

## Original Research Article

# Cutaneous manifestations of diabetes mellitus: a clinico epidemiological study

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**Received:** 03 October 2018

**Revised:** 27 November 2018

**Accepted:** 30 November 2018

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### ABSTRACT

**Background:** Diabetes mellitus is one of the commonest non communicable diseases seen all over the world, constituting 49% from India, i.e., 72 million patients according to the Indian Council of Medical Research. The aim of the study was to study the various skin manifestations in diabetic patients and to correlate them with glycemic levels.

**Methods:** Patients for the study were chosen among those who were on treatment for diabetes mellitus and presented to the skin department with various cutaneous manifestations.

**Results:** Infections were commonest cutaneous manifestations in both type 1 and type 2. Among infections, fungal infections were commoner followed by bacterial infections. Among house wives, the commoner was candidal dermatosis intertrigo-toe/finger cleft followed by chronic paronychia. Among bacterial infections, erythrasma was commonly followed by pyoderma. Among pyodermas, furunculosis was common. Most common associated dermatoses were acanthosis nigricans and acrochordons. Treatment-related manifestations were not found.

**Conclusions:** In type 2 diabetic patients, infections were commonly followed by acanthosis nigricans, acrochordons, and generalized pruritus. Glycemic levels were higher in those with candidiasis and also with pyodermas.

**Keywords:** Diabetes, Glycemic levels, Infections and associated dermatoses

### INTRODUCTION

Diabetes mellitus is one of the most common non communicable diseases and endocrinopathy. The cutaneous manifestations may be primary or subsequent to the long duration of disease or due to treatment-related manifestations. Few cutaneous manifestations are so common in diabetes mellitus.<sup>1</sup> Cutaneous signs of diabetes are the manifestations of multiple factors that include abnormal carbohydrate metabolism, other altered metabolic pathways, atherosclerosis, microangiopathy, neuronal degeneration, and impaired host mechanism. Without control of diabetes, there is little or no response to therapy in some of the cutaneous processes. It affects

all the socioeconomic segments of the population. Mucocutaneous manifestations 'pattern may act as the mirror of diabetes.'<sup>2</sup> Approximately one-third of diabetic patients have cutaneous manifestations. So the early detection of them in diabetes mellitus is of prime importance to be able to and properly manage complications and prevent disability.<sup>3</sup> International Diabetes Federation (IDF) documents the total number of diabetic subjects to be around 101.2 million by the year 2030 in India (now 61.3 million). The highest prevalence of manifestations is seen in type 2 diabetes mellitus.<sup>4</sup> Cutaneous infections seem to be more frequent in type 2 diabetes mellitus, and type 1 diabetes mellitus patients manifest with more autoimmune type cutaneous lesions.<sup>5</sup>

## Aim

To study the various skin manifestations in diabetic patients and to correlate them with glycemic levels.

## METHODS

A single centre observational conducted in Department of Dermatology in Govt. Omanthurar Medical College from October 2016 to October 2017. Inclusion criteria for type 2 DM patients: Obese, very rare spontaneous ketoacidosis, Insulin can be withdrawn without causing diabetic ketoacidosis. Inclusion criteria for type 1 diabetes mellitus (DM): mostly thin with history of recent loss of body, ketoacidosis occurs spontaneously, insulin is needed to prevent diabetic ketoacidosis and ketosuria. Exclusion criteria: diabetic patients with other systemic diseases.

Data collection includes age, sex, family history, duration of diabetes, treatment— present and past, glycemic levels, general exam to find out body mass index, cutaneous examination for signs, scraping/skin biopsy/pus culture and sensitivity.

## RESULTS

There is no sex predilection, more common in 5<sup>th</sup> and 6<sup>th</sup> decades of life. Among 124 patients around 101 have body mass Index of more than 23. Infections form the major part of clinical presentation followed by commonly associated dermatosis. Among infections, fungal infections were commonest followed by bacterial infections. Glycemic levels were high in fungal infections than bacterial infections and were slightly higher in combination of both infections. Among fungal infections, genital candidiasis was the commonest. Among housewife's commoner were candidal dermatosis intertrigo-toe/finger cleft followed by chronic paronychia. High fasting blood sugar values were observed in candidiasis compared to dermatophytosis. The commonest manifestations in dermatophytosis were tinea cruris in males and tinea corporis in females. Pityriasis versicolor was the least observed superficial fungal infection among the patients. Among bacterial infections, erythrasma was common followed by pyoderma and keratolysis punctata. Among patients with erythrasma, only nine patients were asymptomatic and among the remaining patients, erythrasma was diagnosed only by careful clinical examination. Among pyodermas, furunculosis was the commonest presentation. Glycemic levels were higher for pyodermas than for erythrasma. Most common associated dermatoses were acanthosis nigricans and acrochordons with a mean body index of 30.7 and fasting blood sugar level of 177 mg%. Pruritus was the 2nd most common associated dermatosis, majority presenting with generalised pruritus with a mean blood sugar level of 213 mg%. Necrobiosis lipoidica diabetorum, granuloma annulare, scleredema adultorum of Buschke and eruptive xanthoma were not observed.

Diabetic neuropathy and angiopathy were observed only in few patients with a mean blood sugar level of 155 mg% and 181 mg% respectively. Many miscellaneous dermatoses such as urticaria, eczema, miliaria, traumatic fissures etc. were also observed. Treatment related skin manifestations were not observed. In type 1 diabetic patients, infections were commonest cutaneous presentation. Among infections, fungal infections were common followed by bacterial and fungal infections. Glycemic levels were higher in bacterial infections, compared to fungal infections. Among fungal infections, genital candidiasis was the commonest one as in type 2 DM, followed by dermatophytosis. Herpes zoster and herpes labialis were the viral infections observed in this study. Erythrasma was not observed in these patients. Cutaneous amyloid and perforating dermatosis were the associated dermatoses found. Diabetic neuropathy was observed in our study with glycemic levels within normal limits. Treatment related skin manifestations were not found.

**Table 1: Age and sex distribution of patients with type 2 DM (n=128).**

Age range in years	Total no. of patients	Male	Female
21-30	3	1	2
31-40	22	6	16
41-50	41	22	19
51-60	35	17	18
61-70	22	16	6
71-80	1	1	0

**Table 2: Body mass index distribution in type 2 DM patients (group it).**

Body mass index	Total patients	Males	Females
21	1	-	1
22	11	5	6
23	11	6	5
<b>Total (up to 23)</b>	23	11	12
24	22	12	10
25	11	5	6
26	18	11	7
27	1	-	1
28	24	16	8
29	14	4	10
30	2	-	2
31	1	1	-
32	4	2	2
33	-	-	-
34	3	2	1
35	-	-	-
36	1	1	-
<b>Total (more than 23)</b>	101	54	47

**Table 3: Cutaneous manifestations in patients with type 2 DM (n=128).**

Manifestations	No. of patients
Infections	81
Commonly associated dermatoses	41
Conditions associated with angiopathy and neuropathy	7
Miscellaneous conditions	35
Treatment related	Nil

**Table 4: Infections in patients with type 2 DM (n=81).**

Infections	Number of patients	Average fasting blood sugar levels(mg%)
Fungal	64	276
Bacterial	53	212.8
Viral	1	80
Parasitic	1	300
Combination of fungal and bacterial	5	227
Fungal and viral	1	180

**Table 5: Fungal infections in patients with type 2 DM (n=64)**

Clinical presentation	Total patients	Males	Females	Average FBS levels (mg%)
Candidal infection	44	23	21	220
Dermatophytosis	21	15	6	183
Pityriasis versicolor	3	2	1	160
Mucormycosis	1	1	-	540
Combination of candidiasis and dermatophytosis	5	4	1	202

**DISCUSSION**

Various cutaneous manifestations encountered in the present study in patients with type 2 diabetes mellitus are all similar to those documented already.<sup>2-7</sup> Majority of patients in our study were above 40 years of age (80%) similar to other studies.<sup>2,8</sup> Patients in 5th and 6th decades constituted 61.3% similar to other study.<sup>9</sup> Commonest cutaneous manifestations of type 2 DM were infections (65%). Different authors have observed the cutaneous infections in a lesser number of individuals in the range of 26.5% to 55%.

Among infections, fungal infections topped the list as commonest (79%) in our study, as encountered in various studies.<sup>2-4,6,7,9,10</sup> Bacterial infections were next common but were commonest in few other studies.<sup>5,8</sup> High glycaemic levels were found in fungal infections (276 mg%) in comparison to bacterial infections (212 mg%). Candidiasis was found to be commonest among fungal infections, followed by dermatophytoses, as reported by various others.<sup>6</sup> During the study period, one case of mucormycosis was also encountered with advanced diabetic status with blood sugar level of 540mg%. Patients with candidiasis had higher glycaemic levels (mean 220 mg%) when compared to dermatophyte Infections(mean 183%). Though genital candidiasis dominated the clinical picture of fungal infections in the majority of studies like ours, equal representation from seen in only one study.<sup>5</sup> Chronic paronychia was present in 4% of our study population which differs from other study {8%} - all were females. Among the study group, commonest presentation of dermatophytoses was Tinea cruris in males, as also seen in the general population.<sup>6</sup> Tinea corporis and glutealis were found to be common in females. Erythrasma was common among bacterial

infections in our study whereas it was least common in the other study.<sup>3</sup> Among pyodermas, furunculosis was the commonest presentation whereas it was 2nd most common in other studies.<sup>3,6</sup> Average fasting blood sugar levels in pyodermas in pyodermas were found to be higher (209.5 mg%) than erythrasma (147 mg%). Viral and parasitic infections could be considered as least common infections in type 2 diabetic patients (0.8%) where it was about nil to 7.63%.<sup>6</sup> Acanthosis nigricans was seen in 8% of our study patients, similar to other studies which showed a range from 3% to 11.67%.<sup>5</sup> Average blood sugar level was 144mg% which is supported by a high HbA1c level in a study by Goshi et al.<sup>5</sup> Acrochordons were present in 23% of patients in our study whereas its occurrence in other studies was from 3% to 32% . In our study, all the patients with acanthosis nigricans had acrochordons also. Average body mass index in these patients was found to be 30.7. Here acanthosis nigricans could be explained on the basis of higher BMI and can be considered as pseudoacanthosis nigricans. Average fasting blood sugar levels in these patients was 171 mg%. A similar association between diabetes, acrochordons and pseudoacanthosis nigricans is also mentioned by Puneet Bargava et al.<sup>1</sup>

Pruritus was observed to be the next common associated finding (5.6%). All the patients were females with generalized pruritus except in 1 who had pruritus localized to genitals in the absence of candidiasis even on repeated scraping. The causes of pruritus are said to be multifactorial including autonomic imbalance leading to xerosis, neuropathy and increased mast cell population. Other studies showed pruritus in a range between 2.25% to 50% . Mean fasting blood sugar level was 212 mg% in our study. Average fasting blood sugar level was 155 mg%. Diabetic dermopathy was common in men.<sup>4</sup>

Diabetic angiopathy was observed in 1.5% whereas it was in the range of 0.75% to 7%. Eczema was seen in about 6.4% of patients in our series whereas its range was 15.33% to 30.75% in other studies. In our series vitiligo was seen in 3.22% {other studies: 1.25% to 8%}, Psoriasis in 2.4% {2% to 3.3%}, Lichen planus in 3.22% {<1% to 3.3%} & bulla in 0.8% {0.5% to 4%}. Xerosis was seen in < 1% in our study whereas it ranged from 3% to, 30.25% and 34.4% in other studies, highest percentage owing to the climate in Eastern India. Perforating dermatosis was not reported in our study like other studies whereas few studies showed it between 1% and 3.33%.<sup>2,4,7-10</sup> Fasting blood sugar level in diabetic bulla pt. was 200 mg% in our study which is similar to high HbA1c in Ghosh et al.<sup>5</sup> Necrobiosis lipoidica diabetorum, granuloma annulare, scleredema adultorum of buschke and eruptive xanthoma were not reported in our study like other few.<sup>2,4,7</sup> Instead, xanthelasma was reported in few studies.<sup>3-6,9</sup> The stiff joint was seen in few studies.<sup>3,4</sup> Treatment-related skin manifestations were nil in our study, but it ranged from 1.66% to 12% in other studies.<sup>6,7</sup>

### **Type 1 diabetes mellitus**

Findings were similar to that in type 2, i.e. infections being commonest manifestation and fungal infections being more prevalent than bacterial infections except slightly higher glycaemic levels in fungal infections. A study involving the larger number of patients will throw a better light on clinical manifestations in type 1 diabetics.

### **CONCLUSION**

In type 2 diabetic patients infections were more common, followed by acanthosis nigricans, acrochordons and pruritus (generalised). Glycaemic levels were higher in those with candidiasis and also with pyodermas. Hence diabetes has to be suspected if the above mentioned signs are present.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the institutional ethics committee*

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**Cite this article as:** Venkatesan S, Thamizhselvi S, Tharini. Cutaneous manifestations of diabetes mellitus: a clinic epidemiological study. *Int J Res Dermatol* 2019;5:179-82.