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Prevalence of Skin Manifestations of Diabetes Mellitus in the National Diabetic and Endocrine Center of Tripoli - Libya 2016

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ABSTRACT

Diabetes mellitus (DM) is a clinical syndrome that is frequently associated with kinds of skin manifestations. It is observed in 30-71% of diabetic patients as will be presented in this cross sectional study to evaluate the frequency of skin manifestations in patients with DM in this area. This study was conducted from August to October of 2016, including patients between the age of 15 and 92. The data was collected face-to-face from admitted diabetic patients after verbal consent was given. They were tested for skin manifestations by using a specific questionnaire. There was a total of 202 diabetic patients, 56.4% of them were female. The mean age of patients was 44.3 ±17.6 years, 50.5% of cases had NIDDM, mean duration of DM was10.5±8.3 years, most of cases on insulin treatment (81%). The mean HbA1c level was 9.4±2.3%. The prevalence of skin manifestations was 85.1%; 74.3% of patients had skin manifestations after they were diagnosed with diabetes, whereas 66.3% of them had a skin disease more than once. The three skin manifestations were observed included skin infections (15.3%), lipohypertrophy (13.9%), and foot ulcers (10.3%). There were also skin diseases strongly associated with DM such as thick skin (8.4%), itching (6.9%), acanthosis nigircans (6.4%), vetilgo and diabetic bullosis (2.9%), necrobosis lipdecorum (1.4%), and others with different percentages. Skin disorders were quite common at ages from 46 to 60. These disorders were affected by the chronicity of DM. Infections are the bulk of skin disorders. Therefore, patients should be educated about blood glucose control as well as skin and foot care.

Keywords- *Diabetes mellitus; Skin manifestations; Skin lesions.*

INTRODUCTION

Diabetes mellitus is the most common endocrine disorder characterized by the abnormalities of insulin and elevated blood glucose levels. It causes metabolic, vascular, neurological and immunological abnormalities.[1] Diabetes mellitus has been a major public health problem in Libya. It is estimated in the last survey in 2009 to be around 16.1%.[2] The world health organization estimates the global burden of diabetes to be 299 million cases by the year 2025.[3] The cutaneous manifestations of DM are well-known and considered as common, as observed in 30-71% of diabetic patients.[4] The skin is affected by the acute metabolic derangements and the chronic degenerative complications of diabetes.[5] The main mechanism of skin manifestation is dysregulation of glucose, insulin, and lipids. This mechanism can lead directly to physical signs that are observed in the skin of patients with diabetes mellitus. Chronically elevated blood glucose can lead to non-enzymatic glycosylation of cutaneous proteins, which eventually leads to irreversible advanced glycosylation end products.[6] This reaction results in changes in the physical and chemical properties of connective tissues and other body proteins, which in turn could be responsible for various skin complications seen in diabetic patients.

Cutaneous manifestations of diabetes mellitus are common and frequently serve as ports for entry of different micro-organisms, which may result in secondary infections.[7] They can appear as the first sign of diabetes or may develop at any time in the course of the disease. Individuals with type II diabetes are more likely than those with type I diabetes to develop cutaneous manifestations.[8] Patients with type I diabetes are commonly presented with autoimmune related skin manifestations such as vitiligo, lichen planus, *etc*. While patients with type II diabetes typically develop skin infections, thick skin, and granuloma annulare, *etc*.[7] Moniliasis can be an early sign of such cases of type II diabetes.[8] In fact, there are minimum epidemiologic data related to skin disorders in diabetic patients from Tripoli, thus the study is presented to investigate the prevalence of cutaneous manifestations among diabetic patients in the National Diabetic and Endocrine Center of Tripoli.

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MATERIALS AND METHODS

This cross sectional study included 202 patients with diabetes mellitus, admitted in the National Diabetes and Endocrine Center during the period from August to October 2016. Verbal consent was obtained before the interview. The questionnaire covered demographic data, such as file number, name of patient, age, gender, residential address, occupation, educational level, associated disease, type of DM, and the duration and treatment of DM were recorded. The patients' last HbA1c level was measured in the diabetic center by an Integra 400 Pulse machine. In terms of the control status of DM, target control of HbA1c was < 7%.[10] All the patients were examined for any clinically definable skin disorders, visible skin lesions, duration of the skin disease before or after diabetes, and frequencies of occurrence of skin manifestations. A dermatology consultation was also needed in some cases. Statistical analysis was done by using the software SPSS version 2.1. Chi square test was used for testing the difference among the groups for statistical significance. A P value of < 0.05 was considered statistically significant.

RESULTS

The present study was conducted over a period of three months, particularly from August to October 2016. A total of 202 cases were included in this study which comprises of 114 female patients (56.4%), and 88 male patients (43.6%). The mean age of patients was 44.3±17.6 years. The peak prevalence of diabetes mellitus with skin manifestations was with patients between46 and 60 years old (24.3%). The mean duration of DM was 10.5±8.3 years. With the majority of patients on insulin treatment (82.6%), the prevalence of skin manifestations reached 85% of the total patients, and presented after DM about (74.3%). It is quite obvious from Table 2 that, the most common cutaneous manifestation is infections. This was present in 31 patients (15.3%) from all observed skin manifestations. The bacterial infection was detected in 16 cases (7.9%), carbuncle was present in 9 patients (4.5%), cellulites were diagnosed in 5 cases (2.3%), and only one patient (0.4%) had both scalp infection and erysipelas. While fungal infections were seen in 15 cases (7.4%), candidiasis and intertergo were the most common forms which accounted for 14 cases (6.9%), followed by pityrasis versicolor in only one patient (0.6%). The second skin prevalence appeared to be lipohypertrophy which was the only in this study reported as diabetic treatment causes. It was present in 28 patients (13.9%) and it was noticed in type I diabetic patients who were on four doses insulin regimens. Out of 202 cases, there were 21 of them with foot ulcers. The other skin manifestations observed in patients included thick skin in 17 patients (8.4%), itching in 14 patients (6.9%), acanthosis nigricans in 13 cases (6.4%), xerosis in 12 cases (5.9%), and other manifestations such as vitiligo, and diabetic bullosis with the same percentage (2.9%) (Table 3).

Table 1: Sociodemographic characteristic of study sample in National Diabetes and Endocrine Center (Tripoli 2016).

Character	N0	(%)
Age group		
15-30	60	(29.7%)
46-60	55	(27.2%)
31-45	46	(22.8%)
≥61	41	(20.3%)
Total	202	(100%)
Gender		
Female	114	(56.4%)
Male	88	(43.6%)
Total	202	(100%)
Address		
Inside Tripoli	150	(74.3%)
Outside Tripoli	52	(25.7%)
Total	202	(100%)
Level of education		
Intermediate level	66	(32.7%)
Secondary level	46	(22.8%)
Illiterate	34	(16.4%)
Universal and above	31	(15.3%)
Primary level	25	(12.4%)
Total	202	(100%)
Occupation		
House wife	86	(42.6%)
Employee	63	(31.2%)
Student	22	(10.9%)
Retired	20	(9.6%)
Free job	11	(5.4%)
Total	202	(100%)

Table 2: Distribution of study sample according clinical characteristic in National Diabetes and Endocrine Center (Tripoli 2016).

Clinical character	No	(%)
Type of diabetes		
Type II	102	(50.5%)
Type I	100	(49.5%)
Total	202	(100%)
Duration of diabetes		
≥11years	82	(40.6%)
6-10 years	54	(26.7%)
1-5 years	35	(17.3%)
New case	31	(15.3%)
Total	202	(100%)
Treatment		
Insulin two doses	84	(41.6%)
Insulin four doses	80	(39.6%)
Oral hypoglycemic	38	(18.8%)
Total	202	(100%)
Control status of diabetes		
Un controlled HbA1c	156	(77.2%)
Controlled HbA1c	46	(22.8%)
Total	202	(100%)
Occurrence of skin disease to Diabetes		
After DM	150	(74.3%)
No disease	30	(14.9%)
Before DM	16	(7.9%)
With DM	6	(3%)
Total	202	(100%)
Frequency of occurrence of skin disease		
More than once time	134	(66.3%)
Once time	38	(18.8%)
No diseases	30	(14.9%)
Total	202	(100%)

Table 3: Distribution of study sample according the skin manifestations and their classification in National Diabetes and Endocrine center (Tripoli 2016).

Clinical character	No	(%)
No disease	30	(14.9%)
Skin disease associate with DM		
Thick skin	17	(8.4%)
Itching	14	(6.9%)
Acanthoisis Nigericans	13	(6.4%)
Xerosis	12	(5.9%)
Yellow skin	9	(4.4%)
Diabetic bullosis	6	(2.9%)
Vitiligo	6	(2.9%)
Diabetic dermorathy	3	(1.4%)
Necrobosis Lipidica	3	(1.4 %)
Xanthalasma	3	(1.4%)
Urticaria	2	(0.9%)
Psoriasis	2	(0.9%)
Erythma nodosa	1	(0.4%)
Psoriasis	1	(0.4%)
Total	92	(46%)
Bacterial infection		
Carbuncle	9	(4.5%)
Cellitits	5	(2.4%)
Ersyiples	1	(0.4%)
Scalp infection	1	(0.4%)
Total	16	(7.9%)
Fungal infection		
Candidiasis	14	(6.9%)
Pityrasis veriscolor	1	(0.4%)
Total	15	(7.4%)
Diabetic treatment cause		
Lipohypertrophy	28	(13.8%)
Diabetic complication		
Diabetic foot ulcer	21	(10.3%)
Total	202	(100%)

DISCUSSION

Diabetes mellitus is a common disorder and almost all diabetic patients sooner or later will develop skin manifestations in their life; many of these manifestations were explained on the basis of the attachment of glucose to proteins and the subsequent metabolism of this combination, which causes changes in structure, function and color. The most common cutaneous manifestations seen in this research was infection, which was similar to the findings of previous researchers.[9-14] The bacterial infection was the most common type of infection reported in this study. It is well-known that diabetic patients are susceptible to infections probably due to hyperglycemia and defects in polymorphonuclear leucocyte function.[15] The second common cause was Lipohypertrophy, it affected about 13.9% of cases. This may relate to lipogeneic action of insulin or unchanging the site of insulin injection, but the result obtained from Iraqi study[11] revealed 1.8% of lipodystrophy in their patients. The third cause was skin ulcer, seen in 10.3% of the patients in the present study. The same cause was also reported high in previous Pakistani research[9] with a percentage of 12.9%, nevertheless it was reported low in other previous studies with percentages of 3.6% in Iraq[11] and 5.5% in India.[12] This difference might be due to cultural habits such as, walking bare footand lack of education about foot care. The skin manifestations which were strongly associated with DM in this study appeared in different percentages, such as thick skin (8.4%), itching (6.9%), acanthosis nigricans (6.4%), xerosis (5.9%), and diabetic bullosis and vitiligo (2.9%). In other previous studies, itching was reported with 12.1% in Iraq[11], 15.1% in Jordan[10], and 5.7% in Pakistan.[9] The percentage of acanthosis nigricans reached 2% in India[12] and 2.9% in Pakistan.[9] These manifestations are usually unobserved by patients; therefore they seek doctor's help only if they have a major problemwhich does not cure by regular medications. In this study, 85.1% of patients had some kind of skin manifestations of DM. These skin manifestations had also been observed in the range from 11.24% to almost 100% in various other studies in different countries.[9,11,12,16,17] The results in the present study indicated that skin diseases were more prevalent in women than men. While the findings of this study were similar to those of the Pakistani study[9], they contrasted what the other pervious researchers revealed in their research.[12,18] These results might either occurdue to women's better awareness of health issues, or because of men's neglect to seek consultation about any skin problems. The patients who were suffering from IDDM (Insulin-Dependent Diabetes Mellitus) and NIDDM (Non-Insulin-Dependent Diabetes Mellitus) were nearly equal in this research, but different in prevalence in other previous studies.[9,11,12] Most of the cutaneous manifestations were more common at age interval-46-60 years, and increased with increasing the duration of diabetes. That is comparable with the findings of pervious researchers.[13,14] The skin disease decreased when patients received high level of education as observed in this study. The glycaemic status measured in this study was very poor with the majority (77.2%) of patients who had uncontrolled DM. These results appeared to be similar to those reported in Pakistan[9] and India.[12] The high percentage of uncontrolled diabetes predisposed to diabetic complications and skin manifestations. The reason behind that could either be lack of healthcare facilities in Tripolior ignorance of patients about regular checkups.

CONCLUSION

Skin lesions are quite common among diabetic patients between the age of 46 and 60. Females with chronic diabetes are more affected by infections than males; bacterial infection is the most common form. Lipohypertrophy is the second most common form of skin lesion caused by insulin treatment. Patients should be educated about blood glucose control, insulin treatment as well as skin and foot care.

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