



Original Article

Pattern of Cutaneous Dermatoses in Type 2 Diabetes Mellitus in a Tertiary Hospital: A Cross Sectional Study

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Abstract

Background: Diabetes mellitus (DM) continues to be a major public health problem. Multiple factors have a role in the skin manifestations of DM. Cutaneous manifestations of DM are very important to the clinician.

Methods: Current study was carried out in the Department of Dermatology and Venereology, Shaheed Suhrawrdy Medical College Hospital, Dhaka, spanning from 1st January 2017 till 30th June 2017 over a period of six months. Adult patients already diagnosed to be suffering from type 2 DM presenting with cutaneous manifestations were included in the study.

Results: Majority (68.0%) patients had diabetes >5 years, 16.7% had < 1 year and 15.3% had 1-5 years. Family history of DM was found in 70.7% in this study. In this study bacterial infection and fungal infection were more common in female patients (60.0% vs 62.0% respectively). Regarding types of dermatoses, fungal infection was more common in this study 50(33.3%). Others were bacterial infection 20(13.3%), viral infection 7(4.7%) and parasitic infection 7(4.7%). Papulo squamous disease was found 31(20.7%) patients, other diseases were 32(21.3%). Viral infection was more in male patients (71.4%). Parasitic infection was high in female patients 6(85.7%). Papulo squamous diseases was found 21(67.7%) in female patients.

Conclusion: In this study fungal infection, bacterial infection, viral infection and parasitic infections were found to be the more common cutaneous dermatoses among adult diabetic patients. Bacterial infection and fungal infection were more common in female patients.

Key Words: Dermatoses, diabetes mellitus

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Introduction

Diabetes mellitus (DM) is an endocrine disorder affecting all ages and socioeconomic groups. It is characterized by hyperglycemia secondary to absolute or relative deficiency of insulin. DM is classified into two types, DM type 1 (insulin dependent diabetes-IDDM) and DM type 2 (non-insulin dependent diabetes- NIDDM). Global

incidence of DM type 2 in the year 2000 was 171 million which is likely to be 366 million in the year 2030.¹

Many skin disorders show high incidence and severity in DM. The biochemical factors responsible for this are yet to be understood. According to research, about 30% of diabetic

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patients will eventually develop cutaneous manifestations during the natural course of this chronic disease. The skin is a temporary reservoir for excess blood glucose which accounts for tendency to develop pruritus and both bacterial and fungal infections.² As it is known that the skin is the largest organ of the body, which is affected by both acute and chronic metabolic derangements that occur in diabetes.³

It is well known that DM leads to a number of cutaneous manifestations. Skin changes mostly appear later in DM but may be the first clinical presenting sign or even precede the diagnosis by many years.⁴ Several reports propose that few skin manifestations in diabetic patients may suggest the degree of long-term control of diabetes and are associated with other diabetic complications.⁵ Cutaneous manifestations are common in Type I diabetes, like acquired ichthyosis and keratosis pilaris which begin early in the course of the diabetes. Diabetic hands and rubeosis faciei are related to the disease duration.⁶

Poorly controlled Type 2 diabetes mellitus (DM) is associated with several microvascular, macrovascular and neuropathic complications. Multiple factors play a role in the manifestations of cutaneous signs of DM. The prevalence of a cutaneous disorder appears to be similar between Type 1 DM and Type 2 DM patients, but Type 2 DM patients develop more frequent cutaneous infections, and Type 1 DM patients manifest more autoimmune-type cutaneous lesions.⁷

Materials and Methods

Current study was carried out in the Department of Dermatology and Venereology, Shaheed Suhruwardy Meical College Hospital, spanning from 1st January 2017 till 30th June 2017 over a period of six months. The study was conducted after a formal approval from the ethical research committee. Adult patients already diagnosed to be suffering from type 2 DM presenting with cutaneous manifestations were included in the study. Patients having skin changes secondary to pregnancy, other systemic illnesses and iatrogenic factors were excluded. An informed consent was obtained from all the enrolled subjects. The

demographic details of all the enrolled subjects were also documented. A detailed history was obtained from the enrolled patients including duration of diabetes and mode of treatment for diabetes (i.e. diet only, oral hypoglycemic, insulin therapy or combination therapy). After a detailed general, systemic and cutaneous examination, the clinical diagnosis of dermatological findings was established. Their fasting blood sugar, random blood sugar and HbA1c were advised to assess the glycemic control. Unsatisfactory glycemic control defined as HbA1c > 7 as per American Diabetic Association (ADA) criteria. Other relevant laboratory investigations were advised where required including blood complete picture, renal function tests, liver function tests, lipid profile, urine examination and pus for culture and sensitivity. Any special tests like Wood's lamp examination, fungal scrapings, skin biopsy, Tzanck smear, nail biopsy and nail clippings were performed in doubtful cases. All the findings were recorded on a specially designed data sheet. Data were compiled, tabulated and analyzed by SPSS (Statistical package for social sciences) version 23. Mean and standard deviation were used to represent quantitative variables like age, duration of diabetes, fasting blood sugars, random blood sugars and HbA1c. Descriptive variables like presence of various skin changes were presented as frequencies and percentages. Chi-square test was used to determine association of various skin lesions with glycemic control and gender. P value < 0.05 is considered as significant.

Results

Out of 150 type 2 diabetes mellitus patients majority 87 (58.0%) patients belonged to age \leq 50 years. The mean age was found 48.61 ± 11.10 years. Female was predominant (64.7%). Male: female ratio was 1:1.8. Majority 147 (98.0%) patients were married. Most of the patients were Islam religion 145(96.7%). Majority 83 (55.3%) patients were housewives, 48 (32.0%) patients were completed graduate and above education level and 137 (91.3%) patients came from urban area (Table I). Majority 68.0%) patients had diabetes >5 years, 16.7% had < 1 year and 15.3%

had 1-5 years (Figure 1). Family history of DM was found in 70.7% in this study (Figure 2).

Regarding type of dermatoses, fungal infection was more common in this study 50 (33.3%), bacterial infection 20 (13.3%), viral infection 7 (4.7%) and parasitic infection 7 (4.7%). Papulo squamous disease was found 31 (20.7%) patients, other disease was 32 (21.3%). No infection was found in 03 (2.0%) patients (Table II).

Regarding investigations, mean CBC with ESR was found 10.95 ± 1.58 g/dl, mean FBS was 7.67 ± 1.66 mmol/l, mean postprandial blood sugar was 12.05 ± 2.47 mg/dl and HbA1c was 7.12 ± 0.77 %.

Bacterial infection was found in 20 patients among them 14 (70.0%) patients belonged to age ≤ 50 years and 6(30.0%) belonged to age > 50 years. Fungal infection was found 50 patients among them 30 (60.0%) patients belonged to age ≤ 50 years and 20 (40.0%) belonged to age > 50 years. Papulo squamous diseases was found in 31 patients among them 18 (58.1%) and 13 (41.9%) patients belonged to age ≤ 50 and > 50 years respectively. Others disease was found in 32 patients among them 14 (43.2%) patients belonged to age ≤ 50 years and 18 (56.3%) belonged to age > 50 years. Others disease was significantly higher in > 50 years age group (Table IV).

In this study bacterial infection and fungal infection was more common in female patients (60.0% vs 62.0% respectively). Viral infection was more in male patients (71.4%). Parasitic infection was high in female patients 6 (85.7%). Papulo squamous diseases also found more 21 (67.7%) in female patients. Others disease also found more 22 (68.7%) in female patients. The difference was not statistically significant ($p > 0.05$) (table V).

Bacterial infection was found in 20 patients among them 12 (60.0%) patients had DM > 5 year. Fungal infection was found in 50 patients among them 34 (68.0%) had DM > 5 years. Viral infection was found in 6 (85.7%) had DM > 5 years. Parasitic infection was found in 7 patients among them 5 (71.4%) had DM > 5 years. Papulo squamous diseases were found in 31 patients

among them 21 (67.7%) had DM > 5 years. Others disease was found in 32 patients among them 21 (65.6%) had DM > 5 years. The difference was not statistically significant ($p > 0.05$) (Table VI).

Bacterial infection was found in 20 patients among them 17 (85.0%) patients had family history of DM, fungal infection was in 50 patients among them 29 (58.0%) had family history of DM, viral infection was in 7 patients among them 6 (85.7%) had family history of DM, parasitic infection was in 7 patients among them 4 (57.1%) had family history of DM (Table VII).

Results

Table I: Demographic characteristics of the study patients (n=150)

Demographic characteristics	Frequency	Percentage
Age (years)		
21-30	5	3.3
31-40	41	27.3
41-50	41	27.3
51-60	40	26.7
>60	23	15.3
Mean(\pmSD)	48.61(\pm 11.10)	
Sex		
Male	53	35.3
Female	97	64.7
Marital status		
Single	03	2.0
Married	147	98.0
Religion		
Islam	145	96.7
Hindu	05	3.3
Occupational status		
Housewife	83	55.3
Private Job	25	16.7
Govt.	25	16.7
Others	17	11.3
Educational status		
Primary	34	22.7
SSC	45	30.0
HSC	23	15.3
Graduate and above	48	32.0
Residence		
Urban	137	91.3
Rural	13	8.7

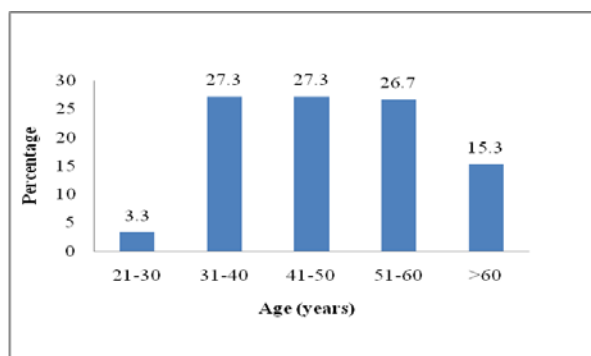


Figure 1: Age distribution of the patients.

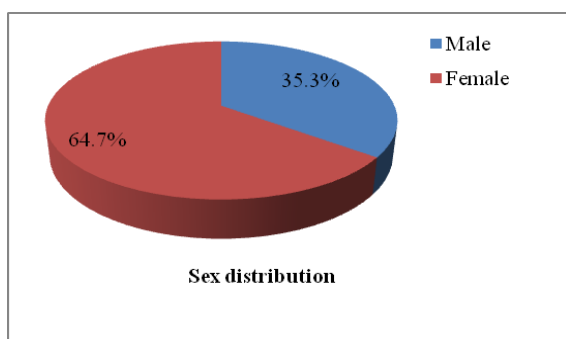


Figure 2: Sex distribution of the patients

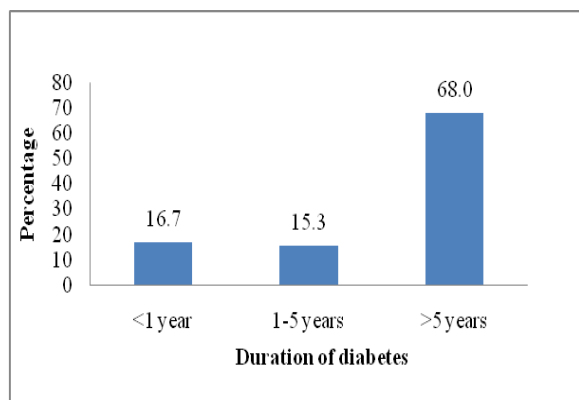


Figure 3: Duration of diabetes of the patients

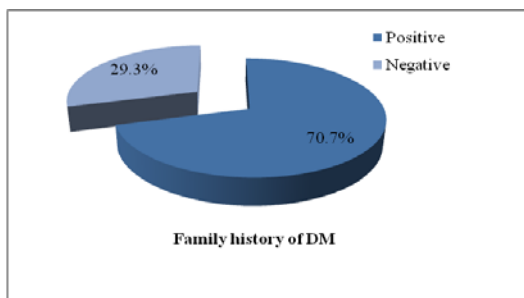


Figure 4: Family history of DM of the patients.

Table II: Distribution of the study patients by type of dermatoses (n=150)

Type dermatoses	Frequency	Percentage
Infection disease		
• Bacterial	20	13.3
• Fungal	50	33.3
• Viral	7	4.7
• Parasitic	7	4.7
Papulo squamous diseases	31	20.7
Others disease	32	21.3
No infection	3	2.0

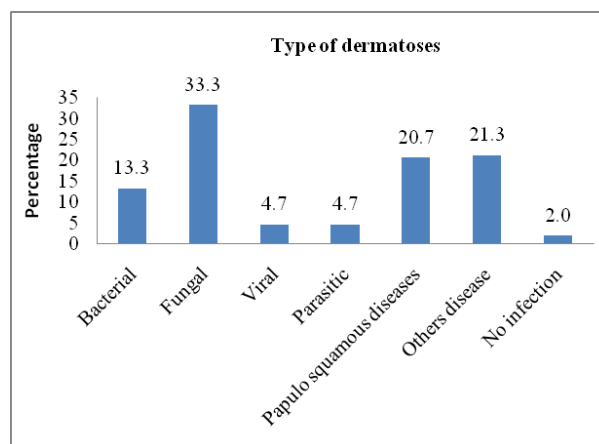


Figure 5: Type of dermatoses of the patients

Table III: Distribution of the patients by investigations

Investigations	Mean	±SD
CBC with ESR (g/dl)	10.95	±1.58
FBS (mmol/l)	7.67	±1.66
Postpranidal blood sugar (mg/dl)	12.05	±2.47
HbA1c (%)	7.12	±0.77

Table IV: Distribution of the type of dermatoses by age (n=150)

Type of dermatoses	Total	Age				P value
		≤50 years		>50 years		
Infection disease						
Bacterial	20	14	70.0	6	30.0	0.28 ^{ns}
Fungal	50	30	60.0	20	40.0	0.88 ^{ns}
Viral	7	5	71.4	2	28.6	0.49 ^{ns}
Parasitic	7	6	85.7	1	14.3	0.14 ^{ns}
Papulo squamous diseases	31	18	58.1	13	41.9	0.86 ^{ns}
Others disease	32	14	43.2	18	56.3	0.04 ^s
No infection	03	0	0.0	3	100.0	0.04 ^s
Total	150	87		63		

Table V: Distribution of the type of dermatoses by sex (n=150)

Type of dermatoses	Total	Sex				P value
		Male		Female		
Infection disease						
Bacterial	20	8	40.0	12	60.0	0.69 ^{ns}
Fungal	50	19	38.0	31	62.0	0.72 ^{ns}
Viral	7	5	71.4	2	28.6	0.06 ^{ns}
Parasitic	7	1	14.3	6	85.7	0.21 ^{ns}
Papulo squamous diseases	31	10	32.3	21	67.7	0.62 ^{ns}
Others disease	32	10	31.3	22	68.7	0.52 ^{ns}
No infection	03	0	0.0	3	100	0.20 ^{ns}
Total	150	53		97		

Table VI: Distribution of the type of dermatoses by duration of DM (n=150)

Type of dermatoses	Total	Duration of DM						P value
		<1 year		1-5 year		>5 year		
Infectious disease								
• Bacterial	20	6	30.0	2	10.0	12	60.0	0.28 ^{ns}
• Fungal	50	7	14.0	9	18.0	34	68.0	0.71 ^{ns}
• Viral	7	0	0.0	1	14.3	6	85.7	0.43 ^{ns}
• Parasitic	7	0	0.0	2	28.6	5	71.4	0.35 ^{ns}
Papulo squamous diseases	31	7	22.6	3	9.7	21	67.7	0.44 ^{ns}
Others disease	32	5	15.6	6	18.8	21	65.6	0.85 ^{ns}
No infection	03	0	0.0	0	0.0	3	100	0.48 ^{ns}
Total	150	25		23		102		

Table VII: Distribution of the type of dermatoses by family history of DM (n=150)

Type of dermatoses	Total	Family history of DM				P value
		Positive		Negative		
Infection disease						
• Bacterial	20	17	85.0	3	15.0	0.13 ^{ns}
• Fungal	50	29	58.0	21	42.0	0.14 ^{ns}
• Viral	7	6	85.7	1	14.3	0.37 ^{ns}
• Parasitic	7	4	57.1	3	42.9	0.41 ^{ns}
Papulo squamous diseases	31	24	77.4	7	22.6	0.35 ^{ns}
Others	32	24	75.0	8	25.0	0.55 ^{ns}
No infection	03	2	66.7	1	33.3	0.87 ^{ns}
Total	150	106		44		

Discussion

In this study, majority 87(58.0%) patients belonged to age ≤50 years. The mean age was found 48.61±11.10 years. Phulari and Kaushik⁷ study observed that the age distribution among the study population, where it was seen that majority 49.5% of respondents were in the age group of 41 to 60 years followed by 42.5% were less than 40 years and only 8% were more than 61 years.

Mean age was 44.5 + 12.2 years. Chatterjee et al.⁸ showed that among 680 patients, the age varied from 14 to 80 years, mean age being 46.3±6.7 years. Sanad et al.⁹ in their study showed that age range was from 17 to 80 years, with a mean of 51.42±14.66 years. In a study by Timshina et al.¹⁰ the age of the patients ranged from 10-75 years, with a mean age of 49.38±12.78 in study of Sandeepthi et al.¹¹ observed that the majority were in 6th decade (34.5%) and 7th decade (30%) respectively. In this study Niaz et al.¹ study showed the mean age was 50 + 11 years.

In this study it was observed that female was predominant (64.7%). Male: female ratio was 1:1.8. Majority 147 (98.0%) patients were married. Most of the patients were Islam religion (96.7%). Majority 83 (55.3%) patients were housewives, 48 (32.0%) patients were completed graduate and above education level and 137 (91.3%) patients came from rural area. Similar observation was found Niaz et al.¹ they showed 41% male and 59% female. Phulari and Kaushik⁷ study observed that majority 66% were males and 34% were females. Galdeano et al.¹² in their study showed that females predominated slightly, representing 57% of the patients. Timshina et al.¹⁰ the majority was females (54.95%) who were diabetic as compared to males (45.1%). Sandeepthi et al.¹¹ the males constituted 66% of the cases with a male to female ratio was 1.89:1.

In this study the majority 68.0%) patients had diabetes >5 years, 16.7% had < 1 year and 15.3% had 1-5 years. Phulari and Kaushik⁷ study observed that the duration of DM among the study population; majority 50.58% were <5 years, 27.05% in 6 to 10 years, 11.76% in 16 to 20 years and 10.85% in 11 to 15 years. Study by Kumar et al.¹³ showed that the duration of diabetes was <10 years in 30 patients, 17 had 11-20 years and 3 had > 20 years of diabetes. Study by Goyal et al.¹⁴ also showed that the duration of diabetes was <10 years in 60 patients. 16 Thirty four patients had 11-20 years of diabetes, and six had >20 years of diabetes. The duration of diabetes was 1-10 years in 290 patients. Two hundred and one (201) had >10 years of diabetes in a study by Chatterjee et al.⁸. Niaz et al.¹ study found that 74(37.0%)

patients had diabetes > 10 years, 33.0% had diabetes 5-9 years and 30.0% had <5 years.

Regarding type of dermatoses, fungal infection was more common in this study 50 (33.3%), bacterial infection 20(13.3%), viral infection 7 (4.7%) and parasitic infection 7(4.7%). Papulo squamous disease was found 31 (20.7%) patients, other disease was 32 (21.3%). No infection was found in 03 (2.0%) patients. Niaz et al.¹ study observed that the most frequently observed skin disease was bacterial infections (26%), followed by fungal infections (22%), viral infections (8%), pruritus (8%). Phulari and Kaushik⁷ study revealed skin manifestations among the study population, where 61% had infectious skin manifestations and 39% had non-infectious skin manifestation. Out of infectious manifestations 39.5% had fungal infection, 20.5% had bacterial and 1% had viral. In Sanad et al.⁹ study, cutaneous infections included fungal (22%), bacterial (16%), and viral (2%) infections. Sandeepthi et al.¹¹ study showed among the cutaneous infections, out of the 132 cases with cutaneous infections, fungal infections (46%) were most frequent, followed by bacterial infections (16.5%) and viral infections (3.5%).

Regarding investigations, mean CBC with ESR was found 10.95±1.58 g/dl, mean FBS was 7.67±1.66 mmol/l, mean postprandial blood sugar was 12.05±2.47 mg/dl and HbA1c was 7.12±0.77 %. Niaz et al.¹ study showed that the mean HbA1c was 8.6 + 1.5 with 68% patients having unsatisfactory glycemic control.

In this study bacterial infection and fungal infection was more common in female patients (60.0% vs 62.0% respectively). Viral infection was more in male patients (71.4%). Parasitic infection was high in female patients 6 (85.7%). Papulo squamous diseases was found 21 (67.7%) in female patients. Others disease was found 22 (68.7%) in female patients. The difference was not statistically significant (p>0.05). Niaz et al.¹ There were 31 females (25%) with acanthosis nigricans as compared to 11 males (13%), (p = 0.030). Gender preponderance was not found to be associated with other dermatoses.

Bacterial infection was found in 20 patients among them 12 (60.0%) patients had DM > 5 year. Fungal infection was found in 50 patients among them 34 (68.0%) had DM >5 years. Viral infection was found in 6 (85.7%) had DM > 5 years. Parasitic infection was found in 7 patients among them 5 (71.4%) had DM > 5 years. Papulo squamous diseases were found in 31 patients among them 21 (67.7%) had DM > 5 years. Others disease was found in 32 patients among them 21 (67.7%) had DM > 5 years. The difference was not statistically significant ($p>0.05$). In study of Phulari and Kaushik⁷ observed that association between duration of DM and bacterial skin manifestation among the study population (n=85) shows statistical significance. Association between duration of DM and fungal skin manifestation among the study population (n=85), where there was no statistical significance seen. In study by Sanad et al.⁹ it showed that the bacterial association with duration of disease was not significant. Findings were not similar to present study. In study by Sanad et al.⁹ it showed that the bacterial association with duration of disease was significantly seen. Findings were not similar to present study.¹⁸ According to a study from Saudi Arabia, for those patients having diabetes of less than 5 years' duration, the incidence of skin manifestations was 80.6%; for those having diabetes for more than 5 years, the incidence was 98%. This difference was statistically significant ($p<0.001$).

In our study bacterial infection was found in 20 patients among them 17 (85.0%) patients had family history of DM, fungal infection was in 50 patients among them 29 (58.0%) had family history of DM, viral infection was in 7 patients among them 6(85.7%) had family history of DM, parasitic infection was in 7 patients among them 4 (57.1%) had family history of DM. Papulo squamous diseases was found 31 patients among them 24 (77.4%) had family history of DM and other disease was in 32 patients among them 24 (75.0%) had family history of DM.

Conclusion

In this study bacterial infection and fungal infection were more common in female patients. Common type of dermatoses found were fungal infection, bacterial infection, viral infection, parasitic infection.

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