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Original Research Article

Primary care-based prevalence of cutaneous lesions among type 2 diabetes mellitus in urban areas of Belagavi, India

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ABSTRACT

Background: Diabetic complications affects every organ and skin is no exception. Cutaneous signs are extremely valuable to physicians as some alert the diagnosis of diabetes mellitus and reflect on glycemic control and lipid metabolism. To estimate the prevalence of cutaneous lesions in urban areas of Belagavi and to find the associated factors.
Methods: Data was collected from type 2 diabetes mellitus patients attending Primary care Urban Health Centre. Current diabetics from the Diabetic Register, maintained in the Urban Health Centres were included, and patients' medical records were reviewed for information regarding duration, medications and complications of diabetes. Information about socio-demographic profile, general physical examination, systemic and cutaneous examination were recorded using validated, predesigned and pretested proforma. All patients were asked detailed history regarding skin complaints, duration of type 2 diabetes mellitus, family history and treatment of diabetes mellitus. All cases underwent cutaneous examination under natural light. Cases where diagnosis was doubtful were confirmed by the Department of Dermatology at K.L.E.'s Dr. Prabhakar Kore Hospital & Medical Research Centre.
Results: Of 180 study participants, average age was 59.88±11.06 years and 74.44% were females. 2.56±0.99 years was the mean duration of diabetes and 89.44% were on oral hypoglycemic agents. Prevalence of cutaneous manifestations was found to 48.88%. The cutaneous lesions were asymptomatic in majority of the participants (48.86%) and progressive 48 (54.5%).
Conclusions: Cutaneous manifestation were highly prevalent and requires for the physician to be vigilant.

Keywords: Cutaneous lesions, Diabetes mellitus, Prevalence study, Urban, India

INTRODUCTION

Diabetes mellitus is a worldwide problem being the most common metabolic disorder. At present there are more than 422 million diabetics globally and predicted to double in 2030 with a maximum increase in India afflicting up to 79.4 million individuals.[1,2]

These sheer numbers indicate the need for in-depth understanding of every aspect of diabetes. This endocrine disorder affects every part of the body with micro and macrovascular involvement and skin is no exception. There is a paucity in availability of enough evidence to explain the pathophysiology of a diabetic skin. Some diabetes associated skin conditions are said be a direct result of hyperglycemia and some state diabetic

complications such as vasculopathy and neuropathy impair cutaneous homeostasis leading to altered mechanical and functional properties of skin.[3] Non - enzymatic glycosylation occurs normally with aging but the process is greatly accelerated in diabetes.[4] The fact that the skin can independently act as a storehouse for sugar, physiologic and pathologic studies of the skin give a far better insight than by studies of the blood alone.[5] So hyperglycaemia can be identified earlier than hyperglycemia.

Need for the study

While all other devastating complications of diabetes have been extensively studied, the aspect of dermatological complications is relatively unexplored. Its prevalence is increasing in the present scenario with attention drawn to the aesthetic purpose of skin. This warrants the need to know the burden of cutaneous lesions among type 2 diabetics.

The objective of the study was to estimate the prevalence of cutaneous lesions in type 2 diabetes mellitus in urban areas of Belagavi and to find the factors associated with it.

METHODS

This prevalence study is a part of a year-long longitudinal study which looked for cutaneous manifestations in type 2 diabetes mellitus and a part of it is published as a conference abstract in International Journal of Diabetes in Developing Countries. It was conducted in the Primary Urban Health Centre Ashok Nagar and Ram Nagar under field practice area of Department of Community Medicine, Jawaharlal Nehru Medical College, Belagavi, Karnataka, India. Data was collected from January, 2016 to December, 2016 by simple random technique from type 2 diabetes mellitus patients attending the primary urban health centre. Informed written consent was taken. The diagnosis of type 2 diabetes mellitus was confirmed by verifying the Diabetic Register, maintained in the health centers and patients' medical records were reviewed for information of duration, medications and complications of diabetes.

Patients with clinically diagnosed dermatological condition prior to diagnosis of type 2 diabetes mellitus and immunocompromised patients with skin lesions were excluded. Information about socio-demographic profile, general physical examination, systemic and cutaneous examination were recorded using validated, predesigned and pretested proforma after piloting. All patients were subjected to detailed history regarding skin complaints, duration of type 2 diabetes mellitus, family history and treatment of diabetes mellitus.

All cases were subjected to thorough head to toe cutaneous examination under natural light. They were screened for cutaneous diseases with known or postulated or without a clear pathogenesis as well as those associated with complications and treatment of type 2 diabetes mellitus. Cases with doubtful diagnosis were confirmed by the Department of Dermatology at K.L.E.'s Dr. Prabhakar Kore Hospital and Medical Research Centre.

The study was approved by the Institutional Ethics Committee for Human Subjects' Research, Jawaharlal Nehru Medical College, KLE Academy of Higher Education and Research, Belagavi. Data was analysed using Statistical Package for Social Sciences (SPSS), version 21.0 Prevalence of cutaneous lesions and risk factors are presented as percentages. Pearson's Chi-Square test was used to find out the association between cutaneous manifestations and risk factors. Probability value (p value) of less than 0.05 was considered as significant.

RESULTS

A total of 180 study participants were included. (134) 74.5% were female and 59.88 ±11.06 years was the mean age of participants. 36.3% were illiterate. Mostly participants (83.3%) were unemployed. According to modified B.G. Prasad's classification, 22 (12.2%) were of class I, 49 (27.2%) were of class II, majority were of class III with 56 (31.1%) participants. 43 (23.8%) were of class IV and 10 (5.5%) were of class V. (Table1).

The study participants' duration of diabetes varied. (84) 46.7% had diabetes from 1-5 years, (46) 25.5% were living with diabetes for more than 10 years. (Table 1) Most of the study participants, (161) 89.4% were on oral hypoglycemic agents (OHA) that were provided by the urban health centre (Table 2).

Among the 180 study participants the prevalence of cutaneous manifestations was found to be 48.8% (Figure 1). The onset of lesion was insidious in more than half of the participants (67.0%) and 54.5% experienced progression of the lesion (Table 3).

The cutaneous lesions were asymptomatic in majority of the participants (43) 48.86%. The other symptoms included were itching (27.2%), burning sensation (22.7%), pain (20.4%), discharge (6.8%). (68) 77.2% of them had single associated symptom, (17) 19.3% had two associate symptoms and (3) 3.4% had three symptoms associated with the skin lesions (Figure 2).

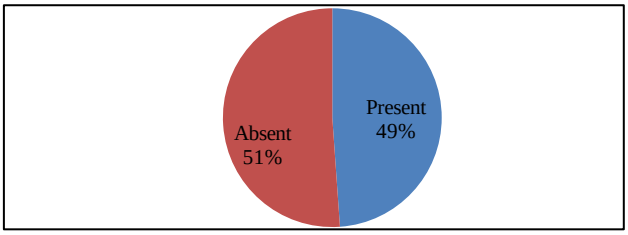

Figure 1: prevalence of cutaneous manifestations in type 2 diabetes.

Table 1: Sociodemographic distribution of study participants.

Variables		Frequency (n=180)	Percentage (%)
Age (in completed years)	26-35	2	1.1
	35-45	15	8.4
	45-55	29	16.1
	55-65	66	36.6
	65-75	52	28.9
	75-85	16	8.9
Gender	Male	46	25.5
	Female	134	74.5
Literacy	Illiterate	65	36.3
	Primary school	52	28.8
	Secondary school	35	19.4
	Pre-University II	9	5.0
	Graduate	19	10.5
Occupation	Unemployed	150	83.3
	Unskilled workers/ manual workers	8	4.5
	Semiskilled worker	1	0.5
	Skilled workers	20	11.2
	Semi-professionals/ professionals	1	0.5
Socioeconomic status (according to modified B.G. Prasad's classification, 2016)	Class I	22	12.2
	Class II	49	27.2
	Class III	56	31.1
	Class IV	43	23.8
	Class V	10	5.5

Table 2: Morbidity profile of study participants.

Variables		Males	Females	Total
		N (%)	N (%)	N (%)
BMI (according to WHO criteria for Asian population)	Normal	15 (32.6)	14 (10.4)	29 (16.2)
	Overweight	25 (54.3)	54 (40.2)	79 (43.8)
	Obese	06 (13.0)	66 (49.2)	72 (40.0)
Duration of diabetes (in years)	<1	10 (21.7)	10 (7.4)	20 (11.1)
	1-5	19 (41.3)	65 (48.5)	84 (46.7)
	5-10	04 (8.6)	26 (19.4)	30 (16.7)
	>10	13 (28.2)	33 (24.6	46 (25.5)
Mode of treatment	Oral hypoglycemic agents	41 (89.1)	120 (89.5)	161 (89.4)
	Insulin	05 (10.8)	06 (4.4)	11 (6.1)
	Both	00 (0.0)	06 (4.4)	6 (3.4)
	Ayurvedic medication	00 (0.0)	02 (1.4)	2 (1.1)

Table 3: Distribution showing nature of the lesions.

Variable		Number	Percentage (%)
Progression	Progressive	49	55.6
	Stationary	39	44.4
Onset	Insidious	57	64.7
	Gradual	13	14.7
	Sudden	18	20.4

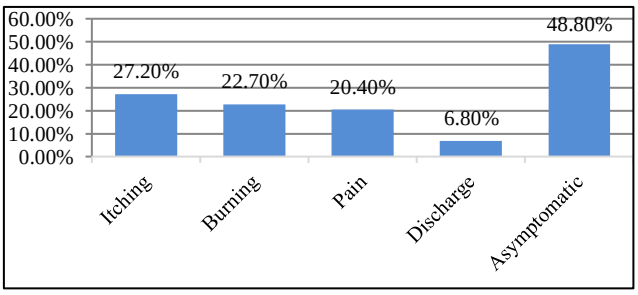

Figure 2: Distribution of associated symptoms of cutaneous manifestation.

Table 4: Association of risk factors to cutaneous lesions.

Risk factors		Present (%)	Absent (%)	χ 2	df	P
Age (years)	26 – 35	0 (0.0)	2 (100.0)	16.861	5	0.005
	35 – 45	8 (53.3)	7 (46.7)			
	45 - 55	13 (44.8)	16 (55.2)			
	55 – 65	44(66.7)	22 (33.3)			
	65 – 75	17 (32.7)	35(67.3)			
	75 – 85	6 (37.5)	10(62.5)			
Gender	Male	17 (37.0)	29 (63.0)	3.521	1	0.061
	Female	71 (53.0)	63 (47.0)			
Literacy	Illiterate	35 (53.8)	30 (46.2)	1.86	4	0.761
	Primary school	26 (50.0)	26 (50.0)			
	Secondary school	14 (40.0)	21 (60.0)			
	Pre-University II	4 (44.4)	5 (55.6)			
	Graduate	9 (47.4)	10 (52.6)			
Occupation	Unemployed	72 (48.0)	78 (52.0)	2.953	4	0.286
	Unskilled worker	4 (50.0)	4 (50.0)			
	Semi-skilled worker	0 (0.0)	8 (100.0)			
	Skilled worker	12 (60.0)	8 (40.0)			
	Professional	0 (0.0)	1 (100.0)			
Socioeconomic status (according to modified B.G. Prasad's classification, 2016)	Class I	8 (36.4)	14 (63.6)	41.789	4	<0.001
	Class II	8 (16.3)	41 (83.7)			
	Class III	31 (55.4)	25 (44.6)			
	Class IV	35 (81.4)	8 (18.6)			
	Class V	6 (60.0)	4 (40.0)			
Duration of Diabetes mellitus (in years)	0-5	54(51.4)	50 (48.0)	3.782	3	0.286
	05-10	16 (53.3)	14 (46.7)			
	More than 10	18 (39.1)	28 (60.9)			
Mode of treatment	Oral hypoglycemic agents	79 (49.1)	82 (50.9)	2.059	3	0.56
	Insulin	6 (54.5)	5 (45.5)			
	Both	3 (50.0)	3 (50.0)			
	Ayurvedic medication	0 (0.0)	2(100.0)			

DISCUSSION

The present study was a part of a year-long longitudinal study conducted in the primary care setting of Urban Health Centers which are the field practice areas of Department of Community Medicine, Jawaharlal Nehru Medical College, K.L.E. University, Belagavi.

Many of the cutaneous lesions are either associated with diabetes or are a sequalae. In this study the prevalence of cutaneous manifestations was found to be in 48.88%. However, the overall prevalence of cutaneous manifestations varied from 11.4 to 91.2%.[6,7] Such a range of prevalence could be noted because the mere absence of a uniform attention paid to the importance of skin and its examination. Many of the associations even considered to be accidental due to high prevalence of diabetes in the general population.[8]

An association between cutaneous manifestations and age was statistically significant. The presence of lesion increased with age.

With no manifestations in the youngest age group and maximum number of manifestations in the age group of 55-65 years with 44 (66.7%) lesions. Then the lesions decreased with 6 (37.5%) diabetics with lesion in 75-85 years age group. This decrease was seen as the number participants in this age group were fewer as well. Ageing affects the skin through both internal and external processes leading to progressive loss of skin integrity.[9] Most people over 65 years have at least one skin disorder and many have two or more.[10]

71 (53.0%) female study participants showed greater presence of cutaneous lesions. This was noticed as the female participants were more in number. Also, the women were noticed to have prolonged soaking of feet in water during household activities such as washing clothes and utensils which increased the occurrence of Tinea Paedis. Estrogen is hypothesized to be critical for maintenance of skin integrity by stimulating DNA repair. Skin aging can be significantly delayed by the administration of estrogen at menopause and has been demonstrated to be at least partially reversible with

Estrogen Replacement Therapy.[9] But, estrogen excess is known to cause Acanthosis nigricans and deficiency causes xerosis and atrophy.[4]

Most of the skin lesions were found among those who were illiterate, (53.8%), most of them were unemployed (48.0%) and belonged to the lower socioeconomic group (81.4%). Similar finding was noted in a study conducted in a diabetic Clinic in UAE, with 51% Illiterate patients and they were less likely to practice foot care Illiteracy and diabetic foot complications.[11] Illiteracy is a barrier to health seeking making such patients more vulnerable to out of pocket expenditure or worse ignorance to preventable and treatable lesions. This reflects on the general perception of skin playing the utmost importance from cosmetologically point of view rather than the reflector of internal milieu. The most expensive complication of diabetes affecting the foot can be prevented effectively with homebased foot care.

In this study the presence of cutaneous manifestations was most commonly observed when the duration of diabetes was for 1 to 5 years with 46 (54.8%) of study participants with lesions. Also, the absence of lesion was pronounced in those with duration of diabetes less than 1 year with 12 (60.0%) among those without manifestations. Hence the longer the duration of type 2 diabetes mellitus more the skin lesion. This reflects on poor early detection of the diabetic status and high lights a multi-dimensional lacuna, from implementational of the national program to individual involvement in their health care of the non-communicable disease. In the study conducted by Nandini Chatterjee et al., duration of diabetes was 1-10 years in 290 patients and 201 had more than 10 years of diabetes.[12] Vahora et al, studied 300 diabetics, 62.33% had the duration of diabetes was less than 6 years and 83.7% of the patients the duration was less than 10 years.[13] In a study conducted by Ragunaha et al, the mean duration of diabetes was 5.5±5.8 years and 82 % of patients the duration was less 10 years.[14] Further cohort studies are recommended which help study the duration for development of skin lesions.

The study showed most of the lesions were present in those on insulin (54.5%). The number of lesions noted among those on oral hypoglycemic agents were 49.1% and no lesions among those who were on ayurvedic medication. Most of the study participants, (161) 89.44% were on oral hypoglycemic agents. Manish N. Kadam et al. showed that 10% patients were only on insulin therapy, the other 76% patients were on hypoglycemic drugs and 14% patients were on were on no treatment.[15] Ghulam Hussain Baloch et al. had 70 type diabetics on oral drugs and 2 on insulin out of the 90 patients studied.[16] Another study conducted by Ahmed et al, 82.2% were on oral hypoglycemic agents, 12.9% were on insulin and 4.9% were on combination therapy.[17] This finding gives a perspective of the possible complications associated allopathic medications. However, the severity with the mode of treatment is not known. An RCT to probe into other traditional methods for management of chronic diseases like diabetes is recommended.

It is worrisome to note the onset of lesion was insidious in 64.77% and progressive in 55.68%. The cutaneous lesions were asymptomatic in majority of the participants (48.86%). There was a statistical significance of occurrence of cutaneous manifestations and the socio-economic status of the individual. The economic burden is a possibility for the lesions to be progressive in nation. While neuropathy is known pathology for asymptomatic diabetic lesions, lack of awareness of diabetic foot care is the biggest attributer for it being the most expensive complication of diabetes.[18]

The limitation of this study was the confounding factors of obesity and seasonal variations were not eliminated. Measuring the glycemic status (HbA1c) was beyond the scope of this study.

CONCLUSION

Cutaneous manifestations were highly prevalent causing considerable morbidity especially in the elderly and those of lower socioeconomic data. Owing to increased susceptibility of diabetic skin to infections emphasis should be on self-care practices to overcome fatal outcomes. However, there are cutaneous markers such as Acanthosis nigricans and skin tag which are considered precursors for the development of diabetes mellitus which the treating physician should also be vigilant in detection and management in early stage lesions.

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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