



## Original Research Article

# Cutaneous Manifestations of Diabetes Mellitus

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## Abstract

**Background:** *Diabetes Mellitus is a common medical disorder presents with spectrum of cutaneous manifestation and up to 1/3<sup>rd</sup> of patients with Diabetes Mellitus were found to have cutaneous changes. Diabetes mellitus affects individuals of all ages and socioeconomic status. Skin manifestations are common during 5<sup>th</sup> decade of life.*

**Aim:** *To Study clinical pattern of various dermatological conditions in Diabetes Mellitus observed in Patients who attended our tertiary care centre in Karimnagar district.*

**Material and Method:** *A Total of 100 Diabetes Mellitus Patients with cutaneous manifestations attended our tertiary care Centre, Karimnagar were randomly selected in this study.*

**Results:** *Total 100 cases results were analyzed, and the Analysis shows cutaneous manifestations have slightly more predilection for Male gender (62%). Among the cutaneous Manifestation, Infections are the most common manifestation which constitute (61%). In infections, fungal infection is the most common infection. Among the fungal infection Dermatophyte constitute (59%) followed by candidal infection (41%). Second most common Manifestation is due to metabolic disorders like acanthosis Nigricans, acrochordon. The least common Manifestation is specific cutaneous markers like bullous diabeticorum, granuloma annulare and necrobiosislipoidica.*

**Conclusion:** *Diabetes patients are susceptible to cutaneous lesions which are uncommon in non-diabetes. Any patient presents with recurrent and multiple cutaneous manifestations need to be checked for diabetes immediately. The ignorance of such manifestation or improper treatment makes the condition worse and leads to complications.*

**Keywords:** *Diabetes Mellitus, Cutaneous Manifestation.*

## Introduction

Diabetes Mellitus is the most common endocrine disorder with increasing incidence and is a major cause for morbidity and mortality. Diabetes

Mellitus is characterized by a state of relative or complete insulin deficiency leading to gross defects in glucose, fat and protein metabolism. Individuals with Type II Diabetes Mellitus are

more likely to develop cutaneous manifestation than those with type I<sup>[1]</sup>. According to WHO Global presence of type II diabetes in the year 2000 was millions which is likely to be 366 millions in the year 2030<sup>[1]</sup>. The international diabetes federation estimates the total number of diabetic subjects to be around 40.9 million in India and this is further set to raise 69.9 million by the year 2025<sup>[2]</sup>. Estimates by the WHO suggest that the number of diabetic subjects would increase to 80 million by the year 2030 in India<sup>[1]</sup>. Skin lesions are frequently observed in diabetic patients and about 30% have cutaneous disorder. The cutaneous signs of Diabetes Mellitus are due to manifestation of multiple factors like abnormal carbohydrates metabolism, altered metabolic pathways, atherosclerosis, micro angiopathy and impaired host mechanism all play a role<sup>[3]</sup>. Skin manifestation may be the first clue to an underlying Diabetes Mellitus.

#### Material and Method

A Total of 100 Diabetes Mellitus Patients with cutaneous manifestations attended our tertiary care center in Karimnagar dist, Telangana were randomly selected in this study. Clinical details of patient's age, sex, duration of Diabetes Mellitus and treatment modalities were noted. The study

period is 12 months from 2017 Apr to 2018 Mar. Inclusion criteria were Diabetes Mellitus patients with cutaneous manifestation. Patients without cutaneous manifestation were excluded.

Urine and blood sugar estimation was done in all selected patients.

Relevant microbiological and histopathological investigations were done to rule out cutaneous disorders. The duration of Diabetes Mellitus observed are presented in Fig-2.

#### Results

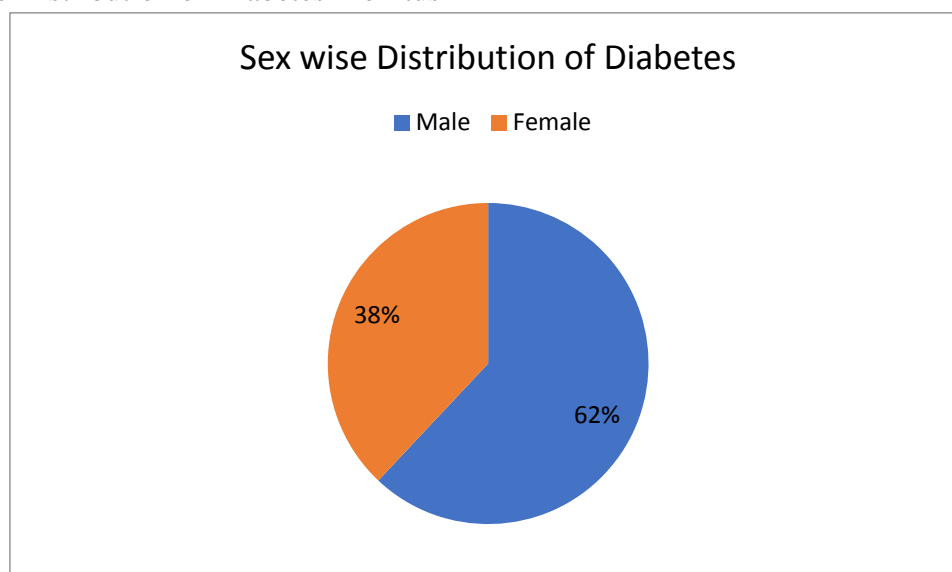
This Study Comprises of 100 patients of Diabetes Mellitus with cutaneous Manifestation. Among them 62 Males and 38 Females, the sex wise distribution of diabetes is depicted in Fig-1. The youngest patient is 28 years old and oldest is 78 with a mean age 52 years. The Male Female ratio is 1.6:1.

On Classifying cutaneous lesions, incidence of skin infections were more during first 10 years of diabetes compared to chronic diabetes.

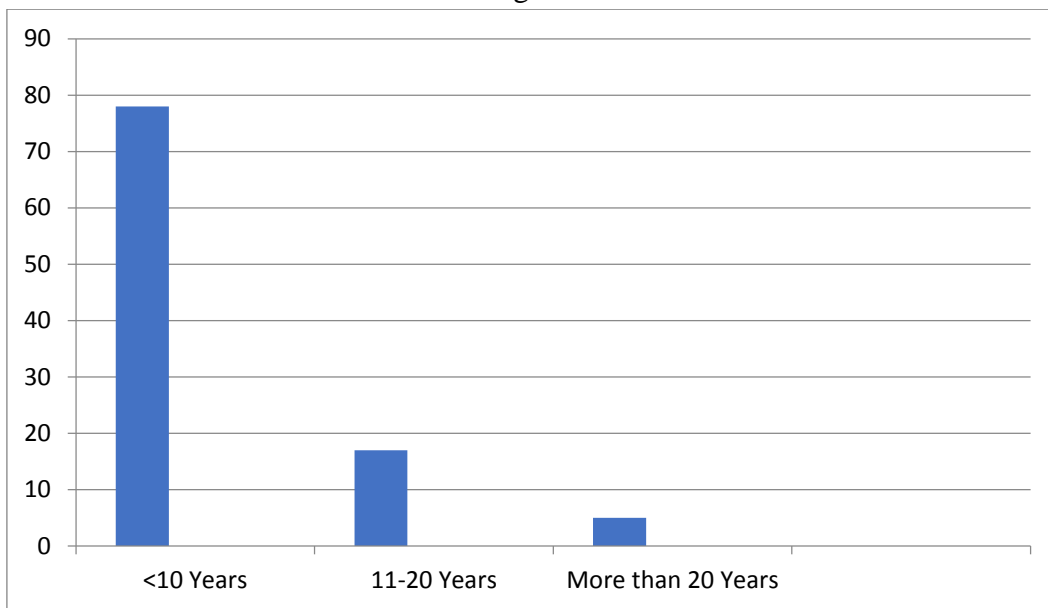
Whereas metabolic changes and diabetic specific cutaneous markers noted more with diabetes for a prolonged period.

Among the Cutaneous Manifestation, infections are the major cutaneous manifestation (61%) the other details are given on Fig III.

**Fig I** – Sex Wise Distribution of Diabetes Mellitus



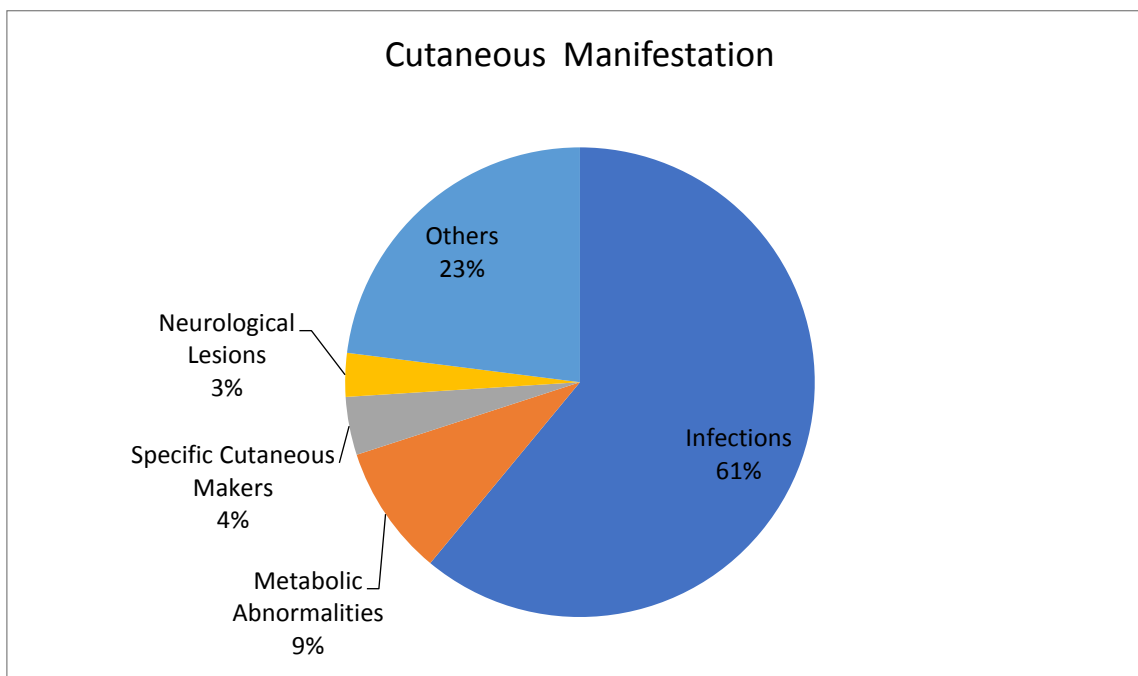
**Fig-II:** Duration of Onset of Diabetes Mellitus among Patients



**Fig-III:** Cutaneous Manifestation of Diabetes Mellitus

Cutaneous Manifestation	Number	Percentage
Infections	61	61%
Metabolic Abnormalities	09	9%
Specific Cutaneous Marker	04	4%
Neurological lesions	03	3%
Others	23	23%

**Fig-IV:** Cutaneous Manifestation in Diabetes Mellitus



Among Skin Infections observed in 61 patients [Fig: V] Fungal infections constitute common presentation (54%) followed by Bacterial (39%) and Viral (7%).

**Fig-V: Skin Infections Observed**

Infections	No. of Cases	Percentage
Fungal	33	54%
Bacterial	24	39%
Viral	4	7%

**Fig:VI – Types of Fungal, Bacterial & Viral Skin Infections**

<b>Fungal</b>	Dermatophytic	19	57%
	Candidal	14	43%
<b>Bacterial</b>	Folliculitis	14	58%
	Furuncle	9	37%
	Cellulitis	1	5%
<b>Viral</b>	Herpes Zoster	4	100%

Metabolic lesions include 9 cases, 4 acrochordon(44%) [Fig: XV], 3 acanthosis nigricans(33%)[Fig: XVI] and 2 xanthelesma palpebrum(22%)[Fig: XVII].

Specific cutaneous markers for diabetes include 4 cases, 2 bullosis diabeticorum, granuloma annulare 1[Fig: XVIII] and 1 necrobiosis lipoidica.

Neurological lesions constitute 3 cases of diabetic foot ulcer [Fig: XIX].

Other conditions constitute 23 cases (23%) these lesions include psoriasis 7 cases, lichen planus 4 cases, xeroses 3 cases , pitted keratolysis 3 cases, Acquired perforating dermatosis 3 cases, Alopecia areata 2 cases, Onychodyrrophy 2 cases, Vitilego 1case and Pruritis 1case.

**Fig-VIII: Candidal Balanopothisis**



**Fig-VII: Tinea cruris**



**Fig-IX: Candidal Vulvovaginitis**



**Fig-X:** Candidal Intertrigo



**Fig-XIII:** Cellulitis with bullous diabeticorum



**Fig-XI:** Sycosis Barbae



**Fig-XIV:** Herpes Zoster



**Fig-XII:** Furuncle



**Fig-XV:** Acrochorden



**Fig-XVI:** Acanthosis Nigricans**Fig-XIX:** Diabetic foot ulcer**Fig-XVII:** Xanthelasma palpebrum**Fig-XVIII:** Granuloma anannulare

### Discussion

Diabetes is the common endocrine disorder with Spectrum of cutaneous manifestation. As the incidence of diabetes increases, cutaneous manifestation associated with diabetes also increases. In few instants such problems are the first sign to identify that a person has diabetes.

In our study Males show more preponderance than Females (62% and 38%) which is correlating with previous study done by Abhishik Goyal et. al (57% and 46%)<sup>[4]</sup> and Dr. P Satyanarayana Rao et. al (57% and 43%)<sup>[5]</sup>

Cutaneous infections are the most common dermatoses seen in (61%) of cases of which fungal infections are more common (54%) followed by bacterial (39%) and viral(7%). Fungal infections were also predominant in studies conducted by Shahzed et. al (28.1%)<sup>[6]</sup> and Raghunatha et. al.<sup>[7]</sup>

Out of 52 patients with Fungal infection, majority had dermatophytosis (31 cases) followed by candidiasis (21 cases).

The Various candidal infections observed are candidal intertrigo (8 cases) [Fig-X], candidal balanoposthitis in (7 cases)[Fig-VIII] and candidal vulvovaginitis (6 cases) [Fig-IX].

Manjunatha.M et. al<sup>[8]</sup>, Dr. P Satyanarayana Rao et al<sup>[5]</sup> and Ramano et al<sup>[9]</sup> also observed dermatophytes as the most commonest fungal infections in diabetes patients.

Infections are common in Diabetes Mellitus patients due to decrease chemotaxis as a result of hyper osmolar serum, impaired release of cytokines and alteration in normal flora<sup>[10]</sup>.

Among 100 diabetic patients, 24 had bacterial infections of which most commonly observed were folliculitis (14 cases) [Fig-XI], furuncle (9 cases) [Fig-XII], cellulitis (1 case)[Fig-XIII] and the above finding is not correlating with results observed by Nigam et. al<sup>[11]</sup> in which furuncle is commonly found followed by cellulitis.

Among 100 patients, 4 patients had herpes zoster [Fig-XIV] the incidence is in accordance with Manjunath. M et. al<sup>[8]</sup> and Bhat et. al<sup>[12]</sup> and Al-Mutair et. al<sup>[18]</sup>.

In our study it is observed that there are 4 cases of acrochordon and its is the most common diabetes associated dermatoses. Studies by Goyel et. al<sup>[13]</sup> and Timshina et al<sup>[14]</sup> showed predominance of acrochordons (32% and 24.6%).

It may serve as a cutaneous marker for Diabetes Mellitus as was concluded by Thappa et. al<sup>[15]</sup>.

Further we observed 2 cases of Xanthelesma palpebrum a metabolic disorder. Farschian et al<sup>[16]</sup> also observed 2 cases in their study.

Insulin at high concentration stimulate insulin like growth factor receptor on Keratinocyte which in turn promote epidermal cell proliferation resulting in development of acanthosis nigricans. 3cases of acanthosis nigracans are observed in our study.

Psoriasis was seen in 7 cases lichen planus and xerosis were seen in 4 cases each pitted keratolysis and APD were seen in 2 cases each.

We did not observe any case of Rubeosis , diabetic dermopathy, diabetic scleroderma, diabetic sclerodactly. Ragunath et. al[7] observed only once case of diabetic dermopathy among 500cases.

The absence of diabetic dermopathy is attributed to shorter duration of Diabetes Mellitus in majority of our patients we enrolled and their darker complexion.

The absence of rubeosis faciei in our study is also due to darker complexion of pt we enrolled.

Among the types of cutaneous manifestation, cutaneous infection are more common with less than 10 years duration of Diabetes Mellitus where as metabolic changes and cutaneous markers were noted in patient with diabetes for prolonged

period. Similar observations were reported by Mahajan et al<sup>[17]</sup> who also found that cutaneous lesion common during first 6 years of Diabetes Mellitus.

Infections were common during early Diabetes Mellitus probably due to decrease phagocytic activity and decrease in host defence mechanism which is noticed immediately in uncontrolled Diabetes Mellitus.

### Conclusion

In our present study infections were the most common lesion (61%) followed by lesions due to metabolic disorders and specific cutaneous markers.

We conclude that the skin is involved in diabetes quite often and many a times they Serve as diagnostic marker for Diabetes Mellitus. Prompt identification of these cutaneous lesions is important in initiating treatment and thereby preventing further complications and fatality. Any patient's presents with recurrent and multiple cutaneous manifestations need to be checked for diabetes immediately. The ignorance of such manifestation or improper treatment makes the condition worse and leads to complications.

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### References

1. Wild S, Roglic G, Green A, Sicree R, King H; Global prevalence of diabetes, estimates for the year 2000 and projection for 2030. *Diabetes Care*, 2004; 27:1047-1053.
2. Sicree R, Shaw J, Zimmet P; Diabetes and impaired glucose tolerance. In: Gan D, editor. *Diabetes atlas*. International diabetes federation. 3rd ed. Belgium: International Diabetes Federation, 2006; 15-103.

3. Ronald GB, Ricky KS. The skin and Diabetes Mellitus, *Int J Dermatol*, 1984;23:567-584.
4. Abhishek goyal, Sujeet Raina, Satinder S kaushal, Vikram Mahajan , Nand Lal Sharma *Indian Journal of Dermatology*. Patterns of cutaneous manifestations in diabetes mellitus. 2010 Jan-Mar; 39–41. John D. Bancroft, Alan Stevens, *Theory and Practice of histological techniques*; 2nd edition; 95- 122.
5. Dr. P. Satyanarayana Rao<sup>1</sup> . Dr.V. Srilakshmi<sup>2</sup> , Dr. Ch.Kishore Kumar <sup>3</sup> , Dr.R. Vijaya Bhaskar<sup>4</sup> . 1 (Associate Professor, Department Of Pathology, Rangaraya Medical College, Kakinada, Andhra Pradesh, India),jan2017.
6. Shahzad M, Robaee AA, Shobaili HAA, Alzolibani AA, Marshood AAA, Moteri BA: Skin manifestations in diabetic patients attending a diabetic clinic in the Qassim region, Saudi Arabia. *Med Princ Pract* 2011;20:137-41.
7. Raghunatha S, Anitha B, Inamdar AC, Palit A, Devarmani SS. Cutaneous disorders in 500 diabetic patients attending diabetic clinic. *Indian J Dermatol* 2011;56:160-4.
8. Manjunatha M1 , Dadapeer HJ 2 , Darshan S3 1Associate Professor, 2 Professor and HOD, 3 Interns, Department of Dermatology, Venereology and Leprology, Shimoga Institute of Medical Sciences, Shimoga, Karnataka, India,2016.
9. Romano G, Moretti G, Di Benedetto A, Giofre C, Di Cesare E, Russo G, et al. Skin lesions in diabetes mellitus: prevalence and clinical correlations. *Diabetes Res Clin Pract* 1998;39:101-6.
10. Tanjore Y Raghu, V Vinayak, Garehatti kanthraj; Cutaneous manifestation of diabetes mellitus: *Indian journal of dermatology*, 2004; 49(2):73-75
11. Nigam PK, Pande S. Pattern of dermatoses in diabetics. *Indian J Dermatol Venereol Leprol* 2003;69:83-5.
12. Bhat R, Khaitan BK. Skin manifestations in internal diseases. In: Valia RG, Valia AR, editors. *IADVL textbook of dermatology*. 3<sup>rd</sup> ed. Mumbai: Bhalani publishing house; 2010. p. 1347-409.
13. Goyal A, Raina S, Kaushal SS, Sharma NL. Pattern of cutaneous manifestations in diabetes mellitus. *Indian J Dermatol Venereol Leprol* 2010;55:39-41.
14. Timshina DK, Thappa DIABETES MELLITUS, Agarwal A. A clinical study of dermatoses in diabetes to establish its markers. *Indian J Dermatol* 2012;57:20-5.
15. Thappa DIABETES MELLITUS. Skin tags as markers of diabetes mellitus: An epidemiological study in India. *J Dermatol* 1995;22:729-31.
16. Farshchian M, Farshchian M, Fereydoonnejad M, Yazdapfar A, Kimyai-Asadi A. Cutaneous manifestations of diabetes mellitus: A case series. *Cutis* 2010;86:31-5.
17. Mahajan S, Koranne RV, Sharma SK. Cutaneous manifestations of diabetes mellitus. *Indian J Dermatol Venereol Leprol* 2003;69:105-8.
18. AI- Mutairi N, Zaki A, Sharma AK» Sheltawi MA. Cutaneous manifestations of diabetes mellitus. *Med Princ Pract* 2006;15:427-30.