

## PREVALENCE OF CUTANEOUS MANIFESTATIONS OF DIABETES MELLITUS

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**Background:** Diabetes mellitus (DM) is a clinical syndrome characterized by hyperglycaemia due to absolute or relative insulin deficiency. The aim of this study was to evaluate the frequency of skin manifestations in patients with diabetes mellitus of this area. This descriptive study was conducted in medical out patient door of District Headquarter Hospital Battgram from January 2008 to July 2008. **Methods:** A total of 350 diabetic (types 1 and 2) patients over 15 years of age attending the medical OPD of DHQ Hospital were examined in detail for skin manifestations of the disease. **Results:** Three hundred and fifty diabetic (type-1 and type-2) patients (193 females and 157 males) enrolled in this study. Mean age of the patients was  $54 \pm 8.53$  years. Duration of diabetes was between 1–12 years; 320 patients had type-2 and 30 patients had type-1 diabetes mellitus. Patients with uncontrolled disease were 327 and 23 patients showed adequate glycaemic control. Seventy-six percent of patients had cutaneous manifestations. The skin manifestations observed were: skin infections 30.9%, foot gangrene and ulcers 12.9%, pruritus 7.1%, vitiligo 5.7%, yellow skin 4.2%, diabetic dermopathy 4.2%, skin tags 3.7%, acanthosis nigricans 2.9%, eruptive xanthomas 2.6%, necrobiosis lipoidica diabetorum 1.4%, diabetic bullae 0.6%, and pigmented purpuras in 0.3% patients. **Conclusions:** Cutaneous manifestations were quite common in the diabetics of this area.

**Keywords:** Diabetes mellitus, cutaneous manifestations, IDDM, NIDDM

### INTRODUCTION

Diabetes mellitus (DM) is a clinical syndrome characterised by hyperglycaemia due to absolute or relative insulin deficiency.<sup>1</sup> It is the most common endocrine disorder and is classified as type 1 or Insulin Dependent Diabetes Mellitus (IDDM) and type 2 or Non-Insulin Dependent Diabetes Mellitus (NIDDM) on the basis of age of onset of disease and degree of insulin dependency. Several surveys conducted on DM in South Asians show a rapidly increasing trend in prevalence of DM, especially of NIDDM.<sup>2</sup> The prevalence of DM in Pakistan is 8.6%, 11.1% and 13.9% in the provinces of Baluchistan, NWFP and Sindh respectively.<sup>3</sup>

Long standing DM can lead to permanent and irreversible functional changes in cells of body which lead to various complications. Skin being the largest organ of the body, is readily available for inspection and scientific study in case of every disease. It is particularly important in diabetics because it essentially does get involved in one way or the other. It is well known that DM is associated with a number of skin manifestations. Skin changes generally appear subsequent to the development of DM but may be the first presenting sign or even precede the diagnosis by many years. Among the many skin manifestations in DM, none is pathognomonic of this disease. Similar to other complications such as retinopathy and nephropathy, skin manifestations are largely the result of combined effect of hyperglycaemia, neuropathy, microvascular angiopathies and impaired host immune mechanisms. The main mechanism behind all these changes is thought to be non-enzymatic glycosylation end product formation. This process occurs to a minor

extent at normal blood sugar concentrations and is apparently accelerated in patients with increased blood glucose levels. This reaction results in changes in the physical and chemical properties of connective tissues and other body proteins. These modified proteins and glycosylation end products are responsible for various skin complications seen in DM. Timing of appearance of various cutaneous lesions in patients with diabetes mellitus might be potentially useful for the search of their pathogenesis, therapeutic interventions or predicting microvascular complications.

This study was carried out in District Headquarter Hospital Battgram, situated in thick forested mountainous areas of North-West Frontier Province (NWFP) of Pakistan. Battgram district is very remote and isolated from the more populous lowlands to the North-West. As a district headquarter hospital it is the first referral hospital for both district Battgram and Kohistan as well as for some parts of district Shangla and tribal area of Kala Dhaka Mansehra. No epidemiologic data related to skin disorders in diabetics has ever been reported from this backward area of NWFP. The present descriptive study was designed to document the occurrence and pattern of cutaneous manifestations among diabetic patients in this region.

### PATIENTS AND METHODS

A total of 350 diabetic patients of either type and more than 15 years of age, presenting in the OPD of DHQ Hospital Battgram, from January 2008 to July 2008, were included in the study.

A thorough medical history was taken especially taking into account the duration of illness, previous blood sugar tests records, previous skin

disorders, dietary control and treatment record of the patients. Blood pressure and random blood glucose readings were recorded. Oral consent was taken from all the participants and they were thoroughly examined for cutaneous disorders and all clinically definable cutaneous lesions were recorded in a predesigned Performa. Patients were labelled controlled or uncontrolled diabetics on the basis of blood glucose measurements, one either random or fasting, at the time of presentation and two or more previous blood glucose records. There was no facility available to check HbA1c level in this DHQ hospital as well as in private sector.

Data were analysed using SPSS-10 and frequencies of occurrence of various cutaneous manifestations were obtained.

**RESULTS**

Among the 350 diabetic cases, 193 (55.1%) were females and 157 (44.9%) were males. The age of the patients ranged from 15 to 70 years with mean age of 54±8.53 years. The majority (320, 91.4%) of diabetics had non-insulin dependent diabetes mellitus and only 30 (8.4%) had type-1 DM. Of the 350 diabetics, 268 (76.6%) had cutaneous manifestations while 82 (23.4%) of patients did not show any skin disorder. Female patients had higher frequency of skin disorders 158 (45.1%) as compared to male diabetics 110 (31.4%). The duration of DM ranged from 1–12 years. Of the total diabetic patients, majority 140 (40%) had 5–10 years of duration of diabetes mellitus, followed by 137 (39.1%) more than 10 years and 73 (20.9%) up to 5 years. The glycaemic status of the patients was very poor. Majority 327 (93.4%) of the patients were with uncontrolled DM whereas only 23 (6.6%) patients showed glycaemic control. All the study population were taking some anti-glycaemic medicine. (Table-1).

Among the cutaneous disorders found in patients with DM, 108 (30.9%) of patients had skin infections. The commonest skin infection was bacterial, observed in 67 (19%) of diabetics followed by fungal in 31 (8.9%) and

viral in 10 (2.9%) of diabetics. The second most common skin disorder was foot gangrene and ulcers detected in 45 (12.9%) of diabetic populations. The foot problems were caused by infection, ill fitting foot wear, improper toe nail cutting, and use of chapal with a single thong between hallux and second toe. Pruritus (both localised and generalised), vitiligo and yellow skin observed in 24 (7.1%), 20 (5.7%) and 15 (4.2%) of diabetic patients respectively. Diabetic dermopathy, skin tags, acanthosis nigricans and eruptive xanthomas found in 15 (4.2%), 13 (3.7%), 10 (2.9%) and 9 (2.6%) of study populations respectively. Necrobiosis lipiodica diabetorum, diabetic bullae and pigmented purpuras were least common and detected in 5 (1.4%), 2 (0.6%), and 1 (0.3%) of the patients with diabetes mellitus respectively. (Table-2)

**Table-1: Patients characteristics (n=350)**

Parameters	Value
<b>Gender distribution</b>	
Female	193 (55.1%)
Male	157 (44.9%)
No of patients having skin disorders	268 (76.6%)
No of NIDDM patients having skin disorders	250 (71.4%)
No of IDDM patients having skin disorders	18 (5.1%)
No of patients having no skin disorder	82 (23.4%)
<b>Age of patients</b>	
Mean±SD years	54±8.53
Range (years)	15–70
<b>Type of DM</b>	
NIDDM	320 (91.4%)
IDDM	30 (8.6%)
<b>Duration of DM</b>	
Up to 5 Yrs	73 (20.9%)
5–10 Yrs	140 (40.0%)
>10 Yrs	137 (39.1%)
<b>Status of DM</b>	
Uncontrolled	327 (93.4%)
Controlled	23 (6.6%)
<b>Status of treatment of DM</b>	
On oral hypoglycaemic	288 (82.2%)
On Insulin	45 (12.9%)
On combination therapy	17 (4.9%)
No treatment	Nil

**Table-2: Cutaneous manifestations observed in diabetics**

Skin manifestations	NIDDM	IDDM	F	M	Total
<b>Skin infections</b>	<b>105 (30%)</b>	<b>3 (0.9%)</b>	<b>71 (20.3%)</b>	<b>37 (10.6%)</b>	<b>108 (30.9%)</b>
Bacterial	65 (18.6%)	2 (0.6%)	55 (15.7%)	12 (3.4%)	67 (19%)
Fungal	30 (8.6%)	1 (0.3%)	13 (3.7%)	18 (5%)	31 (8.9%)
Viral	10 (2.9%)	0 (0.0%)	3 (0.9%)	7 (2%)	10 (2.9%)
Foot gangrene and ulcers	44 (12.6%)	1 (0.3%)	17 (4.9%)	28 (8%)	45 (12.9%)
Pruritus	25 (5.7%)	0 (0.0%)	18 (5%)	7 (2%)	25 (5.7%)
Vitiligo	13 (3.7%)	7 (2%)	14 (4%)	6 (1.7%)	20 (5.7%)
Yellow skin	15 (4.2%)	0 (0.0%)	6 (1.7%)	9 (2.6%)	15 (4.2%)
Diabetic dermopathy	12 (3.4%)	3 (0.9%)	11 (3.1%)	4 (1.1%)	15 (4.2%)
Skin tags	11 (3.1%)	2 (0.6%)	4 (1.1%)	9 (2.6%)	13 (3.7%)
Acanthosis nigricans	10 (2.9%)	0 (0.0%)	8 (2.3%)	2 (0.6%)	10 (2.9%)
Eruptive xanthomas	7 (2%)	2 (0.6%)	6 (1.7%)	3 (0.9%)	9 (2.6%)
Necrobiosis lipiodica diabetorum	5 (1.4%)	0 (0.0%)	1 (0.3%)	4 (1.1%)	5 (1.4%)
Diabetic bullae	2 (0.6%)	0 (0.0%)	1 (0.3%)	1 (0.3%)	2 (0.6%)
Pigmented purpuras	1 (0.3%)	0 (0.0%)	1 (0.3%)	0 (0.0%)	1 (0.3%)
<b>Total</b>			<b>158</b>	<b>110</b>	

## DISCUSSION

Diabetes mellitus is a disease which commonly involves the skin. Minor skin manifestations are ignored by the patients and they seek help of the doctor only if there is any major problem which does not heal with ordinary medications. In this study 76.6% of patients had some kind of cutaneous manifestations of diabetes mellitus as it has been reported in the range from 11.24% to almost 100% in various other studies.<sup>4-6</sup>

The results indicate that skin diseases were more prevalent in women than men. This could be partly due to greater awareness of women of health issues or may be due to under representation of men in medical OPD. In contrast, a study from Sargodha, Pakistan found skin disorders more in men than women.<sup>7</sup>

Majority (91.4%) of patients was suffering from NIDDM and only a small number (8.6%) of patients were with IDDM. This trend of occurrence of diabetes mellitus was comparable to various other studies reported both nationally and internationally.<sup>4-6</sup>

Mean age of diabetic patients in this study was 54 years whereas in a survey done in Karachi Pakistan, it was 51.5 years.<sup>3</sup> The high prevalence of diabetes mellitus in this age meant that majority of diabetics were suffering from the disease in their most productive years of life.

The glycaemic status in this study was very poor. Majority (93.4%) of patients had uncontrolled DM and only 6.6% of diabetics showed glycaemic control. These results were similar to those reported Bhat *et al.*<sup>8</sup> This in itself was indicative of high tendency of diabetic complications, as uncontrolled DM increases the risk of development of microangiopathy and related sequelae.<sup>9-11</sup> This could be due to lack of health related facilities in this remote area or ignorance of patients about blood glucose measurements and low literacy rate in this backward area of NWFP.

The commonest skin manifestation observed in this study was skin infection, found in 30.9% of diabetics. The types of infection were bacterial 19%, fungal 8.9% and viral 2.9%. Naheed *et al.*<sup>12</sup> from Lahore reported cutaneous infections in 62.2% of diabetics, Mehajan *et al.*<sup>9</sup> found skin infections in 54.69% diabetics, Baloch *et al.*<sup>13</sup> observed prevalence of skin infection in 72% of diabetics, Nawaf *et al.*<sup>14</sup> reported skin infection in diabetics the commonest manifestation of their study and Radhu *et al.*<sup>15</sup> found fungal infections more commoner in type ii diabetics. In contrast, a study from Sargodha Pakistan<sup>7</sup> reported skin infection in 23% of diabetic patients. The relative high prevalence of skin infections in this study could be due to poor hygienic conditions.

The second most common skin disorder found in this study was diabetic foot gangrene and ulcers. This abnormality observed in 12.9% of total study population and diabetic foot problems were more prevalent in men as compared to women. In contrast other national studies reported the prevalence of 30% and 46.7% of diabetic foot complications.<sup>16,17</sup> Zafer<sup>18</sup> as well as Mehmood *et al.*<sup>19</sup> described foot abnormalities more prevalent in males than females and Ali *et al.*<sup>20</sup> reported females presenting with foot ulceration had higher body mass index. The causes of foot problem in our population were infection, ill fitting foot wear, improper toe nail cutting, use of chapal with a single thong between hallux and second toe and bare foot gait was also reported a cause of foot complications of diabetics in one study.<sup>21</sup>

The third commonest finding, pruritus was found in 7.1% of diabetic patients in this study. Other similar previous studies reported the prevalence of pruritus were 15.1% and 49%.<sup>22,23</sup>

The prevalence of vitiligo in our patients with diabetes mellitus was rather high and was five times as much as in a similar previous study reported from India.<sup>8</sup>

In this study yellow skin was prevalent in 4.2% of type-2 diabetics and 0.0% in type-1 diabetics. This result was higher than the report of a national study,<sup>7</sup> and in IDDM patients it was lower than another similar earlier study in young diabetics.<sup>24</sup> This study revealed diabetic dermopathy in 4.2% of study population while a similar earlier study reported the prevalence of 1.2% in diabetics.<sup>25</sup>

Necrobiosis lipoidica diabetorum was prevalent in 1.4% of NIDDM patients and 0.0% in IDDM patients in this study. In earlier studies its prevalence was reported in less than 1% of total diabetics and in IDDM patients it was reported in 2.3% of patients.<sup>26,27</sup>

Some of the less common findings observed in this like skin tags, eruptive xanthomas, Acanthosis nigricans, diabetic bullae and pigmented purpuras have also been reported by other similar studies.

## CONCLUSIONS

From the foregoing discussion, it is concluded that skin involvement occurs quite often in diabetics of this area. Patients should be educated about blood glucose control as well as skin and foot care.

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