Original Research Paper

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Medical Science

A CLINICAL STUDY ON CUTANEOUS MANIFESTATIONS IN DIABETES MELLITUS

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ABSTRACT Diabetes mellitus (DM) is a chronic metabolic disorder with multi-organ involvement. Skin is a major target organ, and cutaneous manifestations can serve as crucial clinical indicators of glycemic control, disease duration, and systemic microvascular complications.**Methods :** This is an Observational Cross-sectional study that is conducted in OPD ,DVL Dept of Anathpuram medical college and Hospital, Anathapuram in 100 diabetic patients in the duration of 18 months , during the year 2022-2023.

KEYWORDS : Diabetes mellitus, Cutaneous manifestations, Diabetic dermopathy, Acanthosis nigricans, Glycated hemoglobin (HbA1c), Dermatomycoses, Microangiopathy.

Diabetes mellitus (DM) is a major global public health challenge characterized by chronic hyperglycemia resulting from defects in insulin secretion, insulin action, or both. The skin is a highly active metabolic organ that is profoundly influenced by the systemic alterations of diabetes. It is estimated that approximately 30% to 70%of patients with both Type 1 and Type 2 diabetes mellitus will develop a dermatological complication during their lifetime

The pathophysiology of diabetic cutaneous manifestations is multifactorial and includes:

1. **Microangiopathy and Macroangiopathy:** Altered vascular perfusion leads to tissue hypoxia, impaired nutrient delivery, and delayed wound healing.
2. **Neuropathy:** Sensory loss renders the skin vulnerable to repetitive trauma, while autonomic neuropathy causes xerosis (dry skin) and anhidrosis, predisposing the skin to fissures and infections.
3. **Accumulation of Advanced Glycation End-products (AGEs):** Non-enzymatic glycation of dermal collagen and elastin reduces skin elasticity, limits flexibility, and impairs structural repair mechanisms.
4. **Immunological Alterations:** Hyperglycemia impairs polymorphonuclear leukocyte chemotaxis, phagocytosis, and bactericidal activity, raising the susceptibility to cutaneous infections.

Often, cutaneous signs serve as the first visible cue of undiagnosed diabetes or reflect the progression of underlying systemic microvascular damage (such as retinopathy and nephropathy). This study evaluates the clinicodermatological profile of diabetic patients to establish a clear correlation with their metabolic status.

Methodology:

The study was conducted in the department of DVL, government medical college Anathpuram from 1st july 2022 to 30th 2023 , with the following objectives.

- Study the prevalence of various dermatoses in the diabetic population.
- Study the Age, Sex, and Prevalence of diabetic patients with various dermatoses.
- To correlate the recent Glycosylated Haemoglobin level to the common infections in Diabetes Mellitus patients
- To correlate the mean duration of diabetes mellitus in years in relation to the cutaneous manifestations in Diabetes.
- Study the occurrence of Diabetic therapy induced complications.
- Compare the skin conditions (dermatoses) in patients with type 2 diabetes (noninsulin dependent) to those in patients with type 1 diabetes (insulin dependent).

Patients were studied in detail in a Closed questionnaire in local language regarding comorbidities, clinical history, duration, any treatment history, lab investigations which previously done.

Inclusion Criteria

1. All patients who attend Dermatology Op with skin findings suggestive of Diabetes mellitus.
2. People living with Diabetes who gave informed consent.
3. Consenting persons with Diabetes attending endocrinology outpatient or admitted in medical wards of hospital.

Exclusion criteria

1. Non consenting patients.
2. Gestational Diabetes.
3. Unconsious patients
4. Those who have other associated Endocrine diseases.
5. Study subjects with history of intake of drugs including Nicotinic acid, OCPs, those who applied topical Fusidic acid which can cause Acanthosis Nigricans and other skin conditions were excluded from the study.

OBSERVATION AND DISCUSSION

Table 1: Distribution of study population based on Age

	Frequency	Percentage
30 – 40	25	25%
41 – 50	26	26%
51 – 60	28	28%
61 – 70	21	21%
Total	100	100%
Mean ± SD	50.49 ± 10.74	
RANGE	32 – 70	

In the current study, the age distribution of the diabetic population ranged from 32 to 70 years, with a mean age of 50.49 ± 10.74 years. The majority of participants were in the 51-60 age group (28%), followed by 41-50 (26%), 30-40 (25%), and 61-70 (21%). These findings are reflective of the age-related prevalence of type 2 diabetes, which is typically more common in middle-aged and older adults.

Table 2: Distribution based on Gender

	Frequency	Percentage
Male	47	47%
Female	53	53%
Total	100	100%

In the current study, the gender distribution showed a slight female predominance (53% females vs. 47% males). This gender distribution is comparable to other studies, though there are some regional variations.

Table 3 : Distribution based on Fasting blood sugar

	Minimum	Maximum	Mean ± SD
FBS	128	282	174.8 ± 39.26

In this study, the mean fasting blood sugar (FBS) level was found to be 174.8 ± 39.26 mg/dL, indicating that the majority of the participants had poor glycemic control.

Table 4: Distribution based on Post prandial Blood sugar

	Minimum	Maximum	Mean ± SD
PPBS	198	417	278.10 ± 58.89

The mean postprandial blood sugar (PPBS) level in the current study

was 278.10 ± 58.89 mg/dL, indicating significantly high blood sugar levels after meals.

Table 5: Distribution based on duration pf Diabetes

	Frequency	Percentage
1 – 5	39	39%
6 – 10	45	45%
11 – 15	16	16%
Total	100	100%
Mean ± SD	6.62 ± 4.04	
RANGE	1 – 15	

The mean duration of diabetes in the current study was 6.62 ± 4.04 years. The duration of diabetes is a critical factor in the development of complications.Longer disease duration is associated with a higher risk of both microvascular and macrovascular complications.

Table 6: Distribution based on HbA1c

	Frequency	Percentage
7 – 8	2	2%
8.1 – 9	43	43%
9.1 – 10	24	24%
>10.1	31	31%
Total	100	100%
Mean ± SD	9.61 ± 1.33	
RANGE	8 – 13	

The mean HbA1c level in the current study was 9.61 ± 1.33, indicating poor long term glycemic control among the participants.

Table 7: Distribution based on cutaneous manifestations in Diabetes

Skin lesion	Frequency	Percentage
BACTERIAL INFECTION	13	13%
CHANGES IN NAIL	7	7%
DERMATITIS HERFATIFORMIS	1	1%
DIABETIC BULLAE	4	4%
DIABETIC DERMOPATHY	3	3%
DIABETIC FOOT	15	15%
ECZEMA	7	7%
FUNGAL INFECTION	13	13%
GRANULOMA ANNULARE	1	1%
INSULIN LIPODYSTROPHY	2	2%
LICHEN PLANUS	3	3%
NECROBIOSIS DIABETICA	1	1%
PERFORATING DERMATOSIS	9	9%
PRURITUS	9	9%
PSOARISIS	2	2%
SCELERODERMA LIKE SYNDROME	4	4%
VITILIGO	4	4%
XANTHOMA	2	2%
Total	100	100.00%

In this study, the most common skin lesions were fungal infections (15%) and diabetic foot (15%).The prevalence of fungal infections among diabetic patients can be attributed to the immunosuppressive effects of chronic hyperglycemia, which makes individuals more susceptible to infections. Diabetic foot, another common complication, is often a result of neuropathy and poor blood circulation, leading to an increased risk of infections and ulcers.

Table 5: Distribution based on duration pf Diabetes

	Frequency	Percentage
CAD	15	15%
Metabolic syndrome	19	19%
Diabetic retinopathy	20	20%
Diabetic Nephropathy	12	12%
Diabetic neuropathy	25	25%
Peripheral vascular disease	15	15%

In the current study, diabetic neuropathy was the most prevalent complication (25%), followed by diabetic retinopathy (20%) and metabolic syndrome (19%).

The association of metabolic syndrome with diabetes complications is also notable.

Metabolic syndrome encompasses a cluster of conditions including hypertension, dyslipidaemia, and central obesity, which collectively increase the risk of cardiovascular diseases.

Table 9: Cutaneous maniestations and its correlation with HBA1C

		Mean	SD
BACTERIAL INFECTION	13	9.24	1.30
CHANGES NAIL	7	10.06	1.95
DERMATITIS HERFATIFORMIS	1	9.00	0.00
DIABETIC BULLAE	4	9.38	1.73
DIABETIC DERMOPATHY	3	11.50	0.66
DIABETIC FOOT	15	10.33	1.44
ECZEMA ECZEMA	7	9.26	0.56
FUNGAL INFECTION	13	8.95	1.17
GRANULOMA ANNULARE	1	10.10	0.00
INSULIN LIPODYSTROPHY	2	9.10	0.00
LICHEN PLANUS	3	8.83	0.12
NECROBIOSIS DIABETICA	1	9.30	0.00
PERFORATING DERMATOSIS	9	9.76	1.44
PRURITUS PRURITUS	9	9.70	1.56
PSOARISIS PSORIASIS	2	8.85	0.64
SCELERODERMA SYNDROME	4	9.73	0.99
VITILIGO VITILIGO	4	9.33	0.52
XANTHOMA XANTHOMA	2	10.35	1.20

The mean HbA1c level in the current study was 9.61 ± 1.33, indicating poor longterm glycemic control among the participants. The high HbA1c levels observed in the current study and the reference studies indicate a widespread issue of inadequate diabetes management.

HbA1c levels above 7% are associated with an increased risk of complications, and the mean levels reported here suggest that many patients are at significant risk. Improving HbA1c levels requires a multifaceted approach, including patient education, lifestyle modifications, and appropriate use of medications. Regular monitoring and adjustments to treatment regimens based on HbA1c results are essential for achieving better glycemic control. Additionally, addressing barriers to effective diabetes management, such as socioeconomic factors and access to health care, is crucial for improving outcomes.

SUMMARY

- Age Distribution: The majority of diabetic patients were in the 51-60 age group, with a mean age of 50.49 years. This is consistent with the global trend of diabetes prevalence in middle-aged and older adults.
- Gender Distribution: There was a slight female predominance in the current study (53% females vs. 47% males). This contrasts with some studies reporting higher male prevalence but aligns with others showing similar gender distributions.
- Fasting Blood Sugar (FBS): The mean FBS level was 174.8 mg/dL, indicating poor glycemic control. This is comparable to findings in other studies, which also reported high FBS levels among diabetic patients.
- Postprandial Blood Sugar (PPBS): The mean PPBS level was 278.10 mg/dL, highlighting significant postprandial hyperglycemia. Similar trends were observed in reference studies, emphasizing the challenge of managing postprandial glucose levels.
- Duration of Diabetes: The mean duration of diabetes was 6.62 years. Longer disease duration correlated with an increased prevalence of skin complications,
- HbA1c Levels: The mean HbA1c level was 9.61, indicating poor long-term glycemic control. High HbA1c levels were strongly associated with the prevalence of skin lesions, as observed in reference studies.
- Cutaneous Manifestations: The most common skin conditions included fungalinfections (15%), diabetic foot (15%), bacterial infections, and diabetic dermopathy.
- Correlation with Blood Sugar Levels: Both FBS and PPBS levels were significantly correlated with the prevalence of various skin lesions. Higher HbA1c levels were also associated with increased risk of skin complications.

CONCLUSION

- This study investigated the cutaneous clinical manifestations of diabetes mellitus and their correlation with disease duration and severity.
- Our findings suggest that diabetes associated skin manifestations

are common and diverse, affecting a significant proportion of patients.

- Specifically, we observed a high prevalence of skin lesions and nail changes which were significantly associated with longer disease duration and poorer glycemic control.
- In the present study 51-60years are most commonly affected age group.
- Mean duration of diabetes in the present study shows 6-10years for the development of cutaneous manifestations. Females are most commonly affected.
- In the current study type2 diabetic patients developed most frequent cutaneous manifestations than type 1.
- Our results highlight the importance of cutaneous examinations in diabetes care, enabling early detection and management of skin-related complications. Moreover, our findings underscore the need for improved disease management and patient education to prevent and mitigate the progression of diabetes-related skin manifestations.
- This study contributes to the existing literature on diabetes-related skin manifestations, emphasizing the significance of a comprehensive approach to diabetes care that incorporates cutaneous evaluations and patient-centered management strategies

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