Research Article

A Study to Evaluate Therapeutic Management of Various Cutaneous Disorders in Diabetic Patients

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ABSTRACT

Diabetes Mellitus represent an area in which cutaneous manifestations are considered as important clues towards diagnosis as the patients are more susceptible to a number of muco-cutaneous disorders. The study was carried out to assess various cutaneous manifestations in diabetic patients, their therapeutic management and clinical outcomes. A prospective study was undertaken in which diabetic patients with cutaneous disorders were selected. After clinical assessment of their conditions, they were therapeutically managed and their outcomes were measured, relevant patient counselling was done along with the provided leaflets. About 150 patients of various skin disorders were included in the study. The pattern of cutaneous manifestations found were as follows: Cutaneous infections were observed in 85 patients in which fungal infections were more predominant affecting 52.2% of patients, followed by Dermatoses commonly associated with DM were observed in 38 patients, Non-specific manifestations were seen in 14 patients and neuropathic and ischemic skin diseases were seen in 38 patients. Among which Tinea corporis was most predominant cutaneous manifestation and icthyosis was the least commonly predominant manifestation among all the skin conditions. Male diabetic patients were more prone to infections than females. All the skin conditions were therapeutically managed. Maintaining appropriate glycaemic control in diabetic patients can reduce these infections. Education of patients and health care personnel regarding adaptation of preventive measures, life style modifications and seeking timely dermatological opinion for these skin problems may reduce morbidity, complications, hospital visits and burden on health care facilities. Among 150 cases collected, 108 patients which was 87.1% of total including both diabetes and cutaneous conditions were observed as improved. In 48 patients which was 12.8% of the total, the conditions were found to be stable without any adverse effects or complications as a result of given treatment and effective patient counselling towards their life style modifications.

Keywords: Cutaneous manifestations, Diabetes mellitus, Management, RBS levels, Patient Counselling.

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INTRODUCTION

The skin is the outer covering of the body and is the largest organ, it is affected by both acute metabolic dearrangements and chronic degenerative complications of diabetes mellitus. Individuals with type 2 Diabetes mellitus are more likely than those with type 1 diabetes to develop cutaneous manifestations.

The cutaneous disease can appear as the first sign of diabetes (or) may develop at any time in the course of the disease. Skin can show signs of an internal disease in some cases before the disease advances and becomes more serious. In other cases, symptoms appear on the skin long after the disease begins causing internal damage. Some of the skin changes which may indicate internal diseases like a new rash, change in texture (or) colour, the appearance of growth, etc.,.

The skin changes may eventually be used as a reflection of the patient's current as well as past metabolic status. Endocrine diseases, particularly Diabetes mellitus, represent an area in which cutaneous manifestations may be important clues to the diagnosis. Patients with endocrine diseases are especially susceptible to a number of associated mucocutaneous disorders. Diabetes mellitus is a very common medical disease with sequelae that affect almost every organ system, especially the skin is no exception. The pandemic growth of Diabetes mellitus is by demographics (population, aging), socioeconomic, migratory, nutritional, lifestyle patterns and over-weight. The manifestations of Diabetes mellitus of the integument are numerous and varied. There is considerable uncertainty about the pathogenesis of many of the cutaneous conditions affecting Diabetics. 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.

Many Cutaneous signs are readily recognizable as Diabetic Markers like diabetic dermopathy, diabetic bullae, waxy skin syndrome which are virtually diagnostic of Diabetes mellitus. Some cutaneous conditions appear to be caused by the primary abnormalities of Diabetes mellitus or by major complications, Vasculopathy, and neuropathy, others are linked to altered immunologic conditions, to changes in collagen, and some are a consequence of treatment.

Dermatologic disorders associated with Diabetes mellitus generally appear after the primary disease or they may signal or appear after the primary disease or they may signal or appear coincidentally with its onset, or even precede Diabetes mellitus by many years. The cutaneous clinical signs are numerous and varied as 1/3rd of patients with Diabetes mellitus are estimated to have cutaneous changes.

METHODS

Ethical consideration

The protocol of the study was approved by the institutional ethics committee of Santhiram medical college and general hospital, Nandyal. The study was conducted in compliance with good clinical practice guidelines.

Study design

It is a prospective study which includes diabetic patients with cutaneous manifestations from Inpatient and Outpatient units of dermatology department in Santhiram Medical College and General Hospital to study pattern of cutaneous manifestations, their severity, therapeutic management in diabetic patients and providing leaflets as a part of patient counselling.

Study Site

Department of Dermatology, Santhiram Medical College and General Hospital, Nandyal, tertiary care teaching hospital with approximately 700 bedded capacities.

Study Period

6 months

Study Population

All the diabetic patients with cutaneous manifestations from Inpatient and Outpatient units of dermatology department of Santhiram Medical College and General Hospital, Nandyal.

Sample Size

- 150 patients.

SAMPLING CRITERIA:

- INCLUSION CRITERIA:
  - Patients with informed consent form.
  - Diabetic patients with cutaneous disorders.
  - Patients with age above 20 years.
  - Patients with suspected cutaneous symptoms.
- EXCLUSION CRITERIA:
  - Participants who are unwilling to join the study
  - Pregnant women

Statistics:

- Population: Diabetic patients with cutaneous manifestations were selected.
- Method of selecting the sample: Dermatology and General Medicine OP and IP department.
- Subjects are allocated based on type of cutaneous condition.
- Statistical method: Paired t' test.

Paired t test

Test	Tabular p-value	Outcome p-value
Paired t test	<0.05	<0.00001

P tabular value =0.05;

As P calculated value is less than tabular value (0.00001<0.05)

Hence there is significant relation between RBS levels before and after treatment and patient counselling.

RESULTS

Table I: Age wise gender distribution

Age (in years)	Males (n)	Females (n)	Total (n)	Percentage (%)
21-40	15	28	43	28.6
41-60	52	19	71	47.3
61-80	29	7	36	24.0
Total	96	54	150	100

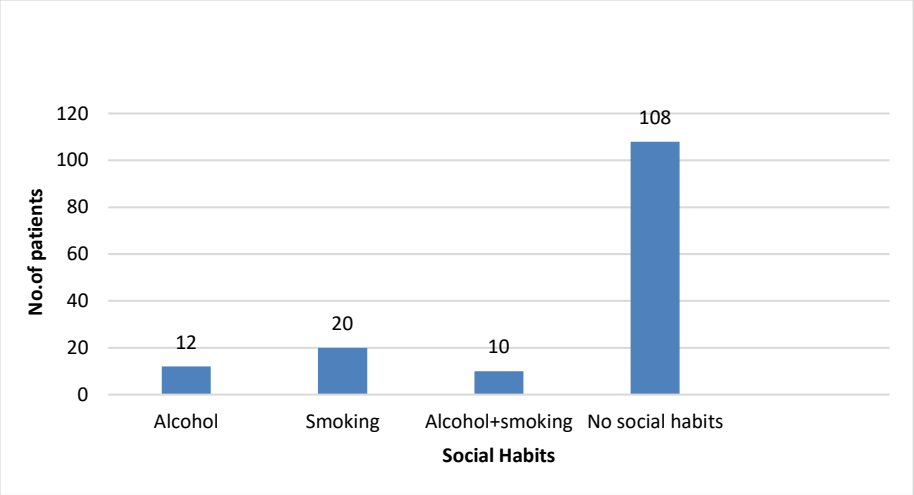

Figure 1: Social history of the patients

Table II: Duration of diabetes

Duration (years)	No. of patients	Percentage(%)
<1	31	20.6
1-5	65	43.3
6-10	34	22.6
>10	20	13.3

Table III: Distribution of patients based on RBS levels (before treatment)

RBS level (mg/dl)	Total (150)	Percentage (%)
180-250	106	71
251-300	36	24
301-350	8	5

Table IV: Cutaneous manifestations in diabetes mellitus

Cutaneous manifestations	Percentage
1.Cutaneous infections	18
a. Bacterial- i. cellulitis	6
ii. furunclulosis	4
iii. folliculitis	3
iv. erysipelas	2
v. carbuncle	19
b. fungal – i. tinea corporis	22
ii. tinea cruris	2
iii. Pityriasis versicolor	4
iv. Vulvovaginal candidiosis	5
c. viral – herpes zoster	
2. Neuropathic and ischemic skin disease	
a. diabetic foot ulcer	8
b. gangrene	5
3. manifestations commonly associated with DM	
a. generalized pruritus	18
b. psoriasis	6
c. Vitiligo	4
d. acanthosis nigricans	2
e. lichen planus	8
4. non-specific manifestations	
a. eczema	7
b. xerosis	2
c. scabies	4
d. icthyosis	1

Table V: Percentage distribution of patients with severity in RBS and Cutaneous manifestations

Disease	Patients (%)	RBS elevation (avg. units)	Severity
Cellulitis	5.3	79	Redness, purulent discharge, swelling, high fever.
Diabetic foot	11.3	84	Swelling, fever, redness.
Generalised pruritus	9.3	66	Itching, redness, rash, blisters.
Lichen planus	10.6	40	Purplish lesions or bumps, loss of colour.
Tinea corporis Tinea cruris	13.3	79	Itching, circular rash, scaly skin.
Furuncle Folliculitis Erysipelas Carbuncle	10	49	Red lesions, fever, pus filled blisters, pain, burning sensation, redness.
Eczema	4.6	38	Dry skin, scaly skin, inflammation, itching, oozing.
Icthyosis Xerosis	2	44	Dry, itchy, scaly skin, cracks on the skin.
Scabies	2.6	52	Bumps, redness, itching, skin burrows.
Vitiligo	2.6	48	Loss of skin colour in patches (depigmentation)
Psoriasis	4	59	Red, raised, inflamed patches on the skin, dry skin, pain.

Table VI: Distribution of patients based on drugs Prescribed

Disease	Prescribed Drugs	Males	Females	No. of patients	%
Cellulitis, Diabetic foot	Sulbactum+cefoperazone(1.5mg IV BD)+ Metranidazole (500mg IV BD) or Piperacillin+Tazobactum(2.25gm IV TID +Inj.Metrogyl(metranidazole)500mgIV BD + Tab. Ciprofloxacin 500mg BD or Tab. Linezolid 600mg or Tab. Ofloxacin 200mg or + Tab. Chymotrypsin 2 lakh units TID	8	2	10	5.3
		12	5	17	11.3
Generalised pruritus	Hydroxyzine 10mg OD Terbinafine 250mg OD Levocitrizen 5mg OD Moisturizing lotion	17	12	29	9.3
Lichen planus	Levocitrizen 5mg OD Betamethasone dipropionate cream BD, Deflozocart 1mg BD, moisturizing cream	14	2	16	10.6
Tinea corporis Tinea cruris	Levocitrezine 10mg OD Sertaconazole 2% w/w Cream Fluconazole200mg BD Ketoconazole soap	9	11	20	13.3
Furunculosis Folliculitis Erysipelas Carbuncle	Cefixime 200mg oral BD for 7 days Fucidic acid cream Serratiopeptidase OD	5	10	15	10
Eczema	Cefixime 200mg oral BD for 7 days Deflozocart 1mg BD for 2 weeks Fucidic acid cream Fourtz- B OD	4	3	7	4.6
Icthyosis Xerosis	Vitamin A chewable tablets Moisturizing cream	3	0	3	2

Scabies	Permethrin lotion once per week 2 times Hydroxyzine 10mg	3	1	4	2.6
Vitiligo	Betamethasone 1mg twice weekly Levamisole 150mg twice weekly Tacrolimus 0.1% w/v BD	2	2	4	2.6
Psoriasis	Omega-3 fatty acid OD Hydroxyzine 10mg Moisturizing lotion BD Clobetasol propionate 0.05% w/v+ Salicylic acid 3%w/v	4	2	6	4

Table VII: RBS levels after treatment and patient counselling

RBS Levels	Total (150)	Percentage (%)
< 180	124	82.6
180-200	24	16
200 – 250	2	1.3

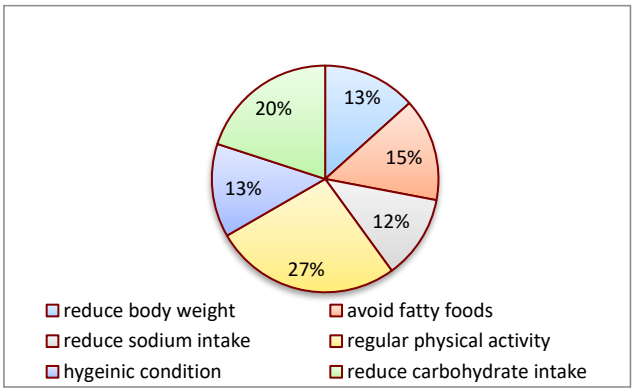

Figure 2: Pie diagram of patient counselling

Table VIII: Percentage distribution of patients with severity in RBS and Cutaneous manifestations after treatment and counselling

Disease	No. of patients (%)	RBS elevation (avg units)	Severity	Outcomes
Cellulitis	5.3	20	Decreased Redness, purulent discharge, swelling, high fever.	Stable
Diabetic foot	11.3	41	Reduced Swelling, fever , redness.	Stable
Generalised pruritus	9.3	30	No Itching, redness, rash, blisters.	Improved
Lichen planus	10.6	15	Reduced Purplish lesions or bumps, loss of colour.	Improved
Tinea corporis Tinea cruris	13.3	28	Decreased Itching, circular rash, scaly skin.	Improved
Furuncle Folliculitis Erysipelas Carbuncle	10	15	Decreased Red lesions, fever, pus filled blisters, pain, burning sensation, redness.	Improved
Eczema	4.6	10	Decreased dry skin, scaly skin, inflammation, itching, oozing.	Improved
Icthyosis Xerosis	2	9	Reduced dry, itchy, scaly skin, cracks on the skin.	Improved
Scabies	2.6	10	Decreased bumps, redness, itching, skin burrows.	Improved
Vitiligo	2.6	15	Depigmented patches start disappearing	Stable
Psoriasis	4	20	Reduced red, raised, inflamed patches on the skin, dry skin and pain.	Stable

DISCUSSION

A number of dermatological conditions are associated with or a sequelae of diabetes mellitus. Many of the conditions are due to high prevalence of diabetes in the general population. A large number of the dermatological problems in diabetics are caused by hyperglycemia induced accelerated production of non-enzymatic advanced glycosylated end products.

About 30% of diabetic patients have some cutaneous involvement during the course of their disease. In our study most of the diabetics had some kind of skin lesions attributed to diabetics, which indicates a high incidence of cutaneous involvement. 56.6 percent patients had cutaneous infections. The diabetic state decreases the resistance of host to infection by impairing many functions of the neutrophils. These infections are

probably more frequent in patients with poor controlled disease.

This study included 150 patients of diabetes mellitus with cutaneous manifestations who attended dermatology department of a tertiary care teaching hospital.

Increasing duration of diabetes increases the possibility of skin involvement, impaired diabetic control as evidenced by higher HbA1C levels was found among patients with infections (Nandini Chatterjee, et al., 2019). In our study RBS levels are found increased due to impaired diabetic control in patients with infections and the patients with >10 years of diabetic duration has more involvement of skin.

The impact of Duration of diabetes was observed to be more in 65 patients who are suffering with diabetes mellitus from 1to 5 years and 20 patients with duration more than 10 years.

Most of the diabetic patients who developed cutaneous manifestations were in the 40-60 years age group (Nawaf Al-Mutairi, et al., 2006). In our study the age group of 40-60 years (47.3%) are mostly developed skin infections. Among 150 patients involved, the females of age group 21-40 are mostly affected with cutaneous infections with mild stage condition. In females stress, illness, occupation, high blood sugar levels will increase development of infections more quickly. Whereas males of age group 41-80 are mostly affected due to age factor (as age increases, immunity decreases), social habits (alcohol, smoking), occupation and any co-morbid conditions. The occurrence of cutaneous infections in male patients were observed due to these conditions.

The most common systemic complication of diabetes was hypertension (Nawafal-Mutairi, et al., 2006). In our study the most common complication was obesity is seen among 34.6% of patients followed by hypertension among 14% of patients.

From the obtained data, it has been observed that 108 patients who do not have any social habits were reported with diabetes associated cutaneous disorders. The impact of social habits on the diabetes associated cutaneous disorders was observed to be very nominal in the whole group.

Among 150 patients, 87.1% condition got improved and 12.8% condition got stable after therapy and appropriate patient counselling.

Patient counselling is done according to the type of skin problems and existing co-morbid conditions. By effective counselling, complications and number of hospital visits can be reduced. There by patient quality of life is increased.

CONCLUSION

This Prospective observational study was conducted in the department of Dermatology, Santhiram General Hospital & Medical College, Nandyal. A total number of 150 subjects, all aged above 20 years were included in the study. This study has provided some insight into the pattern of cutaneous manifestations of diabetes mellitus, and its complications which are frequently occurred in diabetes due to poor glycemic control with longer duration and associated with HTN, obesity and CVD. The management of diabetes is a holistic one and that should focus due attention on skin complications.

Our study results revealed that male diabetic patients were more predominant to cutaneous infections than female diabetic patients due to their social habits, occupation, co-morbid conditions, and age factors. Among 150 cases collected, 108 patients which was 87.1% of total including both diabetes and cutaneous conditions were observed as improved. In 48 patients which was 12.8% of the total, the conditions were found to be stable without any adverse effects or complications as a result of given treatment and effective patient counselling towards their life style modifications.

Maintaining appropriate glycemic control in diabetic patients can reduce these infections. Education of patients and health care personnel regarding adaptation of preventive measures, life style modifications and seeking timely dermatological opinion for these skin problems may reduce morbidity, complications, hospital visits and burden on health care facilities. Pharmacist can play the major role in improving the patient care by the counselling and advising about the medications and life style modifications in the initial stages may contribute to the health of the patient. It shows the positive impact on pharmacist intervention towards the patient disease management especially in cutaneous manifestations associated with Diabetes Mellitus.

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