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Skin manifestation of diabetes at Benghazi Diabetic centre

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Original Research Article

Abstract

Background: Diabetes mellitus is more than just popular endocrine disturbance or malfunction; it is an extending disorder which has a burden on different age groups and socioeconomic populations. The persistent hyperglycaemia contributes to the onset of cutaneous manifestations in diabetes mellitus. Skin signs of this endocrine disease generally appear after the primary disease has developed but may appear coincidentally with its onset, or even precede diabetes by many years. Observing the skin signs of diabetes is crucially important as it can add to adequate disease control. An active workup for many initial changes, such as xerosis, hyperkeratosis or the various skin infections and actively early managing them could be greatly valuable to reduce dangerous untreatable late side effects of diabetes.

In this study we aimed to study the pattern of different cutaneous manifestations associated with diabetes mellitus.

Objective: To evaluate the most common skin manifestation of diabetes, and their relations to age, sex, diabetes duration, fasting blood glucose and glycosylated haemoglobin and making comparisons with other studies.

Methods: This study was conducted between April 2023 and June 2023, and this study included cases attending Benghazi Diabetic Centre and the Diabetic clinic of Benghazi Medical Centre.

Results: Fungal infections were the most common skin manifestations, Females outnumber the males, values of two types of diabetes were similar, the peak of age ranged between (44-53), and the glycaemic profile was unsatisfactory.

Conclusion: Fungal infections are the most common skin manifestation in this study and they are more related to females than males with accelerated sugar levels.

Keywords: Diabetes, Hyperglycaemia, Infection, Manifestations, Skin.

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1. Introduction

Diabetes mellitus (DM) is most likely one of the oldest disorders known to human race. It was first mentioned in the Egyptian manuscript about 3000 years ago. a persistent metabolic illness, the prevalence of which has been rising globally. Due to this trend, it is quickly spreading to other parts of the world and is predicted to affect twice as many people in the next ten years as a result of an aging population. [1]

It is a disease with a potential to attack the majority of the body parts. Changes occurring in the skin, as it's affected by hyperglycaemia like any other internal organs. A lot of skin disorders show high prevalence and intensity in DM, the main chemical circumstances leading to this are yet to be interpreted. And based onW the literature, 30% of the diabetic patients sooner or later will have skin manifestations or signs during the natural course of this chronic illness. The skin is considered to be transient storage for any excess blood sugar, this fundamental finding explains the tendency of the cutaneous tissue to develop itching and inhabit the various infections. [2]

Diabetes harm the skin via more than one mechanism, the hyperglycaemia per se and AGEs are the most prominent factors involved in the whole process.

The most significant harm done to the skin is the modification of collagen fibres brought on by Maillard reactions. The Schiff base reaction is the first step in this process, where an amino acid-derived amine group is condensed into the carbonyl group of a reduced sugar. This base then goes through structural changes to produce a more stable product, known as the initial product of the reaction of Maillard and Amadori products. These substances could interact with amino acids irreversibly and transform into advanced glycation end products (AGEs).[3]

In general words reaching pathologically abnormal levels of glycaemia intensely disturb skin homeostasis by inhibiting keratinocyte proliferation and migration, protein creation, promoting endothelial cell apoptosis, lowering nitric oxide synthesis and impairing phagocytosis and chemotaxis from biological active cells.[2]

In addition to the high endogenous level of AGEs due to the hyperglycaemia in diabetic patients, the cutaneous tissue of the diabetic individuals could contain damaged skin barrier because of their dysfunctional metabolism, that ultimately will lead to decline in the hydration of the stratum corneum and accelerating trans epidermal water loss. [3] There are various ways that the stratum corneum can become dehydrated, including a reduction in aquaporin 3 and a decrease in keratinocyte growth, which is linked to the dry skin seen in diabetics. [4] the aftermath increased skin surface pH, which induce and worsen cutaneous inflammation. [3]

Skin signs or manifestations in diabetes are mainly classified into four groups of potential causes, this classification aimed to facilitate the management of the outcomes.

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1. Skin lesions with strong to weak association with diabetes (Necrobiosis lipoidica: inflammatory granulomatous dermatosis with collagen degeneration and vascular involvement. Diabetic dermopathy: well demarcated hyperpigmented atrophic plaques on the anterior surface of the legs, diabetic bullae, yellow skin, eruptive xanthomas, perforating disorders, Acanthosis nigricans: more common in insulin-independent diabetes presents clinically with hyperpigmented verrucous linear plaques, found mainly in skin folds, Oral leucoplakia: thick, white patches on the inside surfaces of the mouth, Lichen planus: an inflammatory psychosomatic disorder, affecting skin and mucous membranes.)

2.Infections (Bacterial: Erysipelas, Cellulitis, Necrotic fasciitis, Fournier gangrene, Staphylococcal folliculitis
Furunculosis, Carbunculosis, Erythrasma, External otitis, Fungal: Yeast infections, Dermatophytid infections and systemic mycotic infections, viral: Herpes simplex and Herpes zoster).

3. Skin signs due to diabetes complications: (microangiopathy, macroangiopathy, neuropathy).

4. Skin reactions to the therapy itself, which includes (Sulphonylureas or insulin) [2]

Xerosis, callus, and fissures are examples of early-stage diabetic skin conditions that are typically disregarded and underdiagnosed. Those disorders can worsen clinically and progress to foot neuropathy, ulcers, and perhaps amputation if they are not diagnosed and treated. Several dermatological disorders can result from DM-induced neuropathy that affects sensory, motor, and autonomic pathways. [2]

In this current study we aimed to observe the pattern of various cutaneous manifestations associated with diabetes mellitus in a group of patients visiting the endocrine clinics for regular follow up of Diabetes.

2. Materials and Methods

The study was conducted in Benghazi Diabetic Centre and the diabetic clinic of Benghazi Medical Centre, City of Benghazi – Libya. The study period was between April 2023 and June 2023. Information regarding cases were retrospectively gathered from the patents directly with respect to privacy. A total number of 66 cases.

Demographic data were examined regarding the type of skin manifestation, then data analysed with the next consideration: age, sex, duration and type of diabetes, last records of fasting blood glucose and glycosylated haemoglobin.

Statistical analysis: The whole data were evaluated statistically by using Microsoft Excel which has also been applied along with Microsoft word to make graphs.

The clinical data so received were evaluated. A comparison with other similar studies was done.

3. Results

A total number of 66 cases included in the study, over period of two months. The most common skin manifestations observed is the fungal infections (27%), followed by

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Xerosis (17%) followed by Scleroderma (15%). (Figure 1).

In this current study female patients were 45 (68%), while males were 21(32%).

In This study, 35 cases were Type I Diabetes (53%), While 31 cases were Type II Diabetes (47%) (Figure 2), the peaks of incidence of the skin manifestation during the course of diabetes were between (9.6-17) years. (Figure 3). (Maximum age 90 years), (Minimum age 24years), Peaks of age between (44-53) years. (Figure 4).

In this current study (Maximum HbA1c:14), (Minimum HbA1c: 6). Most of the cases of which the HbA1c Value range between (6-10) (Figure 5). (Maximum FBS: 334), (Minimum FBS: 75). Peaks of value of fasting blood sugar ranged between (116-157) (Figure 6)

4. Discussion

In this study regarding skin manifestations of Diabetes mellitus, 66 cases of both genders, different ages were collected, their data arranged and analysed.

The most common skin manifestations found in this study fungal infections (27%), followed by Xerosis (17%) followed by Scleroderma (15%), the category of the others (which includes: skin rash, vitiligo, acne, psoriasis, skin tag, Xanthoma) and the Diabetic dermopathy shared the same results (11%), followed by acanthosis nigricans (7%) and lastly both the bacterial infections and the Diabetic bullae shared same percentage (6%). Those results strongly agree with the study conducted by (Roslind, et al. 2019) [5] where fungal infection was the most common finding. The fungal infection in this current study included (Tenia, Candidal intertrigo and Erythrasma)

In This current study female patients were more than the males, constituting 45 (68%), while males were 21(32%). This finding is in agreement with same cross-sectional study conducted in Karachi where the female gender outnumber the male according to (Niaz et al. 2016) [6].

In a study conducted in Kuwait by (Al-Mutairi et al. 2006) [7] Diabetic Patients Type I with skin manifestations were much less than Diabetic Patients Type 2 with skin manifestations and this disagree with this current study in which both types of diabetes have very close values, 35 cases were Type I Diabetes (53%), While 31 cases were Type II Diabetes (47%).

With respect to Disease duration through which skin manifestations appear differently, the peak of the disease duration was between (9.6-17), this almost agree with a study conducted in India by (Roslind, et al. 2019) where the majority of the patients had skin manifestation (10-14) after the onset of the disease.

Regarding the age group in the population of the study, in this current study (Maximum age 90 years), (Minimum age 24 years), Peaks of age between (44-53) years, followed by age between (64-73), this result totally in agreement with same study conducted in Kolhapur, India. (Phulari and

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Kaushik, 2018) [8].

Taking in consideration the glycaemic profile for the skin manifestation, the study conducted by (Niaz et al. 2016) showed that the level of glycosylated haemoglobin range (6-13) and this is higher than the finding in this current study, (Maximum HbA1c:14) (Only one case), (Minimum HbA1c: 6). Most of the cases of which the HbA1c Value range between (6-10). While the results of range of fasting blood sugar were almost in agreement, in both studies, the majority of the values showed unsatisfactory glycaemic control. (Maximum FBS: 334), (Minimum FBS: 75). Peaks of value of fasting blood sugar ranged between (117-157).

It is crucial for most of the dermatological conditions to receive the appropriate treatment and care, still, a key rule of success is to improve the blood sugar level, rising the patients' education and imposing positive lifestyle changes, these essentials can ultimately improve the quality of life of diabetic patients. (Dourmishev L, Pozharashka 2019) [9].

5. Conclusion

This study included 66 diabetic cases, all with skin manifestations. We concluded that the most common skin manifestation in this study the fungal infection (27%) followed by Xerosis (17%) and the least were both bacterial infections and the Diabetic bullae with (5%).

We conclude that the female gender (68%) is more affected as it constitutes higher percentage than the male gender (32%).

We observed that during the course of diabetes mellitus regardless the type, the skin manifestations are mostly found after (10-14) years of the onset of the disease.

Revising the glycaemic profile, we concluded that the majority of the cases with skin manifestation showed unsatisfactory fasting blood sugar range (117-157) and glycosylated haemoglobin range (6-10)

In summary dermatological manifestations are a highly prevalent complications of diabetes mellitus which affect quality of life and adds to the heavy burden of therapeutic costs. It is found in both types of diabetes and increasing duration of diabetes increases the possibility of skin involvement.

6. Abbreviations and Acronyms

AGEs: Advanced glycation end products
DM: Diabetes mellitus
FBS: Fasting blood sugar
HbA1c: Haemoglobin A1c

7. References

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8.Figures

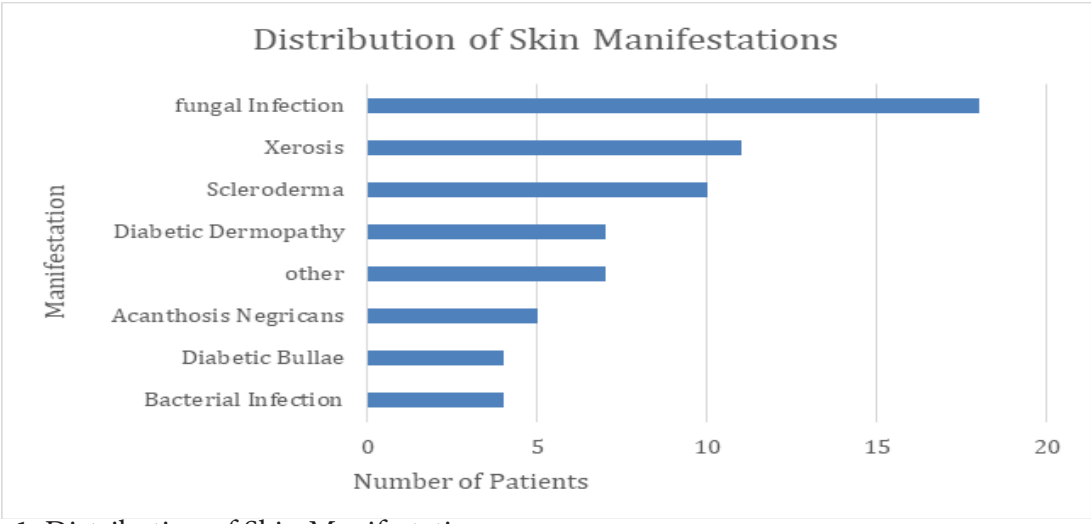

Fig. 1: Distribution of Skin Manifestations

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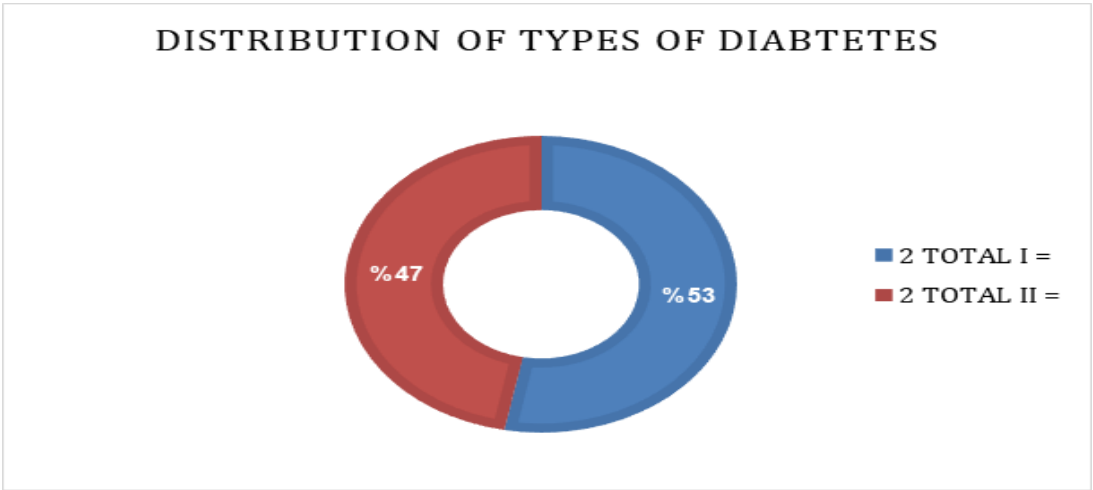

Figure 2: Distribution of types of diabetes

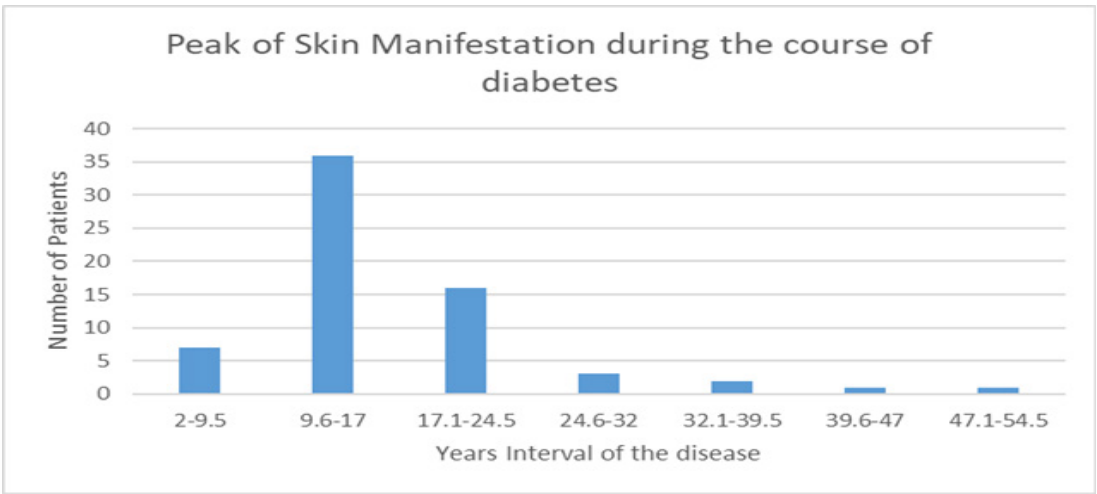

Figure 3. Peaks of Incidence of Skin Manifestation during course of the disease

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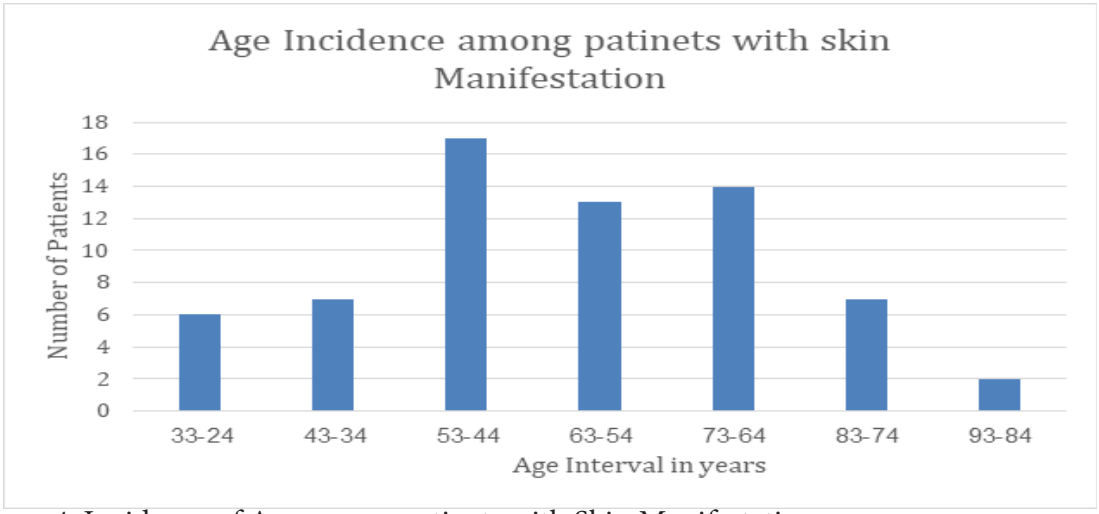

Figure 4. Incidence of Age among patients with Skin Manifestation

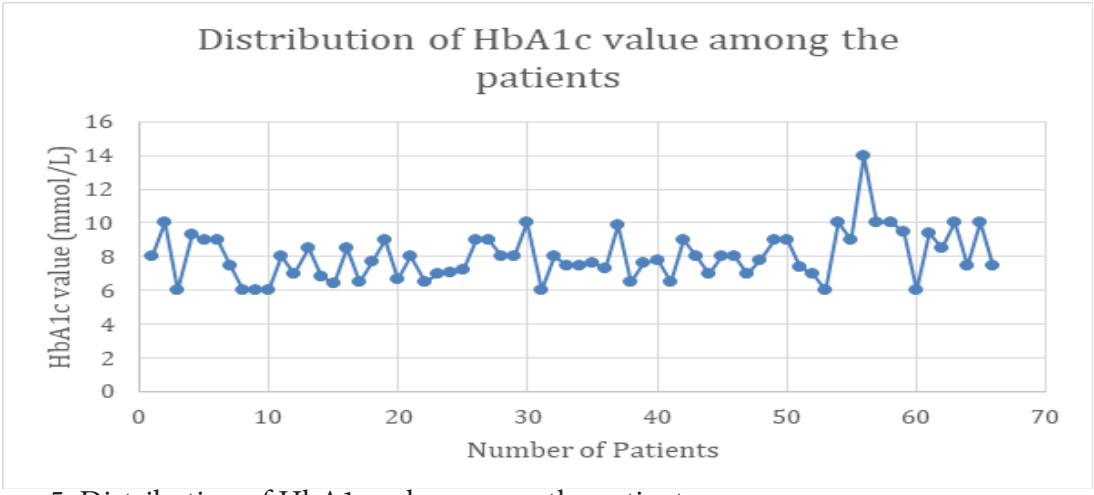

Figure 5. Distribution of HbA1c value among the patients

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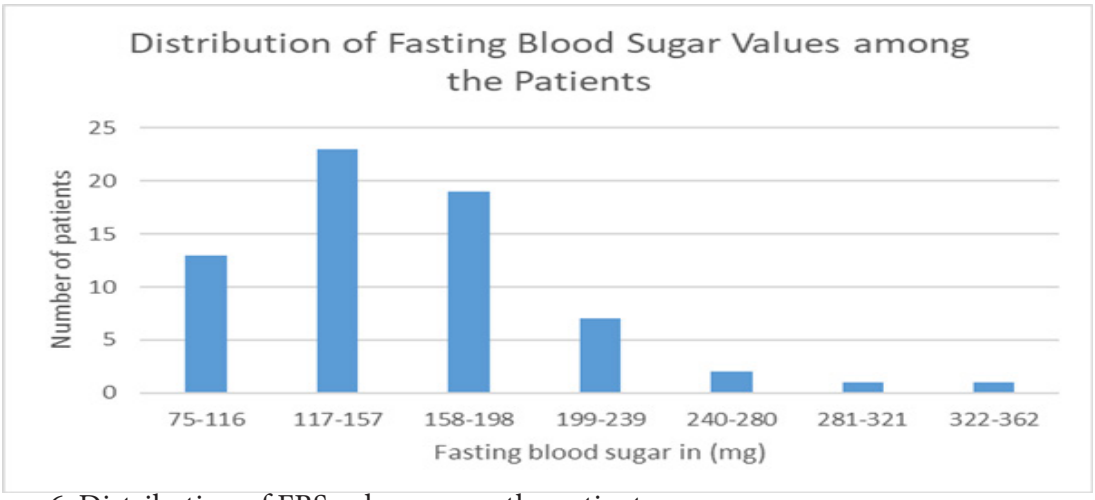

Figure 6. Distribution of FBS value among the patients