

## RESULTS

A total of 500 diabetic patients (84 male , 416 female) were examined .  
Results were tabulated and summerized as follow .

### 1- Classification in genral

152 cases (37 male , 115 female) insulin dependant diabetes mellitus (IDDM)

341 cases (47 male , 294 female) non insulin dependant diabetes mellitus (NIDDM)

1 case (female) secondary diabetes

6 cases (female) gestational diabetes

### 2- Average duration

**Table (1) :- range of duration (in years) of diabetes of the studied diabetics according to their type of diabetes .**

Type of diabetes	X	$\pm$ S . D	Range	
			Minimum	Maximum
IDDM (n = 152)	8.7	$\pm$ 6.1	0.1	30.0
NIDDM (n = 341)	4.7	$\pm$ 4.0	0.1	29.0
Secondary (n = 1)	10.0	$\pm$ 0.0	10.0	10.0
Gestational (n =6)	7.5	$\pm$ 2.2	5.0	10.0

The mean duration was higher in secondary diabetes X 10.0 .  
Than in the IDDM ( X 8.7  $\pm$  S.D 6.1 ) but the maximum range of duration was with IDDM 30.0

**3- Follow ups :**

(100) Patients had recent history of diabetes mellitus  $\leq 6$  months .

(400) Patients were old diabetics cases .

Out of the 500 patients 251(50.2%) had skin lesions .

**4- Table (2) :- Prevalence of skin lesion among the studied diabetics according to type of diabetes mellitus .**

Skin lesion	IDDM		NIDDM		Secondary		Gestational		Total	
	No	%	No	%	No	%	No	%	No	%
Present	68	44.7	178	52.2	1	100	4	66.7	251	50.2
Abscent	84	55.3	163	47.8	0	0.0	2	33.3	247	49.8
Total	152	100.0	341	100.0	1	100	6	100.0	500	100.0

Gestational diabetes has highest prevalence of skin lesion but there is no significant difference between IDDM and NIDDM  $p > 0.05\%$  ,  $Z = 2.268$

**6- Table (4) :- Range of age (in years) among the studied dibetics according to their type of diabetes mellitus .**

Type of diabetes	Range		X	± S . D
	minimum	maximum		
IDDM ( n = 152)	16.0	70.0	49.7	± 12.5
NIDDM (n = 341)	14.0	80.0	51.1	± 10.2
Secondary (n = 1)	17.0	17.0	17.0	± 0.00
Gestational (n = 6)	35.0	45.0	38.7	± 3.90

There was no significant difference between IDDM & NIDDM

t 1.504      P > 0.05

**7- Table (5) :- Sex distribution of the studied diabetics according to the type of diabetes mellitus.**

Type of diabetes	Male		Female		Total		Z	P
	No.	%	No.	%	No.	%		
IDDM	37	44.0	115	27.6	152	30.4	2.981	< 0.05
NIDDM	47	56.0	294	70.7	341	68.2	2.643	< 0.05
Secondary	0	0.0	1	0.2	1	0.2	0.450	> 0.05
gestaional	0	0.0	6	1.5	6	1.2	1.107	> 0.05
Total	84	100.0	416	100.0	500	100.0		

The prevalence of different types of diabetes mellitus was higher in females than males . In IDDM & NIDDM the difference was Significant between male & female

P < 0.05                      Z 2.981 (IDDM)

P < 0.05                      Z 2.643 (NIDDM)

**10- Table (8) :- Cutaneous manifestation of the studied group according to their occupation**

Skin lesion	Employee		Non employee		Total		Z	P
	No.	%	No.	%	No.	%		
Vascular	6	21.4	22	78.6	28	100.0	3.685	< 0.05
Infection	25	16.8	124	83.2	149	100.0	10.852	< 0.01
Neurological	2	40.0	3	60.0	5	100.0	0.456	> 0.05
Drug reaction	0	0.0	2	100.0	2	100.0	-	-
Associated	13	19.4	54	80.6	67	100.0	6.333	< 0.01
Total	46	100.0	205	100.0	251	100.0		

The prevalence of all skin lesion were found to be more in non employee than employee with significant difference in all cutaneous manifestation except neurological disorder .  $P > 0.05$

**11- Table (9) :- range of duration of the diabetes mellitus among the studied diabetics according to their cutaneous manifestation .**

Skin lesion	X	± S.D	Test of significance	
			T	P
Vascular (n = 28)	8.857	5.516	4.030	< 0.01
Infection (n = 149)	6.367	5.442	2.631	< 0.05
Neurological (n = 5)	13.600	3.209	4.057	< 0.01
Drug reaction (n = 2)	3.00	0	0.601	> 0.05
Associated (n = 67)	2.404	6.378	3.413	< 0.05
Total (n = 251)			-	-

Longest duration was found with neurological complication and it was highly significant  $P < 0.01$  .

**12- Table (10) :- Cutaneous manifesation of the studied group according to the type of diabetes mellitus .**

Skin lesion	IDDM		NIDDM		Secondary		Gestational		Total	
	No	%	No	%	No	%	No	%	No	%
Vascular	13	19.1	14	7.9			1	25.0	28	11.1
Infection	47	69.1	101	56.7			1	25.0	149	59.4
Neurological	5	7.4							5	2.0
Drug reaction			2	1.1					2	0.8
Associatad	3	4.4	61	34.3	1	100.0	2	50.0	67	26.7
Total	68	100.0	178	100.0	1	100.0	4	100.0	251	100.0

Vascular complication was highest with gestational diabetes, neurological complication seen only in IDDM,



**13- Table (11):- range of fasting bl. sugar among the studied diabetics according to their cutaneous manifestation .**

Skin lesion	X	S.D	Test of significans	
			T	P
Vascular (n = 28)	240.1	± 84.3	0.196	> 0.05
Infection (n = 149)	240.4	± 76.8	0.419	> 0.05
Neurological (n = 5)	379.0	± 121.1	3.807	< 0.05
Drug reaction (n = 2)	150.0	± 00.0	1.498	< 0.05
Associatad (n = 67)	240.1	± 84.4	0.270	> 0.05

Highest fasting blood sugar was found with neurological complications .

Which was of significant  $P < 0.05$

**14- Past history and family history of skin lesions were irrelevant**

**15- Type of organism :**

Bacterial infection was mostly with staphylococcal aureus (35 cases , 7%) and only one case had staph and pseudomonas.

Fungal infection was mostly with epidermophyton (22 cases , 4.4%) and trichophyton (20 cases , 4%) .

## Discussion

Diabetes mellitus is the most common of the endocrine disorders . The metabolic derangement with diabetes mellitus is frequently associated with permanent and irreversible functional and structural changes in the cell of the body .

Those of the vascular system being particularly susceptible . The changes lead in turn to the development of well defined clinical entities . No organ system appears to be immune from the effects of this disease, the skin is one of the organs affected by diabetes (*Huntely, 1986*) .

### **Presentation of diabetic patients :**

Many patients are first noted to have glycosuria. In routine examination they may have had few or no symptoms and no abnormal physical signs . Some patients present with some of all of the classical symptoms of diabetes as thirst , polydipsia , polyuria, nocturia tiredness, loss of weight, pruritus vulvae or balanitis , impotence, a change in refraction usually in the direction of myopia and parathesia or pain in the limbs . Diabetes may first present as a fulminating ketoacidosis associated with an acute infection or even without evidence of a precipitating cause and in such cases epigastric pain and vomiting may be the presenting complication. Patients may present with symptoms due to complication of diabetes and the

physical signs depend very much on the mode of presentation.  
(*Leslic, 1985*).

The skin has changes which may initiate or predispose to various cutaneous manifestations associated with diabetes mellitus . The main skin changes with diabetes are vascular , infection , neurological, drug reaction, associated dermatosis and may have no cutaneous manifestation .

### **Vascular :**

Microangiopathy. The relation between microangiopathy and diabetes is so far unclear , it is considered by some as an independant hereditary defect linked in some way to hereditary diabetes (*Jelinek, 1986*) other think that it is secondary to intermediate metabolites or inadequate insulin secretion with resultant overproduction of basement membrane or a slowing down of its turn over . Also there are those who look at it as an expression of an immunological injury . However it is now accepted that microangiopathy is characteristic although not specific for diabetes mellitus (*Haim et al., 1973*) .

Some studies reported a positive correlation between thickness of basement membrane and duration of diabetes mellitus .

While others reported that basement membrane thickening does not changes with the duration of diabetes in fact diabetics differ markedly in their susceptibilty to the various manifestation of microangiopathy .

Some patients may have advanced difficulty only a few years after the onset of their disease , while others live for many years with no serious problems. There is a latent period in which there are no physical finding that clearly angur the development of serious trouble (*Jelinek, 1986*) .

According to the hypothesis that the vascular changes may be related to the aging process, a correlation between vascular wall thickening and the age of diabetic patient rather than with the duration of the disease was suggested (*Yasuda et al., 1990*) .

Researchers agree that the moderate reduction in blood glucose level obtained in most diabetic does not prevent vascular complications others reported that with the method of insulin administration currently available, vigorous glucose control has little or no beneficial effect on the progression of diabetic microangiopathy . In fact the question of whether strick control of diabetes helps to delay, prevent or reverse the complication associated with microangiopathy still has no clear answer (*huntley, 1982*) .

Incidence of diabetic bullae is rare but it is specific to diabetes mellitus

In this study the incidence of diabetic bullae was 0.6% which is comparatively high and forms the third common vascular disorder in the studied group .

### **Rubeosis :-**

*Gitelson and Kapliinesky , 1965* in a prospective study of rubeosis it was found that 40% of the studied group had rubeosis .

In this study rubeosis was found in 1.4% of patients which formed the highest percentage among the vascular complication .

### **Punched out ulcer :-**

In this study 0.4% of patients had skin ulcer .

Ischemic skin ulcer was 0.8% and it formed the second highest percentage .

### **Infection :-**

In case of skin infection with diabetes , it is not clear whether the diabetic host is more susceptible to infection or less able to deal with an infection once it is established . (*Savin ; 1979*)

The pyogenic and fungal skin infection are increased significantly in patients who lack long term good glycemic control . Good glycemic control is necessary for decreasing the occurrence of skin infection in diabetic patients. The successful treatment of infection especially with candidiasis usually involves normalizing blood glucose level (*Huntley, 1989*) .

About 10% of diabetic patients suffer from peripheral neuropathy. The ability to recognize diabetic neuropathy permits a dermatologist to confirm the presence of diabetes such recognition is important because some complication of diabetic neuropathy may be prevented by proper metabolic control of diabetes mellitus (*Pirart, et al., 1978*) .

From this study, neurological ulcers (1%) . Was found more in IDDM with highest fasting blood sugar of all cases and also more in rural than urban diabetics who were non employee .

#### **Drug reaction :-**

Photodermatitis has been documented infrequently especially to chlorpropamide. The specific action is not known. Different types of cutaneous reaction may be seen clinically as intermittent or persistent pruritus or maculopapular eruption (*Jegasothy; 1986*) . Allergic reaction are uncommon mild and self limited,. In this study drug reaction occurred in two female patients taking oral hypoglycemic drugs (glucophage). The reaction was maculopapular eruption as was prescribed in the literature .

#### **Lipodystrophy :-**

In this study one case of Lawrence Seip syndrome which is a rare syndrome with total fat atrophy all over the body with IDDM, aged 17

year with eruptive xanthoma all over the buttock and the hands was reported.

**Associated dermatosis :-**

It has been estimated that disseminated form of grannuloma annulare has a relation to diabetes mellitus , while a relation with localized form does not exist its pathogenesis in cases of diabetes mellitus is still unclear (*Huntley; 1982*) .

Most of the cutaneous manifestations of diabetes mellitus still has no clear explanation for their pathogenesis . Also, the relationship between skin disease associated with an increased incidence of diabetes and diabetes mellitus is still unclear and further studies are needed in this field .

Previous estimations of prevalence of skin manifestation of diabetes were about 30% .

In fact actual prevalence of diabetic skin manifestations probably approaches 100% if one looks for metabolic effects on the microcirculation and collagen changes in skin (*Huntley, 1989*) .

**Associated dermatosis :-**

**Sclerodema adultorum or diabeticorum :**

It has been estimated that 2.5% of diabetics may suffer from this skin condition (*Sammuel Moschela 1992*) .



Recent incidence is about 3% (*Steven et al., 1994*) .

In this study incidence of Sclerodema diabeticorum is about 0.2%

### **Eruptive xanthomas of diabetes .**

Insulin is necessary for the normal plasma triglyceride clearing action of lipoprotein lipase (*Eckal, 1989*) .

In this study incidence of eruptive xanthomas of diabetes was about 0.2% . A previous reported incidence for it was not available .

### **Skin tags :**

Skin tags occur more in female than male with an incidence of 2:1

Obesity is often associated with the development of skin tags (Waisman; 1957) .

It was found that about 26% of patients with skin tags had diabetes mellitus (*Kahna et al., 1986*) .

In this study the incidence of Skin tags was about 5% and they were more in obese females . It represented the 3rd highest recorded incidence of skin disorders in the studied group .

### **Pruritus :**

It was found that localised anogenital Pruritus is a common finding of diabetes and candidal infection has been reported as an underlying cause for Pruritus vulvae in diabetic women . It is known that periods of glucosuria aggravate this infection (*Vallonce Own, 1969*) .

Contrary to the popular belief generalized Pruritus is not a manifestation of diabetes mellitus. Repetition of these assertion in numerous text books being based on a single 1927 report .

However intractable genital or anal itching may occur due to complicating mucocutaneous candidiasis. Localized persistant pruritus of the scalp is also recognized as a manifestation of diabetes which needs antipruritic treatment (*Scribner, 1977*) .

In this study incidence of generalized pruritus is about 4.6% which is quite high in comparison with the other findings .

### **Vitiligo :**

It was found that 4 - 5 % of maturity onset diabetics had vitiligo suggested that it is closely associated with prediabetic state and that patients with vitiligo should be watched for the development of diabetes (*Macaron et al., 1977*) .

In this study the incidence of vitiligo was about 1.2% .

### **Acanthosis nigricans :**

A combination of acanthosis nigricans and insulin resistance is found in as many as 5% of women with hyper androgenism (*Barth et al., 1988*) .

In this study incidence of acanthosis nigricans was about 0.2%.

### **Lichen planus**

An increased incidence of abnormal glucose tolerance tests in Lichen planus has been reported (*Huntly, 1986*) .

In this study the incidence of lichen planus was about 1.2% .

### **Stiffy joint**

In this study the incidence of stiffy joint was about 0.2% .

### **Dupuytren's contracture**

It does not in any way seem to be directly related to diabetes but apparently is more frequent among older diabetic than among non diabetic persons. The incidence has been previously estimated as from 12 to 32% in diabetics and as only 6% in non diabetics (*Spring et al., 1966*) .

In this study the incidence was about 0.4% .

From this work, the incidence of skin disorders in general was about 50% of the studied group which is quite high and reflects the ignorance, poverty and lack of health care among the diabetics specially those from rural regions .

## Conculsion

Diabetes mellitus is an important metabolic disease which is present all over the world. Its incidence is about 2% (*Hartlog ; 1984*) of the population, cutaneous manifestation are one of the most important complication of diabetes mellitus .Its incidence is about 30% in all diabetics . Authors put definition and description of the disease and the expected etiological factors, also a description of classification of the disease, presentation of the patient, signs and symptoms of complications of the disease which include :-

- 1- vascular : microangiopathy and macroangiopathy .
- 2- Infection : bacterial fungal .
- 3- neurological : sensory or motor .
- 4- Associated dermatosis which may be a marker for diabetes as diabetic dermopathy, generalized granuloma annulare , necrobiosis lipodica and others .

Diabetes mellitus can be treated by insulin and oral hypoglycemic agents which may cause cutaneous complications in the form of photosensitivity and allergy which may be acute or delayed or biphasic . Many other manifestations occur due to diabetic treatment as lipoatrophy which is one of the important features due to insulin treatment and occur at the site of the injection of insulin. Question now what is the relationship between hyperglycemia and this complication ?

Simply put are complication due to hyperglycemia or are they due to genetic or other factors independant of hyperglycemia ? This is the central clinical question in diabetes .

Hyperglycemia is the most obvious metabolic abnormality in diabetes . It is therefore resonable to suspect that elevated glucose play a role in diabetic complications . Consistant with this is a large body of retrospective evidence showing that better control is usually associated with fewer complications . Unfortunately in the absence of randomized prospective studies in which significant difference in glycemic control are achieved between matched experimental and control groups over an expanded period, current clinical studies can provide only non conclusive evidence .

Classic diabetic complication can occur in secondary diabetes in which genetic aspects of diabetes are presumably missing and in normal kidneys following transplantation into diabetic patients . Certain abnormalities seen in diabetes such as retinal capillary leakage as demonstrated by fluorescein angiopathy, slowed motor nerve conduction and microalbuminuria can be reversed by intense insulin therapy but the relationship between these pathological abnormalities and clinically significant complication has not been demonastrated. On the other hand some patient with very poor glycemic control never develop complication perphaps independant of IDDM .

In a prospective study in human in NIH sponsored multicenter study called the diabetic control and complication trail (DCCT) was done and first published at the American Diabetes Association meeting in Las Vegas in June 1993 . (DCCT) demonstrated a continuous relationship between prevailing glycemic control and risk of complications .

Thus any improvement in glycemic control lessens risk . (*Jay, 1994*)

Taking all factors into account it seems reasonable to conclude that although a definitive relationship between hyperglycemia and complication has been neither established nor disproved at present, the bulk of evidence weights in favour of such a relationship . With this in mind it seems prudent to establish a therapeutic goal (the maintenance of plasma glucose level as close to normal as possible in diabetic patients) .

The major complication of aggressive antidiabetic therapy is hypoglycemia, which if sever enough can produce immediate and reversible CNS damage .

Therefore diabetic management should be pushed until glucose levels are normal or near normal .Other theraputic goals include .

1- Normal growth and development in children .

- 2- Normal pregnancy and childbirth in females .
- 3- Reduction of diabetes related atherosclerosis risk factors especially in old diabetic patient .
- 4- Minimal interference with normal lifestyle in all diabetic .

From this work, the incidence of skin disorders in general was about 50% of the studied group which is quite high and reflects the ignorance, poverty and lack of health care among the diabetics specially those from rural regions .

So to all mentioned skin manifestation of diabetes mellitus the dermatologist, diabetologist and surgeons must give an attention to the cutaneous complication of diabetes mellitus and more health care is required for the diabetic patients .

## **Summary**

Diabetes mellitus is a heterogenous primary disorder of carbohydrate metabolism with multiple etiological factors that generally involve absolute or relative insulin deficiency or insulin resistance or both. All causes of diabetes ultimately lead to hyperglycemia, which is the hallmark of the disease .

### **Classification of diabetes :-**

- 1- Insulin dependent or type I . Formerly called juvenile onset or ketosis prone diabetes .
- 2- Non insulin dependant or type II diabetes NIDDM . Formaly called maturity onset or non ketotic diabetes .
- 3- Secondary diabetes .
- 4- Impaired glucose tolerance .
- 5- Gestational diabetes .

Previous estimations of prevalence of skin manifestations of diabetes were about 30% . In fact the actual prevalence of diabetic skin manifestation probably approaches 100% if one looks for metabolic effects on the microvascular and collagen changes in skin .

The main skin changes associated with diabetes are :-

Vascular , infection , neurological , drug reaction ,and associated disorders .



**The results of the clinical work :-**

- 1- Vascular complication were more in female with high fasting blood sugar with long history of diabetes also in patients with positive family history .
- 2- infection mostly with staph aureus, few cases with staph aureus and pseudomonous in females with type II NIDDM with high fasting blood sugar, house wives and more in rural areas .
- 3- Neurological complication more in IDDM with highest fasting blood sugar of all complications more in rural than urban diabetics.
- 4- Drug reaction with oral hypoglycemic drugs (glucophage) in the form of maculopapular rash . There is no significant rise in blood sugar and also occur in house wives from rural areas .
- 5- Associated dermatosis in this study the incidence as the following :
  - a- Sclerodema diabeticorum 0.2%
  - b- Eruptive xanthoma 0.2%
  - c- Skin tags 5%
  - d- Pruritus 4.6%
  - e- Vitiligo 1.2%
  - f- Acanthosis nigricans 0.2%
  - g- Lichen planus 1.2%
  - h- Stiffy joint 0.2%
  - i- Dupuytren's contracture 0.4%