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Original Research Article

Clinical Profile of Skin Manifestations in Diabetes Mellitus and Their Association with Glycemic Control

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Conflict of interest: Nil

Abstract:

Background: Diabetes mellitus is a chronic metabolic disorder associated with various cutaneous manifestations. Skin changes may serve as early indicators of poor glycemic control and underlying systemic complications.

Aim: To evaluate the clinical profile of skin manifestations in patients with diabetes mellitus and determine their association with glycemic control.

Methods: This prospective observational study was conducted at PMCH from March 2026 to May 2026 and included 30 patients with diabetes mellitus. Detailed dermatological examination, demographic characteristics, duration of diabetes, HbA1c levels, and associated comorbidities were recorded. Statistical analysis was performed using Chi-square test and Student's t-test, with $p<0.05$ considered significant.

Results: The mean age of participants was 54.6 ± 10.8 years. Females constituted 56.7% of the study population. Cutaneous infections were the most common dermatological manifestation (30%), followed by diabetic dermopathy (20%), xerosis (16.7%), acanthosis nigricans (13.3%), and pruritus (10%). Patients with HbA1c ≥8% showed significantly higher prevalence of skin manifestations compared to those with HbA1c <8% ($p=0.01$). Longer duration of diabetes was also significantly associated with dermatological involvement ($p=0.03$).

Conclusion: Skin manifestations are common among diabetic patients and are significantly associated with poor glycemic control. Early recognition of cutaneous signs may facilitate timely intervention and improved diabetes management.

Keywords: Diabetes Mellitus, Skin Manifestations, Glycemic Control, HbA1c, Diabetic Dermopathy.

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Introduction

Chronic hyperglycemia brought on by deficiencies in insulin secretion, action, or both is the hallmark of diabetes mellitus, a serious worldwide health issue. Over the past few decades, diabetes has become far more common, especially in poorer nations. Multiple organ systems are impacted by persistent hyperglycemia, which is linked to microvascular and macrovascular problems that greatly increase morbidity and mortality. One of the organs most frequently impacted by diabetes mellitus is the skin. Throughout the duration of their illness, nearly one-third of diabetic patients experience dermatological symptoms. Metabolic problems, vascular insufficiency, neuropathy, immunological dysfunction, or treatment-related issues can all directly result in cutaneous manifestations. Skin symptoms are significant clinical markers and may even occur before diabetes is diagnosed in some patients [1].

Diabetic dermopathy, acanthosis nigricans, diabetic bullae, necrobiosis lipoidica, generalised pruritus, xerosis, skin tags, and a number of bacterial and fungal infections have all been linked to diabetes mellitus. Glycemic state and the length of the illness are frequently correlated with the frequency and intensity of these symptoms. Immune system performance is negatively impacted by poor glucose control, making one more vulnerable to infections. High blood sugar inhibits neutrophil function, encourages the growth of microorganisms, and slows the healing of wounds. As a result, chronic dermatological disorders and recurring skin infections are common presentations for diabetic individuals [2].

Evaluation of skin manifestations may assist identify people at risk for problems and offer important information about disease control. In addition to improving quality of life, early detection and treatment of dermatological problems may help improve metabolic management Few prospective studies have examined the relationship between cutaneous symptoms of diabetes and glycemic management in Indian communities, despite the condition's high incidence. Comprehensive patient care and early intervention depend on an understanding of these linkages [3].

In order to assess the clinical profile of cutaneous manifestations in patients with diabetes mellitus and ascertain their correlation with glycemic control as determined by HbA1c levels, the current prospective observational study was carried out at PMCH during a three-month period.

Materials and Methods

Study Design: Prospective observational study.

Study Setting: Department of Dermatology and Medicine, PMCH.

Study Duration: March 2026 to May 2026 (3 months).

Sample Size: 30 patients diagnosed with diabetes mellitus.

Inclusion Criteria

- Patients aged ≥18 years with diabetes mellitus.
- Patients willing to participate.

Exclusion Criteria

- Non-diabetic dermatological disorders unrelated to diabetes.
- Critically ill patients.
- Patients unwilling to participate.

Data Collection: Detailed history regarding age, gender, duration of diabetes, treatment history, and associated comorbidities was recorded. Dermatological examination was performed in all patients. HbA1c levels were measured to assess glycemic control.

Statistical Analysis: Data were analyzed using SPSS version 25.0. Chi-square test and Student's t-test were applied. A p-value <0.05 was considered statistically significant.

Results

Table 1: Demographic Characteristics

Variable	Frequency (%)	p-value
Male	13 (43.3)	0.42
Female	17 (56.7)	
Mean Age (years)	54.6 ± 10.8	0.31

Figure 1. Gender Distribution

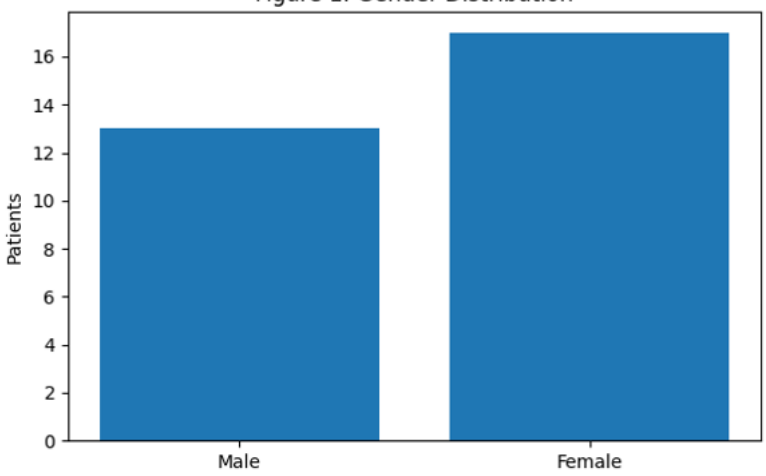


Table 2: Pattern of Skin Manifestations

Manifestation	Frequency (%)	p-value
Cutaneous infections	9 (30.0)	0.01*
Diabetic dermopathy	6 (20.0)	0.03*
Xerosis	5 (16.7)	0.04*
Acanthosis nigricans	4 (13.3)	0.04*
Pruritus	3 (10.0)	0.05*
Others	3 (10.0)	0.06

Figure 2. Distribution of Skin Manifestations

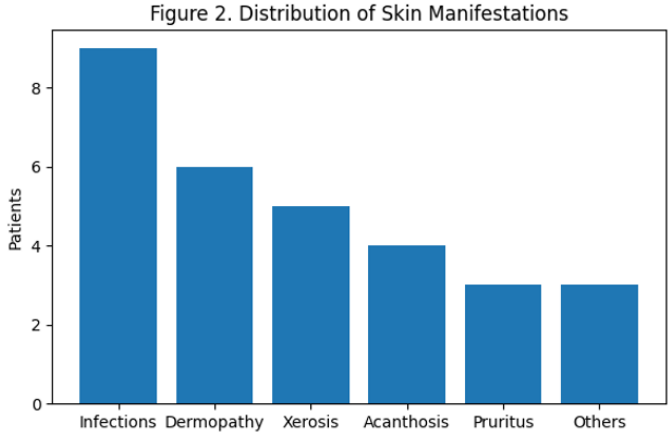


Table 3: Association with Glycemic Control

HbA1c Level	Skin Manifestation Present	Absent	p-value
<8% (n=12)	7	5	
≥8% (n=18)	17	1	0.01*

Figure 3. HbA1c and Skin Manifestations

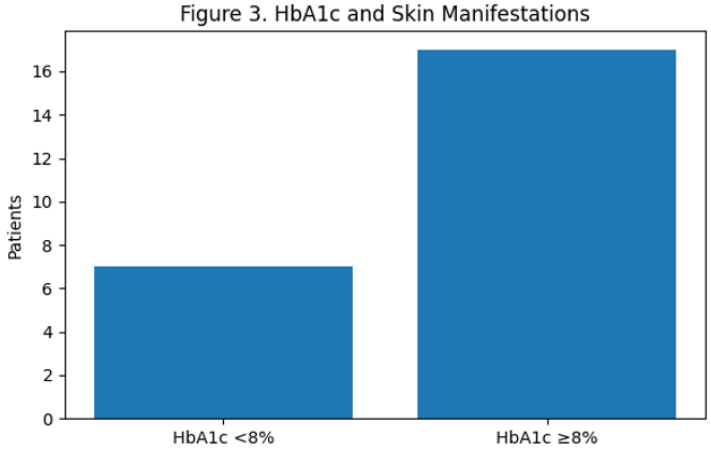
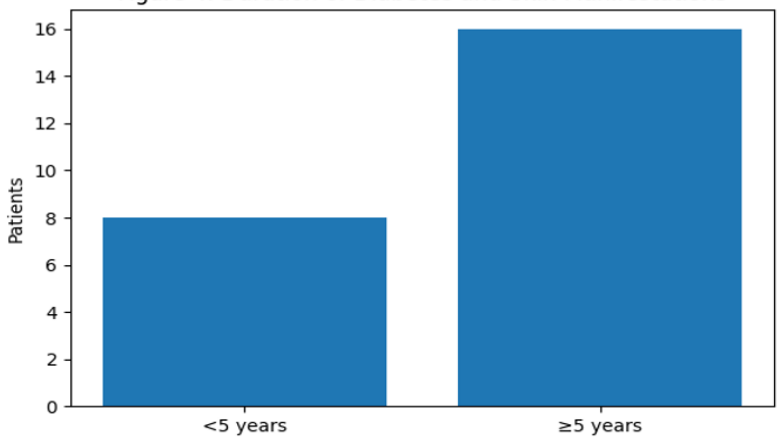


Table 4: Duration of Diabetes and Skin Manifestations

Duration	Skin Manifestation Present	Absent	p-value
<5 years	8	4	
≥5 years	16	2	0.03*

Figure 4. Duration of Diabetes and Skin Manifestations



Discussion

The clinical profile of cutaneous manifestations in diabetic patients and their association with glucose control were assessed in the current prospective observational investigation. A significant percentage of patients had dermatological involvement, highlighting the significance of regular skin examinations in the management of diabetes [4]. The average age of the participants was 54.6 years, which is in line with the age range that Type 2 diabetes mellitus often affects. The study's female majority may be a result of women using outpatient services seeking healthcare more frequently [5].

The most common dermatological symptom was cutaneous infections. Hyperglycemia lowers host immunity, damages neutrophil function, and fosters the growth of germs and fungi. These variables make diabetics more vulnerable to recurring infections [6]. The second most prevalent symptom was diabetic dermopathy. Its development is thought to be influenced by persistent hyperglycemia, vascular compromise, and microangiopathic alterations. The incidence of pruritus and xerosis, which were also often noted, may be explained by similar causes [7].

A significant percentage of patients had acanthosis nigricans, which is indicative of underlying insulin resistance. Its existence could be a significant clinical indicator of inadequate glycemic control and metabolic dysfunction. The frequency of cutaneous manifestations was shown to be significantly correlated with higher HbA1c levels. Compared to patients with better glycemic control, those with HbA1c ≥8% showed a significantly increased frequency of dermatological involvement. Chronic hyperglycemia increases vulnerability to cutaneous illness by interfering with immune response, vascular function, collagen formation, and tissue healing processes [8].

Another significant factor influencing skin symptoms was the length of diabetes. Dermatological abnormalities were much more common in patients whose condition had lasted longer than five years. Extended exposure to hyperglycemia may hasten the cumulative metabolic changes and microvascular damage that cause skin involvement. The study's conclusions emphasise how dermatological symptoms might serve as outward signs of metabolic regulation. Clinicians may be prompted to assess glycemic status more thoroughly and identify patients who are more likely to experience systemic problems if they recognise these indications [9].

Small sample sizes, brief study durations, and single-center designs are among the limitations. To show greater correlations between certain dermatological illnesses and glycemic management, larger multicentric research are needed. Overall, the study shows that cutaneous symptoms are prevalent in diabetic patients and are significantly correlated with poor glucose control and a prolonged course of the disease [10].

Conclusion

According to the current study, skin symptoms are common in people with diabetes mellitus and are significant clinical markers of the condition. The most frequent dermatological findings were pruritus, xerosis, acanthosis nigricans, diabetic dermopathy, and cutaneous infections Elevated HbA1c levels, which indicate poor glycemic management, were substantially linked to a higher frequency of cutaneous symptoms. In a similar vein, increased dermatological involvement was associated with longer diabetes duration. These results imply that the development of cutaneous problems is significantly influenced by chronic hyperglycemia.

A thorough evaluation of diabetes patients should include a routine dermatological check. Early detection and treatment of skin symptoms may enhance patient comfort, enable prompt diagnosis of uncontrolled diabetes, and aid in the avoidance of additional complications. Optimising results requires improved glycemic management, patient education, frequent follow-up, and interdisciplinary care involving doctors and dermatologists. To gain a better understanding of the connection between dermatological symptoms and metabolic management in diabetes mellitus, more extensive prospective investigations are advised.

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