

## A Study of Cutaneous Manifestations Associated with Diabetes Mellitus at a Tertiary Care Teaching Hospital

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### ABSTRACT

**Background:** Diabetes mellitus has emerged as a major public health problem in our country, and our country has a distinction of having the largest number of diabetics in the world. Only a few epidemiologic studies have been done on the prevalence of skin disorders in patients with diabetes mellitus. Present study was conducted to study of cutaneous manifestations associated with diabetes mellitus at a tertiary care teaching hospital. **Methods:** 200 patients with Diabetes Mellitus, visiting the Department of Medicine and Department of Dermatology (outpatient and inpatient) of Uttar Pradesh University of Medical Sciences, Saifai, Etawah, UP (India) during the period of 1 yr. from April 2015 to March 2016 were included in the study. Detailed history was taken as per proforma and patient investigated. **Results:** Maximum incidence was seen between 41-70 yrs. of age and in middle class. Infections and infestations were the commonest associations detected in 49.5% of cases out of which fungal infections were observed in majority of the cases (24.5%) followed by bacterial infection (15.5%) and viral infections (7.0%). Psoriasis and xerosis were detected in 6.0 % of cases each. Skin disease strongly associated with diabetes mellitus like vitiligo were observed in 3.5 % of cases. **Conclusion:** Skin lesions in Diabetes mellitus are sometimes mirror to an underlying disease process and they may be the first expression of the disease. Most of the diabetic patients who developed cutaneous manifestations were in the 41-70 year age group, and infections were the single largest type of involvement seen. Cutaneous lesions can serve as cutaneous markers for DM. These can be detected by a simple cutaneous examination. The commonly seen nonspecific skin manifestations can also be used as skin markers for DM. This can be especially useful in the rural areas where advanced facilities are often unavailable.

**Keywords:** Diabetes mellitus, Cutaneous manifestations, Skin Lesions.

### INTRODUCTION

Diabetes mellitus is the most common endocrine disorder characterized by the abnormalities of insulin and elevated blood glucose level to metabolic, vascular, neurological and immunological abnormalities. Diabetes mellitus has emerged as a major public health problem in our country, and our country has a distinction of having the largest

number of diabetics in the world.<sup>[1]</sup> The International Diabetes Federation (IDF) estimates the total number of diabetic subjects to be around 40.9 million in India and this is further set to raise to 69.9 million by the year 2025.<sup>[2]</sup> Estimates by WHO suggest that the number of diabetic subjects would increase to 80 million by the year 2030 in India.<sup>[3]</sup> The cutaneous manifestations of DM are well known and considered as common, as observed in 30–71% of diabetic patients.<sup>[4,5]</sup> Abnormalities in the metabolism of carbohydrates, alteration of metabolic pathways, vascular involvement in the form of atherosclerosis, microangiopathy and neuronal involvement in the form of sensory, motor and autonomic neuropathies and impaired host mechanisms, all play a role.<sup>[6]</sup> The prevalence of cutaneous infections occurs more commonly in DM Type 2 whereas autoimmune lesions are commonly seen in DM type 1. Among the many skin manifestations in DM which vary from trivial to life threatening, none is pathognomic of the disease.<sup>[7]</sup>

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Research efforts around the globe are continually improving our understanding of the cause of and optimal strategies to minimize considerable morbidity and mortality associated with the cutaneous manifestations of disease, which demands a highly motivated approach to the therapy. It is suggested that these skin changes may eventually be used as a reflection of the patient's current as well as past metabolic status. A study of the dermatological manifestations in diabetics may enlighten us on the various manifestations and help in early diagnosis of diabetes, along with effective management.

Only a few epidemiologic studies have been done on the prevalence of skin disorders in patients with diabetes mellitus.<sup>8-10</sup> Present study was conducted to study of cutaneous manifestations associated with diabetes mellitus at a tertiary care teaching hospital.

## MATERIALS AND METHODS

200 patients with Diabetes Mellitus, visiting the Department of Medicine and Department of Dermatology (outpatient and inpatient) of Uttar Pradesh University of Medical Sciences, Saifai, Etawah, UP (India) during the period of 1 yr from April 2015 to March 2016 were included in the study. Institute ethical clearance was obtained before the start of the study. Those patients not willing to take part in the study and those with gestational diabetes were excluded from the study. A detailed history was taken as per the Proforma with special emphasis on examination of the entire integumentary system, including the skin, hair, oral mucous membrane, genital mucosa, perianal areas and nails.

Routine laboratory investigations were carried out of all patients that includes complete blood count with erythrocyte sedimentation rate, fasting blood sugar and post prandial blood sugar and urine examination (routine and microscopy).

The other investigation will be tailored as per the cutaneous lesions found in the patients.

These includes Wood's lamp examination, Skin scraping and KOH (potassium hydroxide) mount for fungal study, Gram stain, Fungal culture, Tzanck smear, Skin biopsy (Hematoxylin-Eosin and special stains when required), Lipid profile, VDRL, ELISA for HIV-I and HIV-II (where risk factors of HIV exist) etc.

To confirm the diagnosis, a skin biopsy was done in a few cases. The results were tabulated and analyzed. In the present study, we used body mass index (BMI) of  $\geq 30$  as a cut off value to define obesity.

## RESULTS

The present study was conducted over a period of one year from April 2015 to March 2016. A total of 200 cases were included in this study which comprises of 119 male patients (59.5%) and 81 female patients (40.5%). The study reveals that peak incidence of diabetes mellitus with cutaneous manifestation was between 41-70 years of age (73.5%). Majority of patients (67 patients, 33.5%) belonged to middle class. This was followed by lower class (62

patients, 31.0%), poor class (38 patients, 19.0%) and high class (33 patients, 16.5%). A positive family history of diabetes was elicited in 31.5% of cases (34 male and 29 female patients). (Table 1)

**Table 1: Details of Study Population**

	Total	Percentage	
<b>Age Group</b>	21-30	11	5.5
	31-40	25	12.5
	41-50	58	29.0
	51-60	52	26.0
	61-70	37	18.5
	71-80	12	6.0
	81-90	5	2.5
	Total	200	100
<b>Socio-Economic Status</b>	Poor	38	19.0
	Lower	62	31.0
	Middle	67	33.5
	Higher	33	16.5
Total	200	100	
<b>History of DM</b>	Male	34	28.57
	Female	29	35.80
	Total	63	31.5
<b>Blood Sugar Levels</b>	126-200	137	68.5
	201-300	54	27.0
	301-400	8	4.0
	401-500	1	0.5
<b>Obesity</b>	Male	35	29.41
	Female	38	46.91
	Total	73	36.5

In the present study 63.5% of diabetes were found to be non-obese whereas remaining 36.5% were obese comprising of 35 male and 38 female patients. In the present study fungal infections were detected in 49 cases (24.5%), bacterial infections in 31 cases (15.5%), viral infections in 14 cases (7.0%).

Out of 31 patients with bacterial infections, furunculosis were present in 14 patients (7.0%), folliculitis in 5 patients (2.5%), erythrasma in 1 patient (0.5%) followed by ENL in 1 patient (0.5%) and leprosy in 5 patients (2.4%).

Tinea cruris, T corporis were the commonest forms, accounting for 24 cases (12.0%) followed by T. pedis in 5 cases (2.5%) while T Faciei was present in 2 cases (1.0%) only.

Out of 14 patients (7.0%) constituting viral infections, there were 4 cases of Herpes labialis, Herpes Zoster and warts each (2.0%) and 2 case Herpes genitalis (1.0%).

## DISCUSSION

In present study, incidence of DM was more common in 41-70 years of age (73.5%). This is comparable with study of previous researchers.<sup>[11-15]</sup> Nawaf Al-Mutairi stated that relative increase in the incidence of cutaneous involvement with age in diabetic patients may be attributed merely to the long duration of diabetes in these patients. In the present study majority of patients come from middle class (33.5%). Diabetes is commonly observed in middle & high class. This may be due to sedentary life style and lack of exercise. A positive family history of diabetes was elicited in 31.5% of cases (34 male and 29 female patients). Satish K. S found positive family history of diabetes mellitus in 28% of

cases.<sup>[12]</sup> Joslin et al<sup>[16]</sup> in his study observed 41% of diabetes patients had positive family history.

**Table 2: Various Skin Diseases Associated with Diabetes Mellitus**

Skin Disease	Number of Cases	Percentage
Fungal Infections	49	24.5
Bacterial Infections	31	15.5
Viral Infections	14	7.0
Xerosis	12	6.0
Contact Dermatitis	9	4.5
Vitiligo	7	3.5
Keloidal Acne	4	2.0
Psoriasis	12	6.0
Lp	8	4.0
Prurigo Nodularis	1	0.5
Scabies	5	2.5
Alopecia Areata	8	4.0
Aq Ichthyosis	5	2.5
Angular Glossitis	2	1.0
Fixed Drug Eruption	2	1.0
Urticaria	4	2.0
Diabetic Ulcer Of Foot	11	5.5
Palpabral Xanthalesma	2	1.0
Freckles	2	1.0
Burninig Feet Syndrome	2	1.0
Seborrhoeic Kerotosis	2	1.0
Acathosis Nigricans	4	2.0
L Amylodosis	1	0.5
Diabetic Hand Syndrome	2	1.0
Rosacea	1	0.5
TOTAL	200	100

Among the cutaneous disorders observed in our DM patients, infections comprised the largest group affecting 49.5% of cases. Findings were similar to previous researchers.<sup>[12-15]</sup> It is well known that diabetic patients are susceptible to infections probably due to hyperglycemia and defects in polymorphonuclear leucocyte function.<sup>[17]</sup>

Out of 31 patients with bacterial infections, furunculosis were present in 14 patients (7.0%), folliculitis in 5 patients (2.5%), erythrasma in 1 patient (0.5%) followed by ENL in 1 patient (0.5%) and leprosy in 5 patients (2.4%).

Satish K.S et al. found 29 cases of septic bacterial infections (11.6%) in their study.<sup>[12]</sup> Thomas George et al<sup>[1]</sup> and L. C. Anand<sup>[18]</sup> observed bacterial infections in 14% and 15.38% of patients respectively in their study.

Tinea cruris, T corporis were the commonest forms in fungal infections, accounting for 24 cases (12.0%) followed by T. pedis in 5 cases (2.5%) while T Faciei was present in 2 cases (1.0%) only. Satish K.S et al.<sup>[12]</sup> observed fungal infections in 67 patients (26.8%). There were 47 cases of dermatophytosis (18.8%), 14 cases of candidiasis (5.6%) and 5 cases of pityriasis versicolor (2%). Thomas George et al<sup>[11]</sup> found an incidence of 30% of dermatophytosis while D. M. Greenwood<sup>[19]</sup> et al had reported its incidence to be 40%. The present study coincides almost with study of Mahajan et al.<sup>[14]</sup> (30%).

Present study showed 8 cases (4.0%) of Lichen Planus. Satish K.S et al.<sup>[12]</sup> showed 11 cases (4.4%) of LP. Thomas George et al<sup>[1]</sup> found 2% of extensive LP in their study. This study coincides with George et al.<sup>[11]</sup> and Satish K.S et al.<sup>[12]</sup>

Infections and infestations were the commonest associations detected in 49.5% of cases out of which fungal infections were observed in majority of the cases (24.5%)

**Table 3: Infections in present study**

		Number of cases	%
Fungal Infections	T. Cruris	13	6.5
	T. Corporis	11	5.5
	T. Faciei	2	1.0
	T. Pedis	5	2.5
	C. Intertrigo	3	1.5
	C. Balinitis	2	1.0
	Pityriasis Versicolor	5	2.5
	Valvo Voginal Candidiasis	2	1.0
	Onycomycosis	4	2.0
	Paronychia	2	1.0
Total	49	24.5	
Bacterial Infections	Furunculosis	14	7.0
	Folliculitis	5	2.5
	Leprosy	5	2.5
	Carbuncle	3	1.5
	Cellulitis	2	1.0
	Erythrasma	1	0.5
	ENL	1	0.5
	TOTAL	31	15.5
Viral Infections	Herpes labialis	4	2.0
	Herpes Zoster	4	2.0
	Herpes Genitalis	2	1.0
	Warts	4	2.0

followed by bacterial infection (15.5%) and viral infections (7.0%). Psoriasis and xerosis were detected in 6.0 % of cases each. Skin disease strongly associated with diabetes mellitus like vitiligo were observed in 3.5 % of cases.

## CONCLUSION

Skin lesions in Diabetes mellitus are sometimes mirror to an underlying disease process and they may be the first expression of the disease. Most of the diabetic patients who developed cutaneous manifestations were in the 41-70 year age group, and infections were the single largest type of involvement seen. Cutaneous lesions can serve as cutaneous markers for DM. These can be detected by a simple cutaneous examination. The commonly seen nonspecific skin manifestations can also be used as skin markers for DM. This can be especially useful in the rural areas where advanced facilities are often unavailable.

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