovascular, retinopathy and neuropathy complications in these fire and match workers than others.
- Increase in WBC count also suggest that the inflammation is the possible pathogenesis in the diabetes and could be insulin resistance. It is also hypothesised that IL-6 not only increases WBC but also causes insulin resistance.

Thank you