

## ORIGINAL ARTICLE

## SKIN MANIFESTATIONS IN DIABETES MELLITUS

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**Background:** Diabetes mellitus affects all systems of the body. Skin is also frequently involved. The aim of the study was to assess the frequency of various skin manifestations in patients with diabetes mellitus. **Methods:** This descriptive study was conducted at the out-patient diabetic clinics at Aga Khan University Hospital, Karachi. One hundred consecutive patients, both male and female suffering from either type-1 or type-2 diabetes mellitus were included. **Results:** Out of hundred patients, skin changes were present in 84% of patients. The most frequent finding was skin infections present in 29.7% of patients and the second most common finding was diabetic dermopathy found in 28.5% of patients. Other findings were: Acanthosis Nigricans in 19%, sweating complications in 14.2%, nail involvement in 10.7%, oral involvement in 5.9%, diabetic foot in 5.9%, xanthelasma in 4.7%, yellow skin in 1.1%, generalized Pruritus in 1.1%, limited joint mobility in 1.1%. **Conclusion:** The cutaneous manifestations are very common in our diabetic patients (84%) and it is important that they are identified and appropriately treated in diabetes follow up clinics.

**Key words:** Diabetes mellitus, skin manifestations, infection, dermopathy

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## INTRODUCTION

Diabetes Mellitus (DM) is a syndrome with disordered metabolism and inappropriate hyperglycaemia due to either deficiency of insulin secretion or combination of insulin resistance and inadequate insulin secretion to compensate.<sup>1</sup>

It is a major endocrine cause of morbidity and mortality all over the world and the incidence is increasing globally. The worldwide prevalence of diabetes for all age groups was estimated to be 2.8% in 2000 and 4.4% 2030.<sup>2</sup> In Pakistan prevalence approaches 10% among adults and even greater number with glucose intolerance.<sup>3</sup>

Diabetes mellitus affects all systems of the body. Skin is also frequently involved. According to a study 30% of diabetics have some type of skin manifestation during the course of their disease<sup>4</sup> whereas in some studies figure as high as 96% have been reported<sup>5</sup>, indicating how common is skin involvement in patients with diabetes mellitus. Skin findings may be used as an indicator of patient's present as well as past metabolic status or it can be the presenting symptom in some patients not diagnosed to have diabetes as yet.

Infections constitute the main bulk of cutaneous manifestations of diabetes mellitus with incidence ranging between 20–50%.<sup>6</sup> Bacteria and fungi can cause infective complications involving skin and nails of the diabetic patients. Common causative organisms of bacterial infections are Staphylococcus aureus and beta-haemolytic Streptococci and of fungal infection is candida.

Diabetic dermopathy is the appearance of atrophic hyper-pigmented macules on the shin and it is the most common cutaneous sign of diabetes, the incidence of which correlates with severity of diabetes.<sup>7</sup>

Acanthosis nigricans, is a characteristic symmetrical leathery, verrucous brown thickening of the skin and is a recognized marker of insulin resistance.<sup>8,9</sup>

Diabetic foot infections are the most common non-traumatic cause of amputations. It affects around 15% of patients. Ischemia and neuropathy are the two important contributors. Diabetic foot ulceration has a poor prognosis and the five year mortality rate in patients with diabetes after amputation is around 70%.<sup>10</sup>

Uncontrolled diabetes mellitus may lead to the formation of eruptive xanthomas which are discrete dome-shaped papules or nodules (confluent papules), with yellow waxy centres and an erythematous base.<sup>8</sup> Approximately 2–5% of diabetic patients are reported to have a yellow hue to their skin.<sup>11</sup> It is asymptomatic and often seen in individuals with poor glycaemic control. It is best appreciated on the palms and soles because of sparse competition with melanocytic pigment in these areas. Hyperhidrosis is also seen in diabetic patients, which is characterized by sweating beyond that required to maintain a constant internal body temperature.<sup>12,13</sup>

Sudden appearance of one or more tense blisters, generally on the acral portions of the body is a clinically distinct diabetic marker. It is not common and occurs especially in patients with diabetic neuropathy.<sup>13</sup> Necrobiosis lipoidica is specific cutaneous marker of diabetes mellitus but it is uncommon with a reported incidence of 0.3–1.6%.<sup>11</sup>

Limited joint mobility (LJM) and waxy skin syndrome is a complication of diabetes which causes limitation of joint mobility because of skin thickening, in combination with the waxy appearance of tight skin.<sup>14</sup> Vitiligo and lichen planus are autoimmune conditions associated with diabetes.<sup>15</sup>

Though it is well known that diabetes is associated with a number of skin manifestations there is a relative paucity of studies looking at the prevalence of skin changes, especially the national data is very limited

so population based studies should be done in different areas of Pakistan to see the geographical variations and frequencies of various skin manifestations in diabetic patients. This will help to raise awareness and timely management of these conditions which can be life threatening as well.

## MATERIAL AND METHODS

This study was conducted at out-patient diabetic clinics at Aga Khan University Karachi. Hundred patients were included, fulfilling the eligibility criteria of age >15 years, already diagnosed type-1 and type-2 diabetics. Younger patients or patients suffering from hypercholesteremia or vasculitis were excluded from the study. After taking informed consent, complete history and examination was done. Data was collected on a *pro forma*. Data was analyzed using SPSS-10.

## RESULT

Out of 100 diabetic patients with mean age of 52.4 years and age ranging from 18–70 years, there were 58 (58%) male and 42 (42%) females. Out of these 8 (8%) patients had Insulin Dependent Diabetes mellitus (IDDM) and 92 (92%) had Non Insulin Dependent Diabetes mellitus (NIDDM). Skin manifestations were seen in 84 (84%) of patients. Out of these 5 had IDDM and 79 (94%) had NIDDM. More than one skin manifestations were seen in 30 (35.7%) patients.

The most frequent finding was skin infections, noted in 25 patients, including 5 patients with carbuncles, 10 with furuncles, 6 with cellulites and 4 with fungal infections of the skin. After skin infections, diabetic dermopathy was the second most frequent finding present in 24 (28.5%) patients; in all cases it was present bilaterally over the shins without any symptoms. Acanthosis nigricans was reported in 16 (19%) of them and all were suffering from NIDDM. Sweating abnormalities were noted in 12 (14.2%) patients, with localized hyperhidrosis in 4 patients and 8 patients had generalized hyperhidrosis, one of the patients was suffering from IDDM. Nine (10.7%) had nail involvement, 2 had paronychia, 2 had in-growing nails and 7 had yellow coloured nail. Five (5.9%) patients had oral involvement in which 2 had gingivitis, 2 had oral candidiasis and 1 was suffering from burning mouth.

Diabetic foot was present in 5 (5.9%) patients with tingling, burning and numbness but peripheral pulses were present in all of them and none of them had amputation. Four (4.7%) patients had xanthelasma over the upper eyelid. Yellow skin was found in only 1 patient who was asymptomatic. LJM was present in 1 (1.1%) patient more on the hands as compared to feet and the patient had IDDM. None of these patients was found to have necrobiosis lipoidica, diabetic bullae, lichen planus, perforating dermatoses, vitiligo, granuloma annulare or skin tags.

## DISCUSSION

The prevalence of skin manifestations in DM ranges from 30–100%<sup>10</sup> according to various international studies. In our study 84% of diabetic patients had skin lesions and around 30% had more than one skin lesion which is consistent with a study done at Sargodha that noted 83.4% of diabetic patients with coetaneous lesions.<sup>16</sup> The prevalence of skin lesions in diabetic patients in other local studies is 68%<sup>17</sup> and 96%.<sup>9</sup> It means there is a wide variation in the frequencies of skin manifestations in our population.

Skin infections were the most frequent finding and it is present in 29.7% of patients in this study. Incidence of cutaneous infections in other regional studies was 72%<sup>18</sup> and 49%.<sup>19</sup> Mucormycosis, a mycotic infection is also common in diabetic patients and in one study 5 out of 13<sup>20</sup> and in another study 1 out of 162 patients had mucormycosis<sup>16</sup>, however none of the patient in our study had mucormycosis. Reason of these differences in incidence of infections among patients with diabetes may be the socioeconomic and the increasing awareness of proper hygienic measures among diabetic patients.

In literature diabetic dermopathy is reported as one of the most common condition in diabetic patients.<sup>21</sup> It was found in 28.5% of patients with skin problems in this study. It is in contrast with previous studies in which the prevalence was 12%<sup>19</sup> and 4.2%.<sup>22</sup> We don't know the reason exactly but it may be related to infections, personal care, and control of diabetes.

Acanthosis nigricans was present in 19% of patients which is in consistent with a study done at Jamshoro (16.7%).<sup>18</sup> Another study done in Singapore showed acanthosis nigricans in 12% of diabetic patients.<sup>23</sup> The reason may be difference in insulin resistance among different populations.

Sweating abnormalities were present in 14.2% of patients and majority had generalized sweating especially at night which is not consistent with a study done at Karachi in 1998 that showed 16% of diabetic patients having pseudo-motor abnormalities.<sup>19</sup>

Nails are affected frequently in diabetic patients. In our study 9 (10.7%) patients had some kind of nail involvement which is consistent with a study which shows nail involvement in 9% of diabetic patients. Yellow nails are common in diabetics and up to half of the diabetics have been reported to have this.<sup>24</sup> In this study yellow nails were found in 7 (8.3%) patients, followed by paronychia in 2 (2.3%) patients and ingrowing nails in 2 (2.3%) patients.

Oral cavity may also be involved in diabetes. Although no exact prevalence is recorded in the literature, a study<sup>19</sup> shows oral involvement in 17% of diabetic patients. In our study oral cavity is involved in 5 (5.9%) patients, with 2 patients having gingivitis, 2 with oral candidiasis and 1 with burning mouth.

Diabetic foot is a common complication in uncontrolled diabetes. According to a study 15% of

hospitalized diabetic patients have this complication<sup>10</sup>, whereas in our study only 5.9% of patients had this complication. The reason of this difference might be that, our study was done in outpatient clinics only. But another study previously done at Karachi<sup>19</sup> shows diabetic foot in 30% of patients, this study had also been done on outpatient clinics only. The low frequency of diabetic foot in our study may be due to better hygienic conditions, because most of our patients belong to higher socioeconomic status, and increasing awareness of foot complications in diabetes mellitus. Xanthelasma was present in 4.7% of patients and none of them were known to be dyslipidemic, however the reported literature reports variable results ranging from 1.2–1.8%.<sup>25</sup> So as compared to the published literature its frequency is higher in our study.

Skin of patients with diabetes often shows a yellow hue. In our study yellow skin was present in only one patient and was asymptomatic. True prevalence of this is not reported in literature. In literature LJM was reported between 8–50%<sup>15</sup> and it is more common in younger patients with IDDM. In this study it was present in one patient. The low incidence in our study might be because only 8% of patients had IDDM and majority of them were of old age with NIDDM. Previous studies showed vitiligo in 10%<sup>19</sup> and 5.7%<sup>22</sup> of diabetic patients whereas in our study none of the patients had vitiligo. Again the reason may be that in our study only minority of patients had IDDM and vitiligo is mostly associated with IDDM because of autoimmune background of both of these.

Limitations of this study were that only diabetic patients from clinics were selected, so life threatening complications like deep mycosis and amputation of foot were not recorded because these are usually sick patients admitted in the wards. Another limitation was that it was a cross sectional study with data collection period of six months duration only, so long term relationship of skin conditions with treatment could not be established. Furthermore cultures of various skin infections were not taken so exact type of organism could not be recorded.

## CONCLUSION

The cutaneous manifestations are very common in our diabetic patients (84%) and it is important that they are identified and appropriately treated in diabetes follow up clinics. Among these, cutaneous infections were the commonest finding followed by diabetic dermopathy.

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