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A case series study on skin manifestations in diabetic patients

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***Abstract*---**Aim: The present study aimed to investigate the skin manifestation in diabetic patients. Patients and Methods: A case-series study was conducted on 120 diabetes patients having skin manifestation investigated in the Department of Dermatology, PIMS Hospital, Islamabad from 11th March 2021 to 10th March 2022. Study protocol was approved by the institute research and ethical committee. Patients of either gender or age with diabetes mellitus and having at least one skin manifestation were enrolled. Each individual underwent dermatological examination and systemic findings were noted. Blood samples from each individual were taken for measuring the blood glucose level. Skin manifestation images and relevant investigations such as histopathological and microbiological were conducted. SPSS version 26 was used for data analysis. Results: Of the total 120 DM patients, there were 86 (71.7%) type 2 DM or non-insulin dependent and 34 (28.3%) were type I DM or insulin dependent. Out of 120 DM patients, there were 22 (18.3%) male and 98 (81.7%) females. The overall mean age was 48.62± 16.48 years with an age range 16 to 70 years. The mean duration of the disease was

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9.84± 8.42 years varied from 5 months to 25 years. The prevalence of cutaneous infections, pruritus, diabetic dermopathy, xanthelasma, periungual telangiectasia, vitiligo, and insulin injection site's reactivity was 38% (n=46), 12% (n=14), 8% (n=10), 4% (n=5), 7% (n=8), 7% (n=8), and 9% (n=11) respectively. The incidence of diabetic ketoacidosis (DKA) history was 82 (68.3%), out of which one and more than one attack was found in 16 (19.5%) and 66 (80.5%) respectively. Conclusion: The present study found that type II DM patients were more susceptible to skin manifestation than type I DM and skin manifestation is directly associated with increasing diabetes duration. The skin manifestation early detection in diabetic mellitus had major significance in preventing the complications and disability with effective management.

***Keywords*---**skin manifestation, diabetes mellitus, insulin dependency.

Introduction

Diabetes mellitus (DM) is an endocrine condition that affects people of all ages and socioeconomic backgrounds. It is distinguished by hyperglycemia caused by either absolute or relative insulin insufficiency. Diabetes is divided into two types: type 1 (insulin-dependent diabetes-IDDM) and type 2. (Non-insulin dependent diabetes-NIDDM). The overall prevalence of type 2 diabetes was 171 million and it is expected to rise to 366 million by 2030 [1]. Long-term diabetes can cause irreversible functional changes in the body, resulting in a variety of problems. In diabetics, impaired glucose, amino acid, and lipid metabolism leads directly to physical symptoms. Skin lesions affect around 30% of diabetic people [2]. Skin lesions significantly connected with DM, skin lesions of infectious etiology, lesions owing to DM sequelae, and lesions related to DM therapy can be roughly categorized into four types. The common skin disorders such as diagnostic rubeosis, eruptive xanthomas, diabetic bullae, diabetic dermopathy, yellow skin, acanthosis nigricans, lichen planus, and vitiligo were all rare skin disorders related with diabetes [3, 4].

The pathophysiology of these cutaneous symptoms, as well as the interior consequences, is multifaceted and results from a complex interplay of diabetes biochemical, vascular, immunological, and metabolic changes [5]. Diabetes appears to increase the metabolic process of advanced glycation in particular as a result of persistent hyperglycemia. The non-enzymatic modification of proteins, lipids, and nucleic acids by reducing sugars results in a diverse set of chemical moieties known as advanced glycated end products [6]. Skin contains a lot of collagen, which is susceptible to forming and depositing AGEs during protracted hyperglycemia [7]. Ragunatha et al. [8] hypothesized that AGE-RAGE associations in epidermal keratinocytes may potentially produce poor barrier homeostasis, including permeability and antimicrobial barriers, which might be a significant etiology of underlying cutaneous problems reported in DM.

Methodology

A case-series study was conducted on 120 diabetes patients having skin manifestation investigated in the Department of Dermatology, PIMS Hospital, Islamabad from 11th March 2021 to 10th March 2022. Study protocol was approved by the institute research and ethical committee. Patients of either gender or age with diabetes mellitus and having at least one skin manifestation were enrolled. Each individual underwent dermatological examination and systemic findings were noted. Blood samples from each individual were taken for measuring the blood glucose level. Skin manifestation images and relevant investigations such as histopathological and microbiological were conducted. SPSS version 26 was used to analyze the gathered data. Mean and standard deviation were used to assess quantitative data, whereas frequency and percentage were used to analyze qualitative data. To compare means of various groups, the paired t-test was utilized, while the t-test were used to compare frequencies. P values less than 0.05 were deemed statistically significant.

Results

Of the total 120 DM patients, there were 86 (71.7%) type 2 DM or non-insulin dependent and 34 (28.3%) were type I DM or insulin dependent. Out of 120 DM patients, there were 22 (18.3%) male and 98 (81.7%) females. The overall mean age was 48.62± 16.48 years with an age range 16 to 70 years. The mean duration of the disease was 9.84± 8.42 years varied from 5 months to 25 years. The prevalence of cutaneous infections, pruritus, diabetic dermopathy, xanthelasma, periungual telangiectasia, vitiligo, and insulin injection site's reactivity was 38% (n=46), 12% (n=14), 8% (n=10), 4% (n=5), 7% (n=8), 7% (n=8), and 9% (n=11) respectively. The incidence of diabetic ketoacidosis (DKA) history was 82 (68.3%), out of which one and more than one attack was found in 16 (19.5%) and 66 (80.5%) respectively. The incidence of Type-I and Type-II DM is illustrated in Figure-1. Gender's distribution of patients are shown in Figure-2. The prevalence of skin manifestations are depicted in Figure-3. Table-1 represents the demographic details and glycemic profile of the patients.

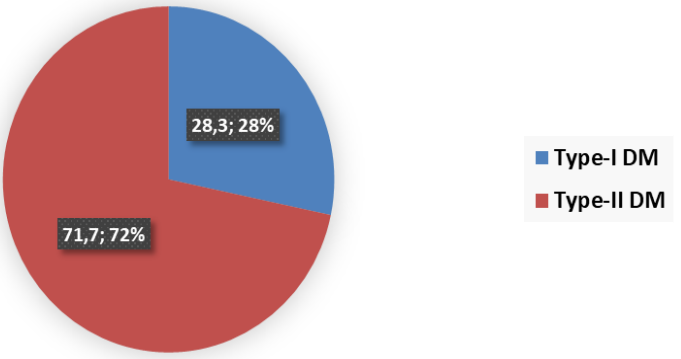

Figure-1 Prevalence of Type-I and Type-II Diabetes mellitus

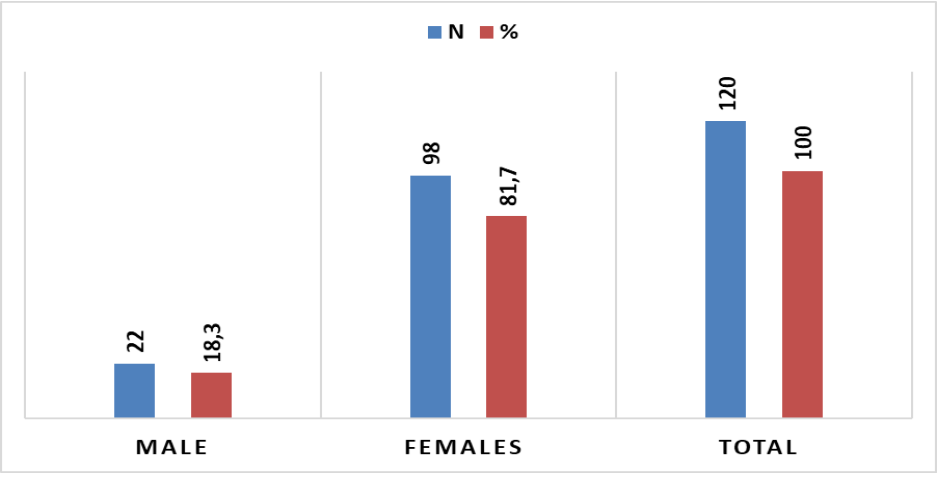

Figure-2 Gender's distribution of DM patients

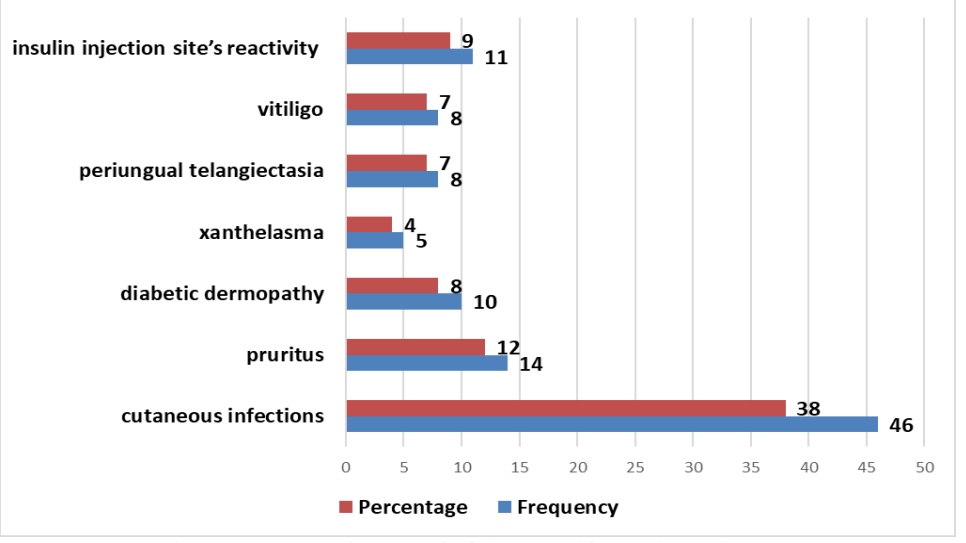

Figure-3 Prevalence of skin manifestations in DM

Table-1. Demographic details and glycemic profiles

Parameters	Value
Age (years)	48.62± 16.48
Gender Male/females	 22/98
Diabetes treatment modes N (%) Insulin therapy Oral hypoglycemics Combination therapy Diet control only	 30 (25) 64 (53.3) 21 (17.5) 5 (4.2)
Fasting blood sugar (mg/dl) ≤130	 41 (34.2)

≥130	79 (65.8)
HbA1c (%)	8.4±1.8
Glycemic control	
S*	38 (31.7)
NS**	82 (68.3)

S* Satisfactory, NS** Not satisfactory

Discussion

The present study mainly focused on skin manifestations in diabetes mellitus (DM) and found that skin manifestation was more common in type II diabetes patients than in type I diabetic patients, and skin manifestation is strongly related to diabetes duration. Early diagnosis of cutaneous manifestations in diabetes mellitus was critical in averting complications and disability with proper care. Skin alterations might appear throughout the prediabetes stage, the acute metabolic state, and the late diabetic degenerative stage. Folliculitis, furunculosis, carbuncle, ecthyma, cellulitis, and erysipelas are common cutaneous bacterial infections in diabetes. Pityriasis versicolor, oral candidiasis, vulvovaginal candidiasis, and dermatophytosis are all examples of cutaneous fungal infections. Calciphylaxis, xerosis, xanthelasma, lipodystrophy, macular amyloidosis, and alopecia are also related illnesses [9]. Herpes zoster and viral warts are two common viral diseases [10].

The skin, being the body's biggest organ, is virtually always impacted by diabetes. The cutaneous symptoms of diabetes are varied, and many studies have found a varying frequency ranging from 30-100% [11, 12]. Skin involvement may potentially be the first symptom in such cases. As a result, skin abnormalities may be observed prior to the onset of diabetes. The majority of diabetes people ultimately acquire skin symptoms. Long-term diabetic patients have more severe skin diseases [13]. The skin alterations are caused by several metabolic irregularities of diabetes, such as prolonged hyperglycemia, which leads to glycosylation of various tissue components in the skin. Neuropathy, dyslipidemia, immunosuppression, and micro- or macroangiopathy are further variables that contribute to dermatologic problems. There are several cutaneous characteristics that are unique to insulin resistance and hyperinsulinemia.

A previous study by Bustan et al., [14] reported that the incidence of cutaneous problems does not change between the two primary categories of diabetes; what differentiates is the type of lesions. Infections are common in type 2 diabetes patients, but autoimmune type dermatologic symptoms are common in type 1 diabetes patients. The present study found that early diagnosis of cutaneous manifestations in diabetes mellitus was critical in averting complications and disability with proper care. The current study discovered that type II diabetes patients were more prone to skin manifestation than type I diabetes patients, and skin manifestation is strongly related to diabetes duration.

In our patient group, the average age at presentation was 48.62 16.48 years. This appears to be consistent with the findings of Boavida et al. [15], who found that the average age of diabetes patients was 54 years. Similarly, Boyle et al. [16] found a comparable mean age of presentation. As a result, the average age of

presentation for DM indicates that the majority of individuals had persistent diabetes that was impairing their social activities and productivity [17].

In our study, infections were the most prevalent kind of dermatosis (57%) and included bacterial infections, fungal infections, and viral infections. The total prevalence of skin infections in diabetic individuals ranges between 20-50% [18]. The majority of patients in our research were female. Dermatological signs were found more frequently in women in our study, indicating that females have a larger illness burden and are more mindful of their health [19]. On the contrary, certain regional studies have revealed a male predominance [20, 21].

Diabetic dermopathy was seen in 8% of our patients. Other researchers, however, have indicated that diabetic dermopathy is the most prevalent and specific dermatological connection with DM [22, 23]. Other dermatological abnormalities with a less than 5% prevalence included spontaneous blisters, granuloma annulare, lichen planus, vitiligo, and eruptive xanthomas. Other researchers have observed a low prevalence of these diseases in people with diabetes [24, 25]. As a result, there is a strong correlation between diabetes and dermatological problems. A proper glycemic management lowers the occurrence and severity of cutaneous illnesses that have or do not have a recognized cause [26, 27]. Almost all diabetic individuals develop skin issues as a result of the long-term impact of diabetes on microcirculation and dermal collagen. Thus, dermatologists play a significant role in lowering dermatological morbidity, improving quality of life, and developing diabetes treatment strategies [28].

Conclusion

The present study found that type II DM patients were more susceptible to skin manifestation than type I DM and skin manifestation is directly associated with increasing diabetes duration. The skin manifestation early detection in diabetic mellitus had major significance in preventing the complications and disability with effective management.

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