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A Study of The Prevalence of Skin Manifestation Among Diabetic Patients Attending Dermatological Outpatient Clinics of Public Hospitals, Sana'a City-Yemen-2023.

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DEDICATION

We dedicate this research to our honorable doctors who, after **ALLAH**, had the credit for the success of this work. Some of them established this lofty scientific edifice, and some of them continued the journey in educating and training this generation of medical students. "We would like to express our heartfelt appreciation to our supervisors, **Dr [MUTAIA ABUARI] and Dr [BASHEER AL-NABEHI]**, for their unwavering belief in our capabilities. Their encouragement, patience, and willingness to guide us through the challenges. This project is a testament to their mentorship and their dedication to fostering the growth of their students. "We also dedicate this research to our family, who played an essential role in encouraging and supporting us morally and psychologically.

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ABSTRACT

Background: Skin is the largest organ in the body, and effected by many systemic diseases including diabetes mellitus. Diabetes mellitus effected the skin by different mechanism, that lead to varies manifestations and skin problems, some of them appear on asymptomatic patient and can be the first indictor for the presence of diabetes mellitus and usually go undiagnosed , while others related to the control of diabetes and lead to serious complication which needs control of blood sugar to be treated.

Objective: The study was conducted to determine the prevalence of different skin manifestation on diabetic patients and enhance knowledge regarding their definition, diagnosis, prevention and treatment methods of them.

Methodology: study is a descriptive cross-sectional study conducted on three of public civilian hospital in Sana'a city, Yemen. A structured Arabic questionnaire was implemented using face-to-face interviews. Statistical analysis had be performed using the SPSS software.

Results: The sample size was eighty-seven 87 participants, among the participants type 1 diabetes mellitus was present in 20 (23%) of participants, while type 2 diabetes mellitus present in 67(77%) of them. Manifestations of skin infection was present as follow fungal infections in 43 (49.4%), bacterial infections in 32(36.8%) and viral infections in 31(35.6%). In non-infectious manifestations dry skin was the commonest detected in 50(57.5%) of patients followed by pruritus 36(41.4 %), acrochordons 26(29.9%), acanthosis nigricans 19(21.8%), Vitiligo 16(18.4%), Necrobiosis lipoidica 13(14%) and Bullosis Diabeticorum 3(3.5%).

Conclusion: Patients with diabetes mellitus either type 1 diabetes mellitus or type 2 diabetes mellitus may be had one or more skin manifestation, which more common in type 2 diabetes mellitus.

Keywords: Diabetes mellitus, Skin manifestation, Prevalence, dermatology, Yemen

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ABBREVIATIONS

AGEs	Advanced glycation end products
AN	Acanthosis nigricans
BD	Bullosis diabeticorum
DD	Diabetic dermopathy
DM	Diabetes mellitus
IGF1	Insulin growth factor-1
GA	Granuloma annulare
HBA1c	Hemoglobin A1c
NF-KB	Nuclear factor- KB
NL	Necrobiosis lipiodica
NO	Nitric oxide
OPD	Outpatient department
ROS	Reactive oxygen species
SD	Standard deviation
SPSS	Statistical package for social sciences
T1DM	Type 1 diabetic mellitus
T2DM	Type 2 diabetic mellitus
UV	Ultra violet radiation

Chapter 1 INTRODUCTION

1.1 Background

Diabetes mellitus (DM) is a clinical syndrome characterized by an increase in plasma blood sugar(Ralston et al., 2018). Globally, an estimated 463 million people had diabetes in 2019 (9.3% of the world's adult population), and this number is expected to reach 700 million in 2045(Penman et al., 2022). There are many types of DM the most common being type 1 and type 2 diabetes, with type 2 form 90%. It is generally considered that type 1 diabetes is due to the autoimmune destruction of insulin-producing cells (beta-cells) in the pancreas, resulting in a pronounced insulin deficiency, while type 2 diabetes is due to a reduced sensitivity of insulin action and the inability to produce sufficient insulin to overcome this insulin function(Ralston et al., 2018).

DM affects many organs in the body, including the skin. The skin affected in about one third of diabetes patients during their life(Lima et al., 2017). Skin manifestations of DM can be simple or life-threatening, infectious or non-infectious(Bose & Kumar, 2020). Skin disorders in diabetic patients are closely correlated with glycemic control. Significant variability in severity and potential outcomes is observed in diabetic skin disorders. Skin disorders in the early stages of diabetes, such as xerosis, calluses and fissures, are often overlooked and often go undiagnosed(De Macedo et al., 2016).

There are many and different symptoms and signs on the skin that appear as result of DM and can be used as indicator that the patient had DM before the appearance of other symptoms, and some of them can suspect complication of DM and the dermatologist may be the first physician that noticed that(Henry & Singh, 2020). Most of these manifestations are due to long term effects of DM on skin collagen and microcirculation. While others appear as result of impaired of immune system, or autoimmune alteration(Margossian & Sabban, 2018).

1.2 Problem Statement

The skin is the most visible organ of the body. It is a well-known fact that it is referred to as window or mirror to the internal health of the body. Abnormalities of insulin and elevated

blood glucose levels lead to metabolic, vascular, neurological and immunological abnormalities. Affected organs include the cardiovascular, renal, nervous system, eyes and the skin. The skin manifestations can be the first presenting sign of diabetes but more often appear in known diabetic patients during the course of the disease(Poorana et al., 2019).

Skin manifestation in diabetic patient are not uncommon. Study was done on three hundred consecutive diabetic patients with cutaneous manifestations who attended dermatology Outpatient department (OPD) at Rajah Muthiah Medical College, Chidambaram from November 2013 to October 2015, constituted the study group. There was a statistically significant correlation between skin infections and uncontrolled diabetes Hemoglobin A1c (HBA1c) >7(Poorana et al., 2019).Other study was carried out to determine the prevalence, pattern, and determinants of skin diseases in diabetic patients at the Barau Dikko Teaching Hospital, Kaduna, North West Nigeria, one hundred consecutive diabetic patients attending the clinic were included in the study. Many of the patients had more than one skin condition at a time(Sani et al., 2020). Also, Skin manifestation was present in 72 (60%) patients of 120 diabetics patient in Indian(Bose & Kumar, 2020). And 239 (43.9%) of DM patients had skin manifestations among 544 patients with DM in Tanzania(Kiprono et al., 2015). Cutaneous lesions were seen in 12 patients (34.3%) of type 1 diabetic mellitus (T1DM) and 280 (98.2%) of type 2 diabetic mellitus (T2DM) among 320 diabetic patients(Shahzad et al., 2011).

1.3 Study justification

The skin is the largest organ in the body, also used as mirror of many systemic diseases including DM, in add to that the manifestation of DM on the skin is common, diverse, variable and complex. Some of these manifestations are related to the duration of the disease and its control, although many of them can be neglected and go unnoticed.

Many of them can indicate or cause serious complications, disability and cosmetic problems, and their treatment depends on the control of DM. In addition to these problems, many dermatologists do not have comprehensive knowledge of skin problems in diabetics.

Researches of these topic is limited on Yemen, particularly in Sana'a city. Therefore, this study was conducted to study the prevalence of different skin manifestation among diabetics and fill some of the knowledge gaps on this topic.

1.4 Question of Study

- What is the relationship between skin and DM?
- What is the relationship between socio-demographic characteristics and skin problems on a diabetic patient?
- What is the relationship between skin problems and the type of DM?
- How many the percentage of different skin manifestation on diabetic patients?
- Is there a relation between skin problem and the level of sugar in the blood?

1.5 Study objectives

1.5.1 General objectives

- The study aims to estimate of the prevalence of skin manifestation in diabetic patients who attending dermatological outpatient clinics of three of public civilian Hospital at Sana'a city - Yemen.
- The study aims to provide a comprehensive understanding of the common skin diseases that affect individuals with diabetes and enhance knowledge regarding their definition, prevention and treatment methods.

1.5.2 Specific objectives

- The study aims to describe the socio-demographic characteristics of individuals with diabetes-related skin diseases, including their gender, and age group.
- The study aims to differentiate diabetic skin manifestations based on the type of diabetes (type 1 or type 2). By categorizing the skin manifestations according to the type of diabetes, we aim to identify any variation or specific patterns associated with each type.
- The study aims to describe the different skin manifestations in relation to the diabetic's duration control. This assessment will help understand the correlation between the severity of skin manifestations and the management of diabetes, potentially providing valuable information for clinicians and researchers.
- The study aims to differentiate diabetic skin manifestations based on infectious and non-infectious disorder in skin of the diabetic patients.

1.6 Hypothesis

- There is relation between skin and DM.
- Many of skin problems related to DM go undiagnosed and has no clinically significant.
- The infectious skin problems are more common than non-infectious.
- There are skin manifestations in patient with type-1 DM differ from patient with type-2 DM.
- No relation between the level of sugar in the blood and severity of skin problems

Chapter 2 Literature Review

2.1 Introduction

DM is the most common endocrine disease and nearly effects all the body organs including the skin which effected in approximately 30 % of diabetics. Skin presentations in diabetic patients different according to type. Cutaneous infections are more frequent in patients diagnosed with T2DM, while autoimmune alterations are more common in Type 1 diabetic patients(Margossian & Sabban, 2018).

Skin disorders in diabetic patients are closely correlated with glycemic control. Problems resulting from high serum glucose levels, which stimulate direct cell damage as well as indirect cell damage through advanced glycation end products (AGEs). High level of blood glucose directly affects the activity of keratinocytes and fibroblasts, causing changes in protein synthesis, proliferation and migration. Also leading to vasodilator dysfunction due to inhibition of nitric oxide (NO) molecules(Lima et al., 2017). High glucose concentrations also cause the formation of (AGEs). (AGEs) formed from the glycation of proteins, lipids, and nucleic acids act through multiple pathways, inducing the formation of reactive oxygen species (ROS), with impairing clearance, also stimulate inflammatory cytokine through the nuclear factor $\kappa\beta$ (NF- $\kappa\beta$) pathway. Indeed, the biochemical interactions of ages are one of the major pathways involved in diabetes complications, including skin disorders. (AGEs) alter the properties of collagen, reducing its flexibility and solubility and increasing 's stiffness(De Macedo et al., 2016).

2.2 Prevalence of skin manifestation among diabetic patients

2.2.1 Global

Study in India involving 120 diabetic patients show that the infectious present in 72 (60%) patients. In this, cutaneous fungal infections were observed in 46 (38.3%) and cutaneous bacterial infectious were observed in 26 (21.7%) patients. The non-infective dermatomes were reported in 56 (46.7%) patients(Bose & Kumar, 2020).

Another study on prevalence of cutaneous manifestation of diabetes mellitus was done in Tanzania at 2014 on 544 patients at diabetic outpatient's clinic, this study shows 451(82.9%) of the 544 patients had type 2 diabetes. The mean duration of the disease was 9.3(SD (Standard deviation) $\pm$ 0.33) years. Also show total of 239 (43.9%) DM patients had skin manifestations. Among the 239 patients with skin manifestations, 297 skin diseases were diagnosed. Among the 150 primary non-infectious skin diseases associated with DM, pruritus was more common one. Also in 113 cases cutaneous infections found and the majority (108, 95.6%) was fungal infection, mainly candida, while the remaining five infections were viral three and bacterial two(Kiprono et al., 2015).

Study on Cutaneous Manifestations Associated with Diabetes Mellitus conducted at Department of Dermatology on 103 cases between 2018 to 2022, this study show 58% of cases are female (60 patients) and 42% male (43 patients), according to type of diabetes, patient has more common type 2 diabetes (98.1%-101 patients), with only 1.9% having type 1 DM (2 patients), manifestations strongly associated with DM, diabetic foot was predominant in 18.4% of patients. It was followed by necrobiosis lipoidica in 6.8%. Bullosis diabeticorum (BD) was present in 5.8% of patients, followed by acanthosis nigricans (AN) in 4.9% of patients. In the analysis of signs and symptoms commonly associated with DM, the highest percentage was recorded in the case of skin xerosis, found in 44 patients (42.7%), followed by pruritus, present in 15.5% of patients ($p = 0.203$). Acrochordons were present in 14.5% of patients(Vățã et al., 2023).

2.2.2 Regional

Study in Al-Hussein Teaching hospital in AL-Nasiriyah city, Thi-Qar province, Iraq. From 122 diabetic patients, 60(49.18%) males and 62(50.81%) females. Mean age was 58.63 ± 9.42 . Study demonstrate that the most considerably skin disorders was, bacterial infection 34 (27.86%), fungal infection 20 (16.39%), acanthosis nigricans 11(9.1%) whereas other skin disorders was less frequently in this study such as granuloma annulare (GA), rubeosis, vitiligo, xerosis and yellow skin(Kawen & Al-Waeli, 2020).

One study to investigate the prevalence of skin manifestations in diabetic patients attending a diabetic clinic in the Qassim region, Saudi Arabia at 2011 was performed on 320

patients, this study show skin manifestations was found in 91.2% of cases had diabetes. These Cutaneous lesions were seen in 12 patients (34.3%) of (T1DM) and 280 (98.2%) of (T2DM). Diabetics had a greater prevalence of skin manifestations in type 2 than type 1 and as long term of diabetes increased, the likelihood of developing skin manifestations also increased(Shahzad et al., 2011).

Another study conducted by Ahmed, et al on prevalence of cutaneous disorder among diabetic patients in Damietta governorate on Egyptian at 2022. This cross-sectional study was on 947 diabetic patients, 595[62.8%] of precipitant diabetic patient had one or more skin manifestation. The common skin problem was found skin infections [27%], acrochordons [19.2%], pruritus [18.2%], xerosis [16.6%], acanthosis nigricans [16.2%], scleroderma-like skin changes [8.2%], and diabetic dermopathy (DD) [7.7%]. Also in this study long term of diabetes, poor controlled HBA1C and obesity were independent risk factors of skin complain in diabetic patients(A. S. Ahmed et al., 2022).

2.2.3 locally

In Yemen, the researchers did not find any researches or studies about the prevalence of skin manifestation among diabetic patients in Yemen.

2.3 Skin manifestation more common in type 1 DM

The type 1 DM is more related to some disease especially those that has autoimmune base these include the following.

2.3.1 Necrobiosis lipiodica

Necrobiosis lipoidica (NL) is a rare granulomatous dermatological disease(Văță et al., 2023). occurring in 0.3 to 1.6% of people with type 1 diabetes, more common in female than male.90% of people with LN who do not have diabetes will eventually develop diabetes (mainly type 1 diabetes).Glycemic control has no influence on the course of LN(Duff et al., 2015).

NL cause is currently unknown. The suggested causes are localized trauma, microangiopathy, immunoglobulin and fibrin deposition, and metabolic changes. Although NL is benign, its appearance is cosmetically concerning to the patient(Duff et al., 2015).

NL lesions typically occur in young and middle-aged patients and most commonly appear on the pretibial skin as painless, irregular ovoid patches with a yellow atrophic center and red periphery to purple.(Fig.2.1) Lesions are often multiple and bilateral. Ulcerations occur in one third of cases and are complicated by secondary bacterial infections or progression to squamous cell carcinoma(Vâță et al., 2023).



Figure 2.1 Necrobiosis lipoidica diabeticorum. (Gloster Jr et al., 2015)

Currently, treatment is based on steroids, used as topical, intra-lesion or rarely systemic(Duff et al., 2015).

2.3.2 Vitiligo

Known as well-defined loss of skin pigmentation, often in the form of patches. As an autoimmune disease, it often occurs together with other autoimmune diseases, such as thyroid diseases, T1DM.

It is a common skin disease with a prevalence of 2 to 10% in patients with type 1 diabetes that occurs spontaneously with a progressive course. The extremities face and neck as well as the trunk are often affected in a symmetrical distribution(Lima et al., 2017). (Fig.2.2) Although all cases diagnosed with diabetes belonged to the generalized type of vitiligo, the study shows no statistically significant association between vitiligo type and the incidence of diabetes mellitus. This shows that the generalized form of vitiligo is often associated with diabetes mellitus(Korde et al., 2018).



Figure 2.2 Non-segmental vitiligo of the hand (a). Generalized vitiligo (b).(Gloster Jr et al., 2015)

Although the pathogenesis of vitiligo is not yet fully understood, the autoimmune hypothesis is the most commonly accepted. This theory is supported by the clinical association of vitiligo with autoimmune disorders, the frequent detection of circulating autoantibodies to surface and cytoplasmic antigens of melanocytes. Furthermore, there are findings of activated T cells in the periphery of actively progressing lesions in some vitiligo patient(Korde et al., 2018).

Vitiligo typically presents with asymptomatic depigmented macule and patches, milky white or chalky, with no clinical signs of inflammation(Lima et al., 2017)(Grimes, 2016).

They vary in size from a few millimeters to several centimeters and often have convex edges that are clearly delineated from the surrounding normal skin(Grimes, 2016).

Diagnosis of vitiligo can be aided by using a Wood lamp. Under a Wood lamp, depigmented areas emit brilliant blue-white fluorescence and have clearly defined boundaries(Grimes, 2016).

Most attempts to treat vitiligo remain unsatisfactory, such as the use of topical corticosteroids, topical calcineurin inhibitors, UV (Ultra violet radiation) irradiation, laser light and skin grafts(Lima et al., 2017).

2.3.3 Bullosis Diabeticorum

Bullosis diabeticorum, or diabetic bullae, occurs in 0.5% of people with type 1 diabetes. This condition is more common in men and people with long-standing peripheral neuropathy. The pathological mechanism is not fully understood. A combination of angiopathy and neuropathy may play a role in the pathophysiology of BD. Histopathological analysis shows subepidermal blisters with little or no inflammatory infiltrate(Lima et al., 2017).

The lesions arise spontaneously and are located primarily on the back and sides of the lower legs and feet(Duff et al., 2015). (Fig.2.3) The lesions present as clear blisters on non-inflamed bases. They are painless and contain sterile fluids. The size of the lesion can vary from a few mm to cm. However, this condition may be the first sign of diabetes. Lesions disappear on their own within 2 to 5 weeks(Duff et al., 2015). The focus of treatment is on preventing infections. If the blisters become large and symptomatic, they can be aspirated, leaving the roof intact to protect the skin barrier. People can use saline compresses to relieve their symptoms. Topical antibiotics or steroids are generally not required(Duff et al., 2015).



Figure 2.3 Bullous diabeticorum. (Gloster Jr et al., 2015)

2.3.4 Periungual telangiectasia

The condition found in up to 49 percent of diabetic patient. Present clinically as nail fold redness, thick cuticle, fingertip tenderness and dilated vessels visible to naked eye. No treatment required for this condition(Bose & Kumar, 2020). (Fig.2.4)

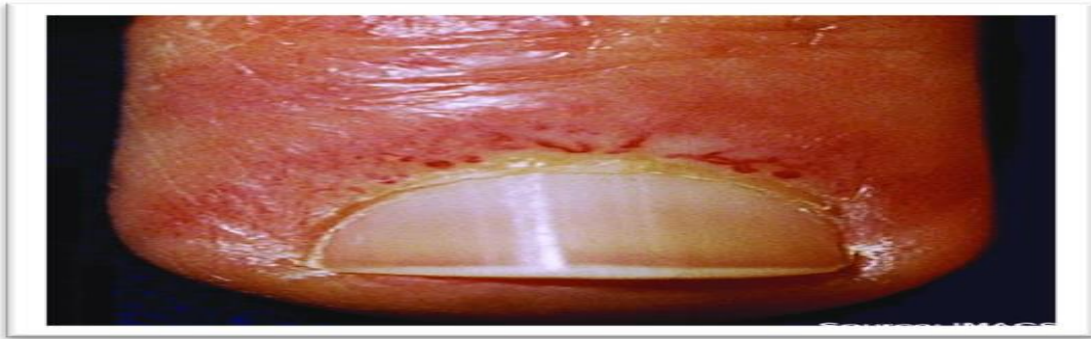


Figure 2.4 Periungual telangiectasias.

2.4 Skin manifestation more common in type 2 DM

2.4.1 Cutaneous infection

Cutaneous infections are present in 20 to 50% of diabetic patients (more common in patients with type 2 diabetes) and are often associated with poor control of the blood sugar (Van Hattem et al., 2008). Study in 2009 of 50 patients with DM, show that 55% of patients had a skin infection at some point of life. Another study reported a skin infection occur in 61% of people with diabetes (Duff et al., 2015).

People with diabetes are more likely to suffer from skin infections due to various factors. High blood sugar levels weaken the immune system and make it more difficult for the body to fight off infections. In addition, diabetes can cause nerve damage that reduce the ability to feel pain, heat, or cold make them more susceptible to trauma and reduce blood supply which also increase the risk of skin infection (David et al., 2023).

2.4.1.1 Bacterial infection

Skin infections such as impetigo, folliculitis, carbuncles, ecthyma, necrotizing fasciitis, Cellulitis and erysipelas are more serious and more common in diabetics. (Van Hattem, 2018).

They usually manifested clinically as painful, red, swollen bumps filled with pus (David et al., 2023). (Fig. 2.5)



Figure 2.5 Cellulitis on leg of diabetic patient. (Gloster Jr et al., 2015)

Bacterial infection can be treated medically by use of topical or systemic antibiotic, or both and if there is abscess surgical drain is needed(David et al., 2023).

2.4.1.2 Candida infection

Patients with DM are more susceptible to Candida infection. Also, Candida infection is more recurrent on them. These make its recurrence signs of pre-diabetic status(Lima et al., 2017).

Clinically, it presents as an itchy erythema, which develops into blisters that surrounded by satellite pustules, followed by ulceration and fissures (Lima et al., 2017). Mucosal infection is manifested by white papules, plaques, and erythematous ulcers. (Fig.2.6) Periungual infections such as white spots with erythema and pus oozing from the nail wall are also common(Lima et al., 2017).



Figure 2.6 Oral candidiasis.

Candida infections resolve with adequate control of diabetes and can be treated with topical imidazole or nystatin(Van Hattem et al., 2008).

2.4.1.3 Dermatophytosis infection

Dermatophyte infections, such as skin dermatophytosis or onychomycosis, are common in people with diabetes (Lima et al., 2017).

Tinea or dermatophytes are superficial infections of the skin, hair, and nails by fungus (Duff et al., 2015).

The most prevalent dermatophytes are *Trichophyton rubrum*, *Trichophyton interdigital* (Lima et al., 2017). (Fig.2.7)

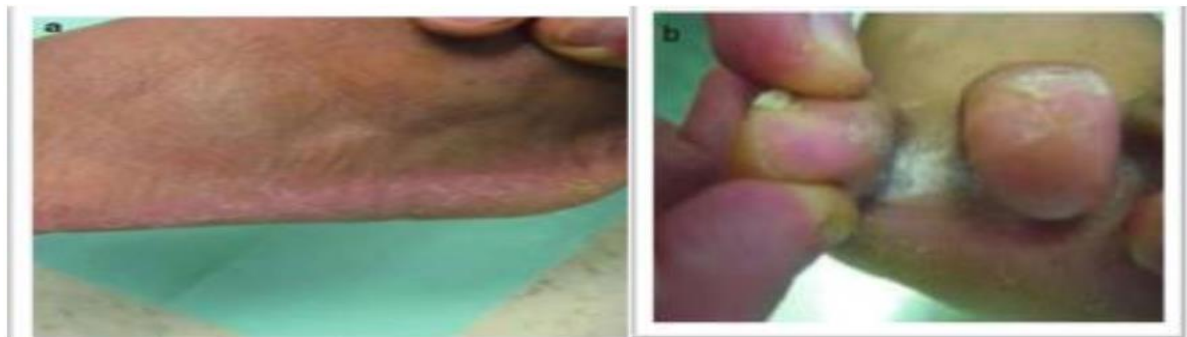


Figure 2.7 Moccasin and interdigital tinea pedis. (Gloster Jr et al., 2015)

Treatment options include drying the area and applying one of the newer topical imidazole antifungals (Lima et al., 2017).

2.4.2 Acrochordons

Acrochordons (known as skin tags) are benign skin tumors (SY et al., 2017). They are small, pedunculated, soft, often pigmented lesions occurring on the eyelids, the neck, and the axillae (Van Hattem et al., 2008).

There is association of acrochordons with insulin resistance and obesity along with a familial predisposition for developing such lesions (SY et al., 2017). A large study of patients with skin tags found more than 25% had diabetes and 8% had IGT (Van Hattem et al., 2008).

Clinically it appears as a small, soft, usually pedunculated outgrowth lesion of skin that vary in size from 2 to 5 mm or sometimes larger ones do occur. (Fig.2.8) there are usually no symptoms, but there may be itching or pain and inflammation by catching on clothing or

jewelry(SY et al., 2017). Skin tags are diagnosed mostly clinically by their appearance and only if the diagnosis is not clear biopsy should be done to exclude malignant disease(SY et al., 2017).



Figure 2.8 Skin tag (acrochordons).(Gloster Jr et al., 2015)

Reassurance of the patient that the lesion is benign and treatment may use in some case with many options are available that include Snip excision, Cryotherapy, Shave Excision or Electrodesiccation(Van Hattem et al., 2008).

2.4.3 Acanthosis Nigricans

Acanthosis nigricans appears as hyperpigmented and velvety plaques on the body folds, more common in the axilla, groin and posterior neck(Van Hattem et al., 2008).

Acanthosis nigricans appears more common in person with obesity with incidence 74%(Hud et al., 1992). A study from India showed that 5.9% of patients with diabetes are affected by acanthosis nigricans. Another study found a prevalence of 11.6% in diabetics(Bose & Kumar, 2020). Early diagnosis of type 2 diabetes in adolescents and young adults (up to 40 years) is associated with a more aggressive form of the disease, which is accompanied by the premature development of serious complications(Butt et al., 2023).

Insulin and Insulin growth factor- 1(IGF1) and their keratinocyte receptors are involved in the regulations of proliferation of keratinocytes which lead to a peculiar epidermal hyperplasia(Venkatswami & Anandan, 2014).

Patients often present with darkening and thickening of the skin with no real symptoms or mild itching. On physical examination, lesions appear symmetrical, hyperpigmented, velvety plaques which can occur in almost any location, although these locations often include areas of folds skin such as the groin, armpit or back of the neck(Salati et al., 2021). (Fig.2.9)

Treatment of acanthosis nigricans focus in treatment of cause. Many options are found with life style change form the most important one that include Weight reduction and exercise can reduce insulin resistance(Van Hattem et al., 2008). Other option include topical retinoids are considered one of the first-line treatment options or topical vitamin D analogs. Other case needs use of Oral retinoids (isotretinoin and acitretin) or Metformin and rosiglitazone(Patel et al., 2018).



Figure 2.9Acanthosis nigricans.(Gloster Jr et al., 2015)

2.4.4 Diabetic dermopathy

Diabetic dermopathy is a term used to describe small, round, brown atrophic lesions that appear on the lower leg of diabetic patients(George & Walton, 2014).

DD is the most common skin manifestation of diabetes with incidence ranges from 9% to 55%(Morgan & Schwartz, 2008).

The mechanism that causes DD is still unknown, although many hypotheses have been explored Melin suggested that the diabetic dermopathy lesions occurred as a result of trauma. Binkley suggested that DD is due to reduced skin temperature, slow blood flow, increased blood viscosity and vascular fragility. Other suspected mechanism is that diabetic neuropathy causes degeneration of the subcutaneous nerves, leading to diabetic dermopathy(George & Walton, 2014).

The lesions begin spontaneously as round or oval, scaly, red or purple macules or papules that do not disappear in pressing. Induration with central depression or blistering may occur. lesion then progress to the characteristic scar-like lesions of diabetic dermopathy(George & Walton, 2014). (Fig.2.10)



Figure 2.10 Diabetic dermopathy.(Gloster Jr et al., 2015)

There is no treatment is recommended or proven effective on the shins in a bilateral asymmetrical distribution, but have rarely been reported on the arms, thighs, trunk, and abdomen(George & Walton, 2014).

If necessary, cosmetic camouflage can be used to conceal the appearance of skin lesions(George & Walton, 2014).

2.4.5 Calciphylaxis

Calciphylaxis is a multifactorial skin vascular disease lead to ischemic cutaneous infarction due to obstruction of the blood vessels in the subcutaneous fat tissue and dermis. Severe pain and susceptibility to infection make calciphylaxis very debilitating, with an annual mortality rate of 40 to 80%(Chang, 2019).

Calciphylaxis is characterized by chronic, painful, non-healing wounds and commonly occurs in patients with chronic kidney disease specially in those undergo to dialysis(Chang, 2019). With an incidence 1% to 4% in the dialysis patients(García-Lozano et al., 2018). In research study about eighty-nine cases of Calciphylaxis were diagnosed, between 2006 and 2016 with result of 75.3% of cases were hemodialyzed. In dialyzed and non-dialyzed Calciphylaxis

case the diabetes was present in 25.7 to 26.3%(Gaisne et al., 2020). Other study between 2014 and 2019, 47 cases of calciphylaxis were registered and the diabetes was present in 76% of patient(Ruderman et al., 2021).

The calciphylaxis pathogenesis attributed to progressive lumens narrow due to calcification within the middle layer of the vessel walls (also called medial calcification) and endothelial cell proliferation and fibrosis beneath the intima (also called subintimal fibroplasia). Then thrombosis subsequently develops in the lumen of the vessel and lead to ischemic lesions(Ruderman et al., 2021).

Calciphylaxis is diagnosed clinically as cutaneous manifestations ranging from a single skin lesion to multiple rashes covering different areas of the body. Development often takes place relatively quickly skin lesions. Calciphylaxis may begin as a small area of redness and tenderness or begin with a broad pattern of livedo reticularis and progress to intense erythema (Chang, 2019). (Fig.2.11)



Figure 2.11 Calciphylaxis. (Gloster Jr et al., 2015)

However, histological examination is recommended and still the gold standard for definitive diagnosis; However, in cases where there is a high clinical suspicion of calciphylaxis, immediate aggressive treatment should be initiated and histological confirmation may be reserved(García-Lozano et al., 2018).

Calciphylaxis treatment requires collaboration between multiple disciplines for appropriate treatment. Including dermatology, nephrology, wound care, nutrition and pain management(García-Lozano et al., 2018).

The cornerstone of treatment in all patients include Wound care as removal of necrotic tissue, support of wound healing, and prevention of infection also pain management by benzodiazepines and narcotic analgesics as in adequate doses are recommended. Also, calcium correction and kidney transplant is recommended(García-Lozano et al., 2018).

2.4.6 Eruptive xanthomas

Eruptive xanthomas are a skin condition that most commonly occurs on the extensor surfaces of the limbs, buttocks, and shoulders. This may be due to high serum triglyceride levels and uncontrolled diabetes(Abdelghany & Massoud, 2015). With incidence less than 0.1% of diabetic mellitus patients and affect men more than women(Van Hattem et al., 2008).

The appearance of eruptive xanthomas is associated with increased levels of triglyceride-rich lipoproteins. Lipid changes occur in association with familial hypertriglyceridemia and diabetes mellitus and result in hypertriglyceridemia due to lack of lipoprotein lipase activity and impaired clearance of chylomicrons and very low-density lipoproteins, this causes lipoproteins to pass through the blood vessel wall into the subendothelial layer, where the lipoproteins are taken up by macrophages, and the most important histological feature is the formation of foam cells in the superficial dermis, mixed with a lymphocytes and neutrophil infiltrate(Zaremba et al., 2013).

Eruptive xanthoma usually appear suddenly as multiple small (1 to 2 mm), yellow, dome-shaped papules surrounded by an erythematous halo and most commonly occur on the extensor surfaces of the extremities, buttocks, shoulders, and hands(Zaremba et al., 2013). (Fig.2.12) These papules can itch, and tender(Van Hattem et al., 2008). And it taken as an indicator of underlying systemic conditions such as hypertriglyceridemia and uncontrolled diabetes mellitus to prevent cardiovascular disease and pancreatitis, as that kind of skin exanthema may be the first signal of cardiovascular risk(Lee & Sheth, 2019).



Figure 2.12 Eruptive xanthomas.(Gloster Jr et al., 2015)

The treatment of eruptive xanthomas includes diet restriction, exercise, and drug treatment to control hyperlipidemia and diabetes(Abdelghany & Massoud, 2015). The lesions usually disappear slowly, several months after the hypertriglyceridemia is corrected by lipid-lowering medications or better glycemic control(Abdelghany & Massoud, 2015).

2.4.7 Pruritus

Pruritus, or commonly known as itching, is an annoying stimulus that causes the desire to scratch the affected area of skin(Lima et al., 2017).

Chronic pruritus is a common skin complain of diabetes. It is often associated with xerosis cutis. Approximately (3-49%) of people with diabetes experience itching, which significantly affects their quality of life(Lima et al., 2017). A study conducted on 106 DM patients by Al Mutairi et al.⁷ reported pruritus as the second most common cutaneous manifestation, affecting 49% of patients(Lima et al., 2017).

Generalized pruritus may occur with clinically discrete dry skin or may be associated with erythematous papules or nodular prurigo(Lima et al., 2017).

Diabetic polyneuropathy is associated with sweating dysfunction due to sympathetic nervous system impairment which may play a role in the pathogenesis of diabetic pruritus(Lima et al., 2017).

Treatment includes normalization of blood glucose levels accompanied by basic skin care with emollients such as urea-containing moisturizers, adjusted with topical antipruritic such as

polidocanol or menthol, Oral antihistamines or antidepressants drug may be used in unresponded cases(Lima et al., 2017).

2.4.8 Dry skin

Dryness of the skin (xerosis) due to a decrease in moisture and lipid content in the epidermis layer is a common finding in diabetes-related autonomic neuropathy, which leads to denervation of the sweat glands and is also considered normal skin aging processes(Baker & Al-Muzaini, 2018). The pathogenesis of xerosis in T2DM is not fully understood. It is well known that diabetic skin is characterized by a decrease in production of sebum and triglycerides from the sebaceous glands due to an impaired insulin signal. During long-term hyperglycemia, skin collagen deposits advanced glycated end products (AGE) and non-enzymatic glycosylation of other proteins, such as laminin and elastase(Stingeni et al., 2021).

Xerosis is a very common skin disease in patients with type 2 diabetes mellitus (T2DM)(Stingeni et al., 2021). Xerosis clinically appear as scaling and flaking, can affect any area and is often associated with a high disease burden(Stingeni et al., 2021).

Simply applying appropriate moisturizers once or twice daily is one of the best preventive treatments offers(Baker & Al-Muzaini, 2018).

Hard skin/callus and corns it is quite thick, yellow in color, dry and hard in appearance(Baker & Al-Muzaini, 2018). Although the mechanism of this is still unknown, noted to appear on weight-bearing parts of the foot, especially the metatarsal head area and on the tips of the toes, commonly seen in people with sensory neuropathy. The presence of plantar calluses in neuropathic subjects was shown to significantly increase pressure and shear forces at the top of the foot. They are best treated by enucleation, i.e. Removing them with a scalpel, which must be done by a podiatrist. If left untreated, they may ulcerate at the apex due to the sustained pressure placed on the immediate skin tissue(Baker & Al-Muzaini, 2018).

2.4.9 Granuloma annulare

Granuloma annulare (GA) is a non-infectious granulomatous skin and subcutaneous tissue disorder that occurs in the form of reddish nodules with a lighter center, non-atrophic in

nature and raised purple-red edges resembling a ring(Sanches et al., 2019). (Fig.2.13) The nodules are most commonly located on the distal parts of the extremities and heal with change in color (hypo, hyper). Clinically may be asymptomatic or may have itching(Sambura et al., 2024).



Figure 2.13 Granuloma annulare.(Gloster Jr et al., 2015)

The frequency of occurrence is around 0.3%, with female patients predominantly affected. more coexisting diabetes, mainly type 2, ranges from 21% to 77%(Sambura et al., 2024).

2.4.10 Diabetic erythema (Rubeosis faciei)

Rubeosis faciei often occurs in patients with uncontrolled blood sugar. Due to microcirculation disorders, the superficial vessels of the face dilate, which leads to the formation of chronic bright red erythema on the face(Sambura et al., 2024). (Fig.2.14)



Figure 2.14 Rubeosis faciei diabeticorum

Treatment is primarily causal and involves regulating the patient's carbohydrate metabolism and avoiding caffeine and smoking(Sambura et al., 2024).

2.5 Skin manifestation related to treatment of DM

2.5.1 Insulin injection site complication

Insulin is the essential therapy in people with type 1 diabetes mellitus (T1DM) and in type 2 diabetes mellitus (T2DM) in advanced stage .Insulin is mostly used as subcutaneous injection however, subcutaneous insulin therapy is associated with multiple injection site complications, include lipohypertrophy, lipoatrophy, allergic, amyloidosis, abscess , Insulin edema, Idiosyncratic skin reaction and Insulin Allergy(Pal et al., 2020).

2.5.1.1 Lipohypertrophy

Lipohypertrophy is the most common skin complication of insulin injections, with an incidence of approximately 38% in type 1 DM and type 2 DM patients using insulin(Jedlowski et al., 2019). There is thought that lipohypertrophy to be due to the anabolic properties of insulin, which promotes protein and fat synthesis(Jedlowski et al., 2019). And it is clinically manifested by soft swelling of rubbery consistency, (Fig.2.15) histologically with normal epidermal component and nodular hypertrophy of dermal adipocytes(Jedlowski et al., 2019). Lipohypertrophy is associated with recent insulin use, young age, low body mass index, use of the abdomen for injections, and irregular rotation of injection sites(Richardson & Kerr, 2003).

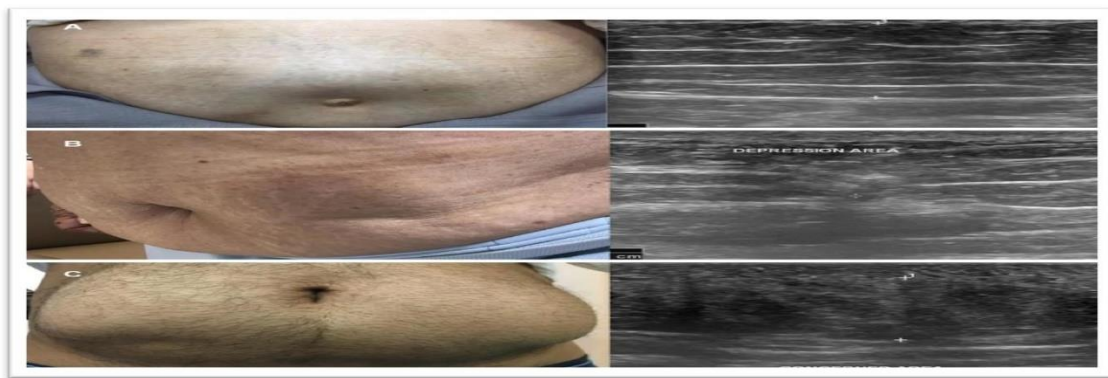


Figure 2.15 A typical insulin-induced lipohypertrophy

Treatment of lipohypertrophy generally involves avoidance of these risk factors and, in particular, rotation injection sites and avoid reusing needles(Richardson & Kerr, 2003).

2.5.1.2 Lipoatrophy

Lipoatrophy is more common in type 1 DM than type 2 DM. Current studies suggest that lipoatrophy occurs in 0.4–2.4% of patients with type 1 diabetes. Clinically, lipoatrophy manifests itself as skin depression with loss of fatty tissue Subcutaneous tissue that allows palpable touch depression at the insulin injection site(Jedlowski et al., 2019).(Fig.2.16)



Figure 2 16 Lipoatrophy

Histological examination of lipoatrophy cases revealed atrophy of adipose tissue with lymphocytic and eosinophilic infiltrates. Chemise/tryptase-positive degranulation tree cells. Typical presentation occurs after 6-24 months of regular insulin therapy and counting common among young people and those who had already had skin reactions to insulin(Jedlowski et al., 2019).

Pathological mechanisms associated with the development of lipoatrophy are unknown but could involve the lipolytic components of some insulin preparations or an immune-mediated inflammatory process with release of insulin lysosomal enzymes that promote lipoatrophy. Lipoatrophy may occur in response impurities in insulin suspensions or, historically, due to single use of non-human insulin. If lipoatrophy develops, it is generally recommended that patients should not inject into these areas. Repeated injections of highly purified pork or human insulin was administered to the affected area is associated with greater than 90% atrophy regression. If those remedies fail, and re-accumulation does not occur Dexamethasone (4 µg/unit) is added. Insulin injection may be effective in restoring fat accumulation(Jedlowski et al., 2019).

2.5.1.3 Insulin allergy

A few years ago, there was talk of allergic reactions to insulin occurs in approximately 50% of patients. These reactions are now less common, but most patients still have an immune response to insulin(Richardson & Kerr, 2003). Local reactions to subcutaneous insulin are usually erythematous, itchy, and sometimes indurated, occur at the injection site. These local skin reactions are generally short-lived and resolve spontaneously within a few weeks despite continued insulin administration. (Fig.2.17) But if the skin reactions last longer than 2-4 weeks, then replacing the insulin with a less allogeneic insulin, e.g. Newer analogue insulins may be useful. Also, there are desensitization protocols in which insulin was injected subcutaneously and many cases of insulin cases of allergic desensitization have been reported. Desensitizing agents commonly used for CSII include Lispro, aspart and regular insulin(Richardson & Kerr, 2003).



Figure 2.17 Eruptive xanthomas.

2.5.1.4 Skin abscess

Skin abscesses or cellulitis due to continuous insulin infusion are one of the most common causes of discontinuation of pump therapy Skin infections occur, including abscess formation. In most cases are bacterial, mostly *Staphylococcus* spp. Or *Streptococcus* spp., although infection by *Rhizomucor* spp. Was reported With the introduction of topical disinfectants, serious infections have decreased significantly, suggesting that these complications can be successfully prevented by appropriate antiseptic measures(Richardson & Kerr, 2003).

2.5.2 Skin reaction induced by oral antidiabetics

Although of widespread use of antidiabetic drug, their side effects are very rare. Most common oral hypoglycemic drug which cause skin reaction are sulfonylurea derivatives such as glibenclamide, chlorpropamide, which responsible for non-specific reaction. Other commonly used oral antidiabetic drug is metformin which lead to psoriasiform drug eruption(Lima et al., 2017).

Acarbose also may lead to erythema multiform exudativum and generalized exanthematous pustulosis(Lima et al., 2017).

Dipeptidyl peptidase-4 inhibitor as sitagliptin has been associated with cases of Stevens-Johnson Syndrome(Duff et al., 2015)

Chapter 3 Methodology

3.1 Study Design

This study followed a descriptive cross-sectional observational study conducted over 5 months from,11 November 2023 to 11 February 2024.

3.2 Study Area/ location

This study was Carried out at the dermatological outpatient clinic of three of public civilian hospital (Al-Thawra general hosiptal, Al-Gumhouri teaching and general hospital , Al-Kuwait university hospital) in Sana'a city, Yemen.

3.3 Study duration

This study was conducted from,11 November 2023 to 11 February 2024

3.4 Study population

The target population of the study are diabetic patients of both types attending the dermatological outpatient clinic of three of public civilian hospital (Al-Thawra, Al-gumhouri, Al-Kuwait) in Sana'a city, Yemen.

3.5 Inclusion and Exclusion Criteria

3.5.1 Inclusions criteria

- Patients previous diagnosed as s/he had diabetic.
- Both type of diabetic (type 1 and type 2).
- Patients of both genders.
- Diabetic patient in dermatologic outpatient clinic.
- Patients above age of 1st decades.
- Patients willing to participate in the study. .

3.5.2 Exclusion criteria

- Non diabetic patient with skin manifestation due to other systemic illnesses.
- patient has diabetic ulcer or foot.
- patient has gestational diabetes.
- patient diagnosed as pre diabetics or not confirmed diabetic.
- patient under age of 1st decades.

3.6 Sampling technique

This study followed purposive nonprobability sampling method which selected diabetics patients from other cases attending dermatological outpatient clinics at hospital of study area.

3.7 Sample Size

Sample size in this study was eighty-seven 87 participants.

3.8 Study variables

Our study had different variables mentioned below.

Independent Variables:

- Age.
- Sex (male, female).
- Type of diabetic mellitus (type 1 DM / type 2 DM).
- Type of treatment (diet / oral hypoglycemic drug / insulin)
- Duration of disease.
- Level of HBA1c (<7 / 7-8 / >8)
- Duration of disease (<1 / 1-5 / 6-10/ >10) years
- Compliance to treatment (regular /irregular).

Dependent Variables:

- Infectious skin disease (bacterial, fungal, viral).
- Noninfectious skin disease.

3.9 Data Collection

Data collected using a specifically developed Arabic questionnaire, which developed by researchers, edited and accepted by supervisors of Dermatology department and community medicine department at 21 September university and other dermatologist at clinics of research conducted. This Arabic questionnaire was implemented by trained researchers able to explained some of obscure questions to patients and we used some picture to help participants in defined the different skin lesion with its name to increase them knowledge about different skin problems compliance not previously documented and as same as to help them in a conducting right answers when applying in questionnaire . The questionnaire has six part.

First section - Sociodemographic data: This part included data about (age, gender, educational level, resident and job).

Second section - Questions about diabetics. This part included questions about (type of diabetic, duration of disease, monitoring & type of drug used to treatment.

Third section - Questions about different skin manifestation associated to diabetic drug either injection or oral drug (as insulin site injection side effect, oral hypoglycemic).

Fourth section - Questions about different skin symptom lead to visit of dermatologist which subcategorized into (inflammatory symptoms and non-inflammatory symptoms).

Five section - Questions about monitoring skin disease in diabetic patients and its treatment with preventive method used by patients.

Six section - Picture about different skin manifestations in diabetic patients which arranged as inflammatory and non-inflammatory disease with diagnosed written by end of picture.

3.10 Data analysis

After data were collected, it was revised, coded, and fed to statistical software IBM SPSS version 29. Descriptive analysis based on frequency and percent distribution was done for all variables including participants' age, gender, type of diabetes, duration of diabetes and infectious

and non-infectious symptoms. Chi squared test and p-value less than 0.05 were used to examine the relation between skin manifestation and type of DM, duration of DM, management of DM and level of HBA1C.

Chapter 4 Results

4.1 Distribution of patient characteristics variable as sociodemographic, type of diabetic, duration of disease, type of treatment used and level of HBA1c.

This part of the results explains the descriptive analysis of patient characteristics variable include information about the number of patients involved in the study, the sex and age of them , type of DM they had , duration of the disease, ways used for treatment of DM, regularity in treatment and the level of Hb A 1C at last measurements.

The study was done on 87 diabetic patients with skin manifestations who attend the dermatological out-clinic.

According to the gender of the patients 56 (64.4%) of participants were male while 31 (35.6%) were female as appear in Figure 4.1.

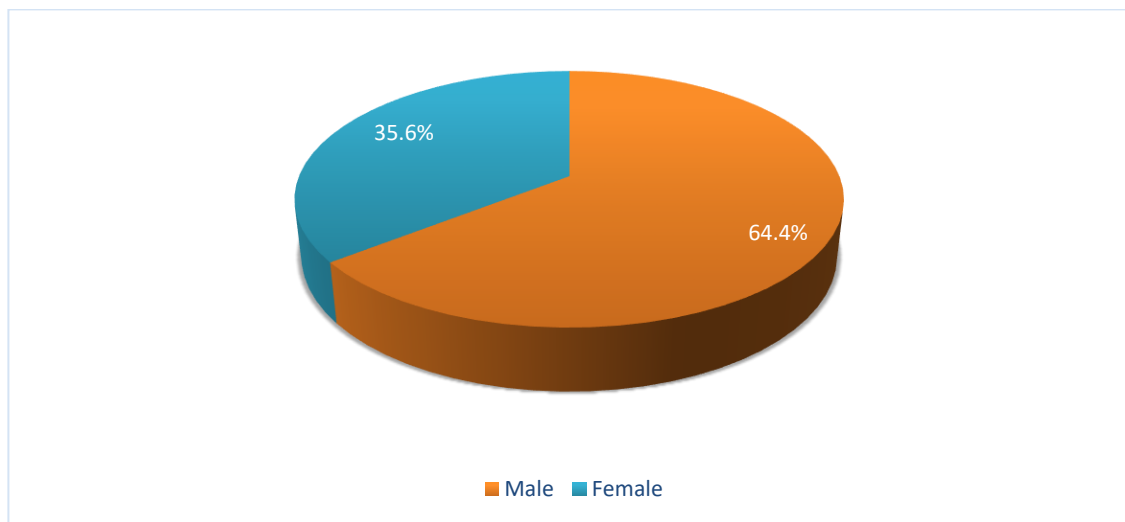


Figure 4.1 Distribution of the gender variable among diabetic patient with skin manifestation

Regarding the age, the participants were categorized into five group. Most of them were belong to the age > 50 years, representing 52(59.8%), then to the age between 41-50 years, 21(24.1%), followed by age 31-40 8(9.2%), 4(4.6%) age 21-30 years, the last one was the age between 10-20 years 2(2.3%). Figure 4.2

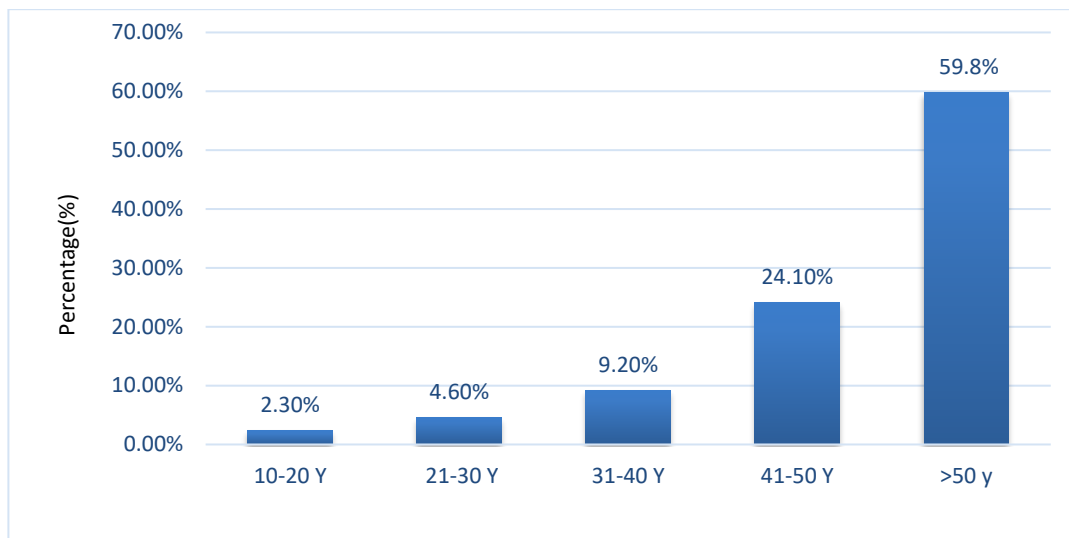


Figure 4.2 Distribution of age variable among diabetic patient with skin manifestations

Figure 4.3 detects that maximum number of patients were had type-2 DM 67(77%) and others had type-1 DM 20(23%).

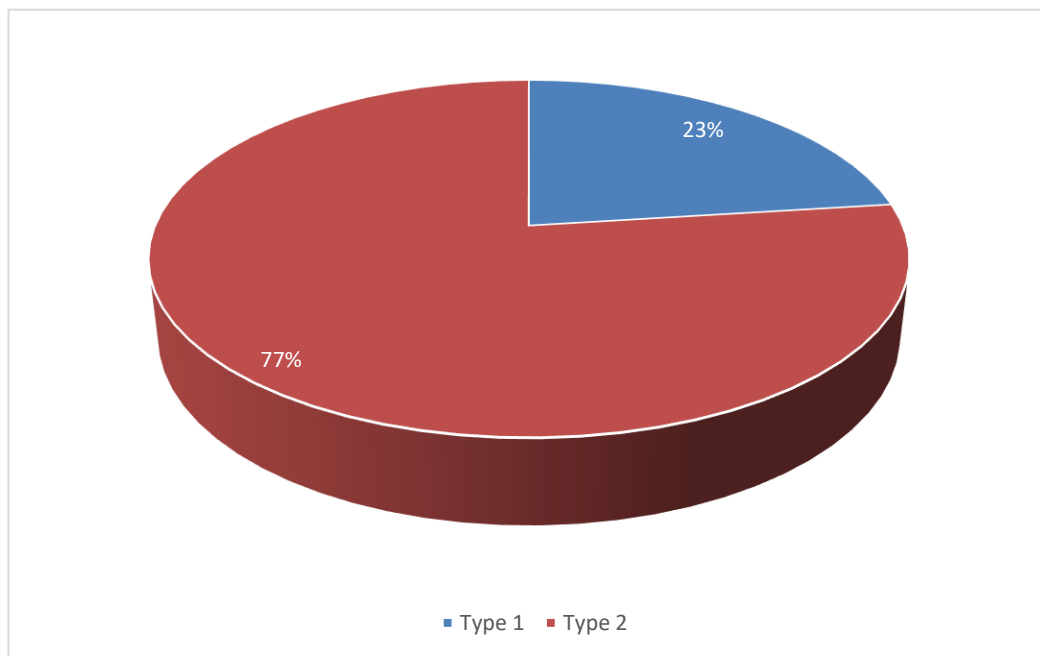


Figure 4.3 Distribution of the type of DM variable among diabetic patient with skin manifestations

Figure 4.4 Shows the distribution of the sample by their duration of the disease, the result representing the largest number of patients had duration of >10 years 33(37.9), followed by duration of 5-10 years 26(33.3%), duration of 1-5 years 16(18.4%), duration < 1 year 9(10.3%).

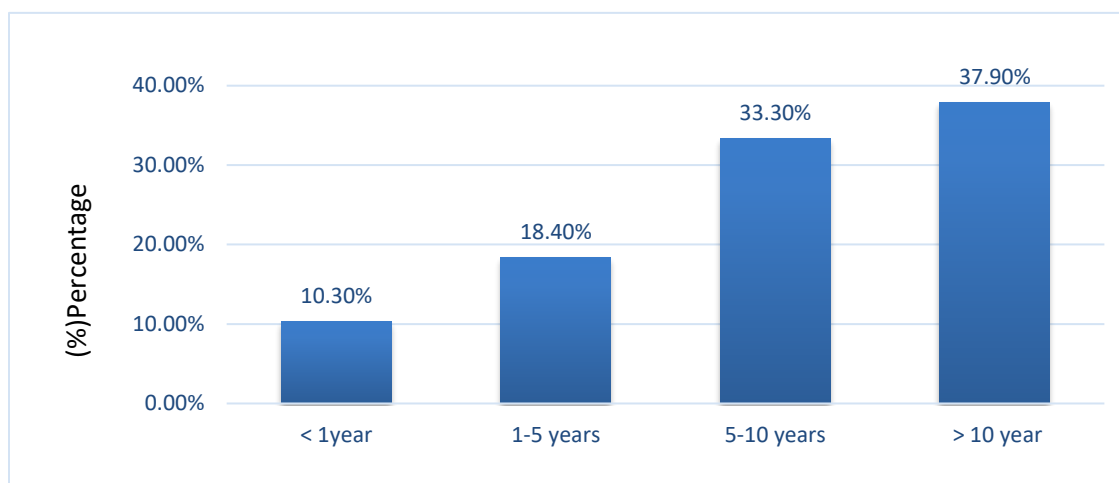


Figure 4.4 Distribution of the duration of DM variable among diabetic patient with skin manifestations

The study show that the treatment of DM was mostly by the use of oral hypoglycemic drugs 51(58.6), insulin injections 32(36.8%) and diet 4(4.6%). Figure4.5

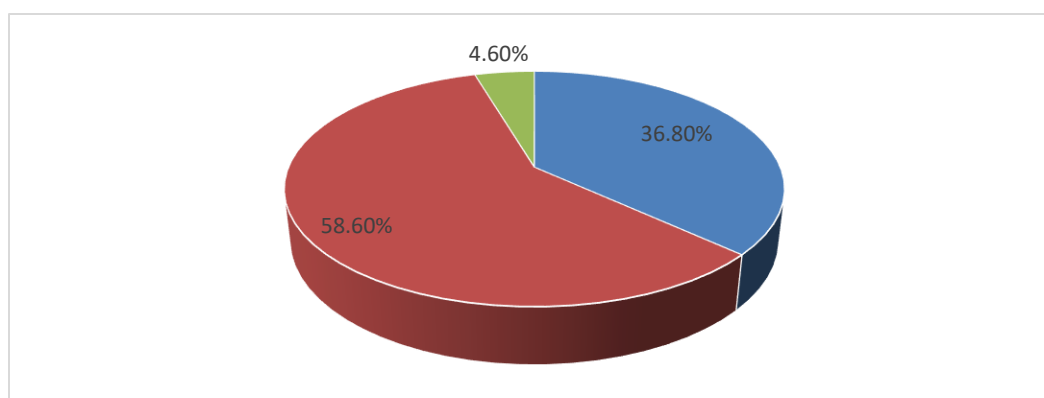


Figure 4.5 Distribution of the type of treatment variable among diabetic patient with skin manifestations

Figure 4.6 detects the distribution of compliance on treatment to hyperglycemia which show majority of them on regular treatment 65(74.7%) also show that which on irregular treatment was 22(25.3%).

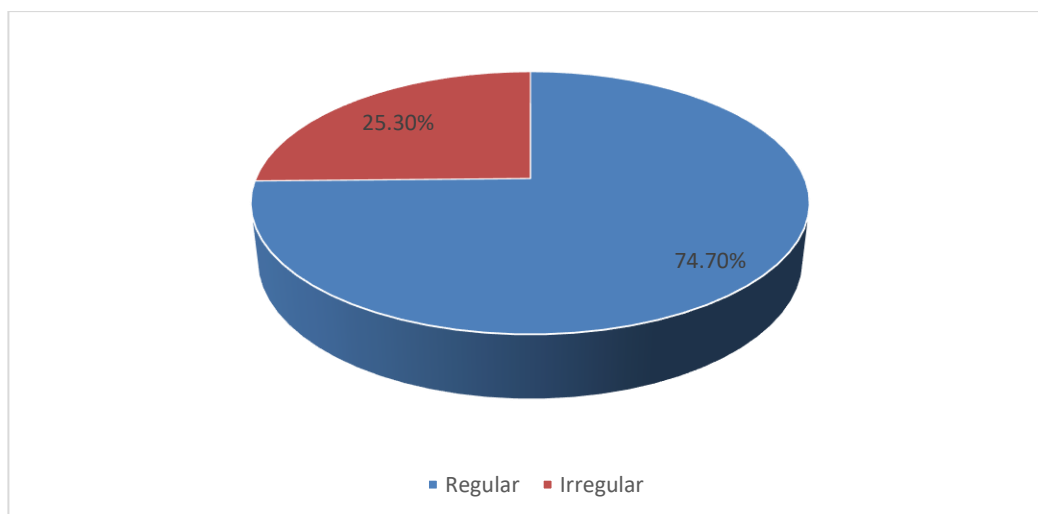


Figure 4.6 Distribution of the compliance on treatment among diabetic patient with skin manifestations

The study also show level of HBA1c on participate which found majority of patient with HBA1c level between 7-8 in 36(41.4%) , more than 8 was 27(31%), this study also show number of patient neglected his monitoring which found in 18(20%) and last one was patient 6 (6.9%) his level less than 7. Figure 4.7

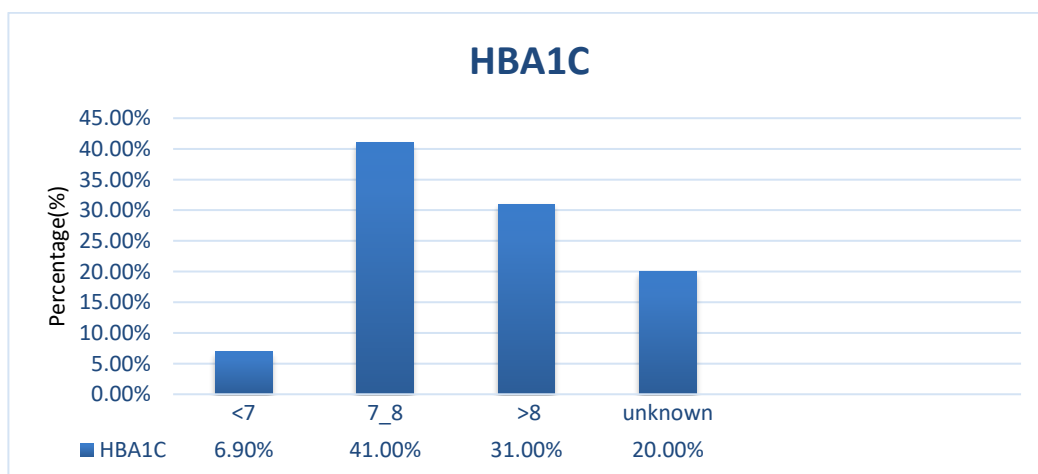


Figure 4.7 Distribution of the level of HBA1C diabetic patient with skin manifestations

4.2 Distribution and percentage of different skin manifestations on diabetic patients attending dermatological outpatient clinics of public hospitals, Sana'a city, Yemen.

Table 4.1 show the frequency and percentage of infectious skin problems in diabetic patients, we notice from the table that the most infectious skin manifestation in diabetic patient was fungal infections, it appears in 43(49.4%) of 87 study patients followed by bacterial infections, which found in 32(36.8%) of the patients, the least one was the viral skin infection 31(35.6%).

Regarding the site of the fungal infections the most common site was the foot 18(20.7%), multiple site 12(13.7), hair 7(8.0%), face 4(4.6%), genitalia 2(2.3%).

The study detects that the cellulitis was the common bacterial infections in diabetic patients, which found in 16(18.4%) of 87 patients, followed by furuncles by 11(12.6%), the last was skin abscess 5(6.8%).

The study detects that the warts 19(21.8%) was more common than Zoster 12(13.8) in viral infections.

Table 4.1 Distribution and percentage has infectious skin disorder in diabetic patient

Variables/Factors	Categories	Yes		No	
		N	%	N	%
Fungal	Fungal in hair	7	8.0	80	92.0
	Fungal in face	4	4.6	83	95.4
	Fungal in foot	18	20.7	69	79.3
	Fungal in genitalia	2	2.3	85	97.7
	Multiple site	12	13.7	75	86.3
	Total	43	49.4	44	50.6
Bacterial	Furuncle	11	12.6	76	87.4
	Cellulitis	16	18.4	71	81.6
	Abscess	5	6,8	69	93,2
	Total	28	32.2	59	67.8
Virus	Warts	19	21.8	68	78,2
	Zoster	12	13,8	75	86,2
	Total	24	27.6	67	72.4

Table 4.2 show the frequency and percentage of non-infectious skin problems in diabetic patients, we notice from the table that the most common non-infectious problems is dry skin 50(57.5%) followed by pruritus 36(41.4 %) acrochordons 26(29.9%), acanthosis nigricans 19(21.8%), vitiligo 16(18.4%), necrobiosis lipoidica 13(14%) and bullosis diabeticorum 3(3.5%).

Table 4 2 Distribution and percentage of non-infectious skin manifestation in different cases.

Variables/Factors	Categories	N	%
Necrobiosis lipoidica	Yes	13	14,9
	No	74	85,1
Vitiligo	Yes	16	18.4
	No	71	81.6
Bullosis Diabeticorum	Yes	3	3.5
	No	84	96.5
Periungual telangiectasia	Yes	0	0
	No	87	100
Acrochordons	Yes	26	29.9
	No	61	70.1
Acanthosis Nigricans	Yes	19	21.8
	No	68	78.2
Pruritus	Yes	36	41.4
	No	51	58,6
Dry skin	Yes	50	57,5
	No	37	42.5
Granuloma annulare	Yes	0	0
	No	87	100
Diabetic erythema (Rubeosis faciei)	Yes	0	0
	No	87	100

Table 4.3 show the frequency and percentage of treatments related skin problems in diabetic patients, we noticed from the table that the most common problems among 32 patients whose treated by insulin injections is lipoatrophy 10(31.5%) followed by bleeding at site of injections 8(25%) and lipohypertrophy 1(3.1%). while who has no skin problems 13(40.6%).

The table show that among 51 patients whose use oral hypoglycemic drugs 12(23.5%) had a pruritus, 5(9.9%) had photosensitivity reaction 1(2%) had hypersensitivity reaction. While 34 (66.6%) had no manifestations

Table 4 3 Distribution and percentage of treatments related skin manifestation in different cases.

Variables/Factors	Categories	Yes		No	
		N	%	N	%
Insulin injections	Bleeding	8	25	24	75
	Lipoatrophy	10	31.5	22	68.5
	Lipohypertrophy	1	3.1	31	96.9
	Allergy	0	0	32	100
	None	13	40.6	19	59.4
Oral hypoglycemic drugs	Photosensitivity reaction	5	9.9	46	90.1
	Hypersensitivity reaction	1	2	50	98.0
	Pruritus	12	23.5	39	76.4
	None	34	66.6	17	33.3

4.3 Association between type of the DM and different skin manifestation appear in diabetic patients attending the Dermatological outpatient Clinics of Public Hospitals in Sana'a City, Yemen by determine the P-value

The association between type of the DM (type 1 DM and type 2 DM) and different skin manifestation appear in diabetic patients appear in table 4.4.

Table 4. 4 Association between type of the DM and different skin manifestation appear in diabetic patients attendin the Dermatological outpatient Clinics of Public Hospitals in Sana'a City, Yemen by P-Value

Variables/Factors	Categories	Yes		No		Total		P-Value
		N	%	N	%	N	%	
Fungal infection	DM type 1	7	35	13	65	20	100	0.141
	DM type 2	36	53,7	31	46,3	67	100	
Bacterial infection	DM type 1	6	30	14	70	20	100	0.812
	DM type 2	22	32.8	45	67.2	67	100	
Viral infection	DM type 1	6	30	14	70	20	100	0.783
	DM type 2	18	26.9	49	73.1	67	100	
Necrobiosis lipiodica	DM type 1	3	15	17	85	20	100	0.927
	DM type 2	10	14.9	57	85.1	67	100	
Vitiligo	DM type 1	2	10	18	90	20	100	0.271
	DM type 2	14	20.9	53	79.1	67	100	
Bullosis Diabeticorum	DM type 1	2	10	18	90	20	100	0.436
	DM type 2	1	1.5	66	98.5	67	100	
Periungual telangiectasia	DM type 1	0	0	20	100	20	100	-
	DM type 2	0	0	67	100	67	100	
Acrochordons	DM type 1	7	35	13	65	20	100	0.569
	DM type 2	19	28.4	48	71.6	67	100	
Acanthosis Nigricans	DM type 1	5	25	15	75	20	100	0.697
	DM type 2	14	20.9	53	79.1	67	100	
Pruritus	DM type 1	9	45	11	55	20	100	0.708
	DM type 2	27	40.3	40	59.7	67	100	
Dry skin	DM type 1	11	55	9	45	20	100	0.799
	DM type 2	39	58.2	28	41.8	67	100	
Granuloma annulare	DM type 1	0	0	20	100	20	100	-
	DM type 2	0	0	67	100	67	100	
Diabetic erythema (Rubeosis faciei)	DM type 1	0	0	20	100	20	100	-
	DM type 2	0	0	67	100	67	100	

*P-value < 0.05 is statistically significant

The study is done in 87 diabetic patients, 20 of them had type 1 DM and 67 had type 2 DM.

Regarding to the fungal infections, among patients has type 1 DM 7(35%) answered "yes," to has fungal infection, while 13(65%) answered "no". Among patients has type 2 DM 36(53.7%) answered "yes," 31(46,3%) answered "no" (p-value 0.141). The p-value suggests that the association between type of DM and fungal infections is not statistically significant at a conventional significance level. This means that the observed differences in the percentages of "yes" and "no" responses could be due to chance and do not provide strong evidence of an association between type of DM and fungal infections based on type of DM.

Regarding to the bacterial infections, among patients has type 1 DM 6(30%) answered "yes," to has bacterial infection, while 14(70%) answered "no". Among patients has type 2 DM 22(32.8%) answered "yes," 45(67,8%) answered "no" (p-value 0,812). The p-value suggests that the association between type of DM and bacterial infections is not statistically significant at a conventional significance level. This means that the observed differences in the percentages of "yes" and "no" responses could be due to chance and do not provide strong evidence of an association between type of DM and bacterial infections based on type of DM.

Viral skin infections among the 20 patients with type 1 diabetes mellitus, 6 patients have viral infections (30%), while 14 patients deny any infections (70%). The 67 patients with diabetes mellitus type 2, 18 patients reported a viral infection, while 49 patients deny any infections (73.1%). The p-value = 0.783, suggests that the association between type of diabetes and viral infections is not statistically significant at a conventional significance level.

Necrobiosis lipiodica among the 20 patients with type 1 diabetes mellitus, 3 have necrobiosis lipiodica (15%), while the rest 17 patients deny any (85%). In the group with diabetes mellitus type 2 (67 patients), 10 reported necrobiosis lipiodica and 57 did not. The p-value = 0.927, suggests that the association between type of diabetes and necrobiosis lipiodica is not statistically significant at a conventional significance level.

Vitiligo out of the 20 patients with type 1 diabetes mellitus, only 2 patients reported a vitiligo, while 18 patients did not (90%). Moving on to the 67 patients with type 2 diabetes mellitus, 14 patients reported vitiligo, while others have no vitiligo. The p-value = 0.271, suggests that the association between type of diabetes and vitiligo is not statistically significant at a conventional significance level.

Bullosis diabeticorum for the 20 patients with type 1 diabetes mellitus, only 2 patients reported bullosis diabeticorum (10%), while 18 did not (90%). Among the 67 patients with diabetes mellitus type 2, only one of them reported history of bullosis diabeticorum, while the rest 66 patients deny any (98.5%). The p-value of 0.436 indicates that the association between type of diabetes, and bullosis diabeticorum is not statistically significant conventional significance level.

Acrochordons among the 20 patients with type 1 diabetes mellitus, 7 have acrochordons (35%), while the rest 13 patients deny any (65%). In the group with diabetes mellitus type 2 (67 patients), 19 reported acrochordons (28.4%) and 48 did not. The p-value = 0.569, suggests that the association between type of diabetes and acrochordons is not significant at a conventional significance level.

Acanthosis nigricans out of the 20 patients with type 1 diabetes mellitus, 5 patients reported an acanthosis nigricans, while 15 patients did not (75%). Moving on to the 67 patients with diabetes mellitus type 2, 14 patients reported acanthosis nigricans (20.9%), while others have no acanthosis nigricans. The p-value = 0.697, suggests that the association between type of diabetes and acanthosis nigricans is not significant at a conventional significance level.

Pruritus for the 20 patients with type 1 diabetes mellitus, 9 reported pruritus (45%), while 11 did not (55%). Among the 67 patients with diabetes mellitus type 2, 27 reported pruritus and 40 did not. The p-value of 0.708 indicates that the association between type of diabetes, and pruritus is not significant.

Dry skin among the 20 patients with type 1 diabetes mellitus, 11 have dry skin (55%), while the rest 9 patients deny any history of dry skin (45%). In the group with diabetes mellitus type 2 (67 patients), 39 reported dry skin (58.2%) and 28 did not (41.8%) The p-value = 0.799,

suggests that the association between type of diabetes and Dry skin is not significant at a conventional significance level.

4.4 Association between the regularity in treatment of the DM and different skin manifestation appear in diabetic patients attending the Dermatological outpatient Clinics of Public Hospitals in Sana'a City, Yemen by determine the P-value

The association between the regularity in treatment of the DM and different skin manifestation appear in diabetic patients appear in table 4.5

Table 4.5 Association between the management of the DM and different skin manifestation appear in diabetic patients attending the Dermatological outpatient Clinics of Public Hospitals in Sana'a City, Yemen by P-Value

Variables/Factors	Categories	Yes		No		P-Value
		N	%	N	%	
Fungal infection	Regular treatment	33	50.8	32	49.2	0.666
	Irregular treatment	10	45.5	12	54.5	
Bacterial infection	Regular treatment	20	30.8	45	69.2	0.627
	Irregular treatment	8	36.4	14	63.6	
Viral infection	Regular treatment	16	24.6	75.4	69.3	0.287
	Irregular treatment	8	36.4	63.6	50	
Necrobiosis lipiodica	Regular treatment	9	13.8	56	86.2	0.622
	Irregular treatment	4	18.2	18	81.8	
Vitiligo	Regular treatment	10	15.4	55	84.6	0.213
	Irregular treatment	6	27.3	16	72.7	
Bullosis Diabeticorum	Regular treatment	3	4.6	62	95.4	0.301
	Irregular treatment	0	0	22	100	
Periungual telangiectasia	Regular treatment	0	0	65	100	-
	Irregular treatment	0	0	22	100	
Acrochordons	Regular treatment	16	24.6	49	75.4	0.065
	Irregular treatment	10	45.5	12	54.5	
Acanthosis Nigricans	Regular treatment	13	20	52	80	0.475
	Irregular treatment	6	27.3	16	72.7	
Pruritus	Regular treatment	26	40	39	60	0.653
	Irregular treatment	10	45.5	12	54.5	
Dry skin	Regular treatment	33	50.8	32	49.2	0.030
	Irregular treatment	17	77.3	5	28.7	
Granuloma annulare	Regular treatment	0	0	65	100	-
	Regular treatment	0	0	22	100	

Diabetic erythema (Rubeosis faciei)	Regular treatment	0	0	65	100	-
	Irregular treatment	0	0	22	100	

*P-value < 0.05 is statistically significant

As appear in table above infectious case, Among the patients with Regular and Irregular treatment, the distribution of fungal, bacterial, and viral infections varied. Only virus infections show strong association with Irregular treatment of diabetes mellitus, while bacterial and fungal Infections, shows that association with regularity of treatment is not statistically significant.

Among the 65 patients with regular treatment, 33 have fungal infections (50.8%), while the rest 32 patients deny any infections (49.2%). In the group with an irregular treatment (22 patients), 10 reported fungal infections and 12 did not. The p-value = 0.666, suggests that the association between irregular treatment and fungal infections is not statistically significant at a conventional significance level.

Bacterial infection out of the 65 patients with regular treatment, 20 patients reported a bacterial infection, while 45 patients deny any infections (69.2%). Moving on to the 22 patients with an irregular treatment, 8 patients reported bacterial infections, while others having no infection. The p-value = 0.627, suggests that the association between irregular treatment and Bacterial infections is not statistically significant at a conventional significance level.

For the 65 patients with Regular treatment, 16 reported virus infections (24.6%), while 49 deny any infections (75.4%). Among the 22 patients with an irregular treatment, 8 reported virus infections and 14 did not. The p-value of 0.287 indicates that the association between irregular treatment, and virus skin infections is not statistically significant at a conventional significance level.

Necrobiosis lipiodica among the 65 patients with regular treatment, 9 have necrobiosis lipiodica (13.8%), while the rest 56 patients deny any (86.2%). In the group with an irregular treatment (22 patients), 4 reported necrobiosis lipiodica and 18 did not. The p-value = 0.622, suggests that the association between regular treatment and necrobiosis lipiodica is not statistically significant at a conventional significance level.

Vitiligo out of the 65 patients with Regular treatment, 10 patients reported a vitiligo, while 55 patients did not (84.6%). Moving on to the 22 patients with an irregular treatment, 6 patients reported vitiligo, while others have no vitiligo. The p-value = 0.213, suggests that the association between irregular treatment and vitiligo is not statistically significant at a conventional significance level.

Bullosis diabeticorum for the 65 patients with regular treatment, 3 reported bullosis diabeticorum (4.6%), while 62 did not (95.4%). Among the 22 patients with an irregular treatment, none of them reported history of bullosis diabeticorum the p-value of 0.301 indicates that the association between irregular treatment and bullosis diabeticorum is not statistically significant.

Acrochordons among the 65 patients with regular treatment, 16 have acrochordons (24.6%), while the rest 49 patients deny any (75.4%). In the group with an irregular treatment (22 patients), 10 reported acrochordons and 12 did not. The p-value = 0.65, suggests that the association between irregular treatment and acrochordons is not statistically significant at a conventional significance level.

Acanthosis nigricans Out of the 65 patients with regular treatment, 10 patients reported an acanthosis nigricans, while 55 patients did not (84.6%). Moving on to the 22 patients with an irregular treatment, 6 patients reported acanthosis nigricans, while others have no acanthosis nigricans. The p-value = 0.475, suggests that the association between irregular treatment and acanthosis nigricans not statistically significant at a conventional significance level.

Pruritus for the 65 patients with regular treatment, 26 reported pruritus (40%), while 39 did not (60%). Among the 22 patients with an irregular treatment, 10 reported pruritus and 12 did not. The p-value of 0.653 indicates that the association between irregular treatment, and pruritus not statistically significant.

Dry skin among the 65 patients with regular treatment, 33 have dry skin (50.8%), while the rest 32 patients deny any history of dry skin (49.2%). In the group with an irregular treatment (22 patients), 17 reported dry skin (77.3%) and 5 did not (22.7%) The p-value = 0.030, suggests that the association between irregular treatment and dry skin is statistically significant at a conventional significance level.

4.5 Association between the duration of the DM and different skin manifestation appear in diabetic patients attending the Dermatological outpatient Clinics of Public Hospitals in Sana'a City, Yemen by determine the P-value

The association between duration of the DM and different skin manifestation appear in diabetic patients appear in table 4.6.

Table 4 6 Association between the duration of DM and different skin manifestation appear in diabetic patients attending the Dermatological outpatient Clinics of Public Hospitals in Sana'a City, Yemen by P-Value

Variables/Factors	Duration of DM	Yes		No		P-Value
		N	%	N	%	
Fungal infection	<1 Y	2	22.2	7	77.8	0.283
	1-5 Y	7	43.8	9	56.2	
	6-10	15	51.7	14	48.3	
	>10	19	57.6	14	42.4	
Bacterial infection	<1 Y	5	55.6	4	44.4	0.350
	1-5 Y	5	31.3	11	68.7	
	6-10	10	34.5	19	65.5	
	>10	8	24.2	25	75.8	
Viral infection	<1 Y	1	11.1	8	88.9	0.159
	1-5 Y	5	31.3	11	68.7	
	6-10	5	17.2	24	82.8	
	>10	13	39.4	20	60.6	
Necrobiosis lipiodica	<1 Y	2	22.2	7	77.8	0.512
	1-5 Y	1	6.3	15	93.8	
	6-10	6	20.7	23	79.3	
	>10	4	12.1	29	87.9	
Vitiligo	<1 Y	0	0	9	100	0.112
	1-5 Y	3	18.8	13	81.2	
	6-10	9	31	20	69	
	>10	4	12.1	29	87.9	
Bullosis Diabeticorum	<1 Y	0	0	9	100	0.303
	1-5 Y	0	0	16	100	
	6-10	2	6.9	27	93.1	
	>10	1	3	32	97	
Periungual telangiectasia	<1 Y	0	0	9	100	-
	1-5 Y	0	0	16	100	
	6-10	0	0	29	100	
	>10	0	0	33	100	
Acrochordons	<1 Y	1	11.1	8	88.9	0.186
	1-5 Y	7	43.8	9	56.2	

	6-10	6	20.7	23	79.3	
	>10	12	36.4	21	63.6	
Acanthosis Nigricans	<1 Y	2	22.2	7	77.8	0.912
	1-5 Y	3	18.8	13	81.3	
	6-10	6	20.7	23	79.3	
	>10	8	24.2	25	75.8	
Pruritus	<1 Y	3	33.3	6	66.7	0.828
	1-5 Y	8	50	8	50	
	6-10	11	37.9	18	62.1	
	>10	14	42.4	19	57.6	
Dry skin	<1 Y	3	33.3	6	66.7	0.363
	1-5 Y	10	62.5	6	37.5	
	6-10	19	65.5	10	34.5	
	>10	18	54.5	15	45.5	
Granuloma annulare	<1 Y	0	0	9	100	-
	1-5 Y	0	0	16	100	
	6-10	0	0	29	100	
	>10	0	0	33	100	
Diabetic erythema (Rubeosis faciei)	<1 Y	0	0	9	100	-
	1-5 Y	0	0	16	100	
	6-10	0	0	29	100	
	>10	0	0	33	100	

*P-value < 0.05 is statistically significant

Regarding to fungal infection which varied widely according to duration of disease, among patients has disease for duration more than 10years 19(57.6%) has fungal infection of this category, while number of cases decrease if duration of disease decrease, patients with disease duration between 6-10years which has fungal infections 15(51.7%), patients with duration less than 1years only 2(22.2%) patients has fungal infection. The p-value (0.28%) show significant relation between duration of diabetic mellitus with fungal skin infection. This prove that there is no statistically significant association between duration of disease with prevalence of fungal skin infection.

Among 28 patients with cutaneous bacterial infections in our study, 5 out of 9 cases has DM for less than 1years has bacterial infection, while 5 out of 16 cases has DM for 1-5years, number of bacterial skin infection in patients who had DM for more than 10 years was 8 of out 33 cases has bacterial infections. P-value (0.3) which appear statistically non-significant. This also explain association of duration of DM with bacterial skin infection.

Regarding viral skin infection, our study show patients who has DM for less than 1 years 1(11.1%) of case answered yes while 8(88.9%) of cases answered no, in patients has DM for 1-5years number of cases answered yes 5(31.3%) out of 16cases, 5(17.2%) out of 29 cases has viral skin infection, in patients who had DM for more than 10 years 13(39.4%) of cases has viral skin infections. P-value 0.15 this show statistically significant at a conventional significance level. This means that there is no statistically significant statistically significant association between duration of DM and viral infections.

For non-infectious skin conditions appear in skin of DM patients, patients with necrobiosis lipiodica found in patients who has DM for less than 1 year 2(22.2%) out of 9 cases , for duration 1-5 years 1(6.3%) out of 16 cases , for duration 6-10 years 6(20.7%) out of 29cases and for duration more than 10 years 4(12.1%) out of 33 cases, with(p- value 0.5). The p-value suggests that the association between duration of DM and Necrobiosis lipiodica is not statistically significant at a conventional significance level. This show weak relation between duration of DM and necrobiosis lipiodica need some another study to show this relation.

Regarding to acanthosis nigricans presented in patients with DM for less than 1 years 2(22.2%) of this group of patients, 1-5years 3 cases of this group (18.8%), in patients had DM for 6-10 years 6(20.7%) while 23(79.3%) cases of this group did not has acanthosis nigricans and in patients who has DM for more than 10 years 8(24.2%) out of 33 cases in this group affected (p-value 0.91). The p-value suggests that the association between duration of DM and acanthosis nigricans is not statistically significant at a conventional significance level. This means that the observed differences in the percentages of "yes" and "no" responses in different group could be due to chance and do not provide strong evidence of an association between duration of DM and acanthosis nigricans.

Regarding to acrochordons presented in DM patients with DM for less than 1 years 1(11.1%) of this group, 7(43.8%) out of 16 cases had DM for 1-5years, from 29 cases which had DM for 6-10 years only 6(20.7%) has acrochordons while 23(79.3%) did not and only 12(36.4%) cases had acrochordons out of 33 cases with DM for more than 10 years (P-value 0,1). The p-value suggests that the association between duration of DM and acrochordons is statistically significant at a conventional significance level. This means that there is no statistically significant association between duration of DM and acrochordons. The p-value

indicates that the observed differences in the percentages of "yes" and "no" responses across different duration of DM are unlikely to be due to chance alone.

Vitiligo shows strong association with increase of the duration of DM which is statistically significant. As the patients with duration less than 1year, Non-reported vitiligo, 3(18.8%) patients with duration between 1-5years having vitiligo. While the 9(31%) out of 29cases with DM for 6-10years has vitiligo. Patients with DM for more than 10 years, 4(12.1%) of them having vitiligo. The p-value = 0.11, suggests no statistically significant association between durations of DM and Vitiligo is statistically significant at a conventional significance.

Regarding to bullosis diabeticorum, in patients with DM less than 1 year and for 1-5years no reported cases. In our study reported 2(6.9%) out of 29 cases with DM for 6-10years has bullosis diabeticorum and 1(3%) case in patient with DM for more than 10 years. P-value 0.3 this show there is not statistically significant value.

Dry skin appear in skin of diabetic patients in different group according to duration of DM, 3(33.3%) out of 9 cases with DM for less than 1 year affected by dry skin, 10 cases with duration of DM for 1-5years, while patients with DM for 6-10years 19(65.5%) cases has dry skin and 18 out of 33cases with DM for more than 10 years has dry skin. The P-value 0.36. there is not statistically significant value.

Regarding to pruritus in patient with DM for less than 1years 3(33.3%) out of 9 cases has pruritus, 8 cases has pruritus in patients group with DM for 1-5years, 11 out of 29 cases with DM for 6-10 years while remainder did not has pruritus, in patients with DM for more than 10 years 14(42.4%)cases has pruritus (P-value 0.82). The p-value suggests that the association between duration of DM and pruritus is not statistically significant at a conventional significance level. This means that the observed differences in the percentages of "yes" and "no" responses could be due to chance and do not provide strong evidence of an association between duration of DM and pruritus based on duration of DM.

4.6 Association between the HbA1C levels and different skin manifestation appear in diabetics patient attending the Dermatological outpatient Clinics of Public Hospitals in Sana'a City, Yemen By Chi Square Test

The association between the HbA1C levels and different skin manifestation appear in diabetic patients appear in table 4.7.

Table 4.7 Association between the level of HbA1C and different skin manifestation appear in diabetic patients attending the Dermatological outpatient Clinics of Public Hospitals in Sana'a City, Yemen by P-Value

Variables/Factors	Level of Hb A 1C	Yes		No		P-Value
		N	%	N	%	
Fungal infection	< 7	0	0	6	100	0.021
	7-8	15	41.7	21	58.3	
	>8	17	63	10	37	
	Unknown	11	61.1	7	38.9	
Bacterial infection	< 7	1	16.7	5	83.3	0.799
	7-8	11	30.6	25	69.7	
	>8	10	37.0	17	63.0	
	Unknown	6	33.3	12	66.7	
Viral infection	< 7	2	33.3	4	66.7	0.655
	7-8	10	27.8	26	72.2	
	>8	9	33.3	18	66.7	
	Unknown	3	16.7	15	83.3	
Necrobiosis lipiodica	< 7	0	0	6	100	0.149
	7-8	9	25	27	75	
	>8	2	7.4	25	92.6	
	Unknown	2	11.1	16	88.9	
Vitiligo	< 7	0	0	6	100	0.628
	7-8	8	22.2	28	77.8	
	>8	5	18.5	22	81.5	
	Unknown	3	16.7	15	83.3	
Bullosis Diabeticorum	< 7	0	0	6	100	0.356
	7-8	1	2.77	35	97.3	
	>8	2	7.4	25	92.6	
	Unknown	0	0	18	100	
Periungual telangiectasia	< 7	0	0	6	100	-
	7-8	0	0	36	100	
	>8	0	0	27	100	
	Unknown	0	0	18	100	
Acrochordons	< 7	2	33.3	4	66.7	0.595

	7-8	12	33.3	24	66.7	
	>8	9	33.3	18	66.7	
	Unknown	3	16.7	15	83.3	
Acanthosis Nigricans	< 7	1	16.7	5	83.3	0.923
	7-8	9	25	27	75	
	>8	5	18.5	22	81.5	
	Unknown	4	22.2	14	77.8	
Pruritus	< 7	1	16.7	5	83.3	0.227
	7-8	17	47.2	19	52.8	
	>8	13	48.1	14	51.9	
	Unknown	5	27.8	13	72.2	
Dry skin	< 7	3	50	3	50	0.499
	7-8	24	66.7	12	33.3	
	>8	13	48.1	14	51.9	
	Unknown	10	55.6	8	44.4	
Granuloma annulare	< 7	0	0	6	100	-
	7-8	0	0	36	100	
	>8	0	0	27	100	
	Unknown	0	0	18	100	
Diabetic erythema (Rubeosis faciei)	< 7	0	0	6	100	-
	7-8	0	0	36	100	
	>8	0	0	27	100	
	Unknown	0	0	18	100	

*P-value < 0.05 is statistically significant

Infectious case, Among the patients with different HbA1c levels, the distribution of fungal, bacterial, and viral infections varied. Only fungal infections show strong association with increasing in HbA1c levels, while bacterial and viral Infections, shows that association with high HbA1c levels is not statistically significant.

Among the 6 patients with HbA1c levels below 7, none reported fungal infections. For the 36 patients with HbA1c levels between 7-8, 15 have fungal infections (41.7%) while 21 deny any infections (58.3%). In the group with HbA1c levels above 8 (27 patients), 17 reported fungal infections and 10 did not. Among the 18 patients with unknown HbA1c levels, 11 reported fungal infections and 7 did not. The p-value suggests that the association between HbA1c levels and fungal infections is statistically significant at a conventional significance level (p-value = 0.021).

Bacterial skin infection Out of the 6 patients with HbA1c levels below 7, one reported a bacterial infection. In the group of 36 patients with HbA1c levels between 7-8, 11 patients had bacterial infections, accounting for 30.6% of the group. Moving on to the 27 patients with HbA1c levels above 8, 10 patients reported bacterial infections. For the 18 patients with unknown HbA1c levels, 6 reported bacterial infections. The p-value of 0.799 indicates that the association between HbA1c levels and bacterial infections is not statistically significant.

Virus skin infections Among the 6 patients with HbA1c levels below 7, 2 patients reported virus infections, while others having no infection. For the 36 patients with HbA1c levels between 7-8, 10 have viral infections (27.8%) while 26 deny any infections (72.2%). In the group with HbA1c levels above 8 (27 patients), 9 reported virus infections and 18 did not. Among the 18 patients with unknown HbA1c levels, 3 reported virus infections and 15 did not. The p-value = 0.655, suggests that the association between HbA1c levels and virus infections is not statistically significant at a conventional significance.

Necrobiosis lipiodica, shows strong association with high HbA1c levels as the 6 patients with HbA1c levels below 7, none reported Necrobiosis lipiodica, while the 36 patients with HbA1c levels between 7-8, 9 have Necrobiosis lipiodica (25%). In the group with HbA1c levels above 8 (27 patients), only 2 reported Necrobiosis lipiodica and 25 did not. And only 2 patients of 18 patients with unknown HbA1c levels, report history of Necrobiosis lipiodica P-value = 0.149, suggests that association between high HbA1c levels & Necrobiosis lipiodica is not statistically significant at a conventional significance.

Vitiligo shows that the association with high HbA1c levels is not statistically significant. As only 8 out of 36 patients with HbA1c levels between 7-8, 5 patients with HbA1c levels above 8 having vitiligo. While the 6 patients with HbA1c levels below 7, none of them having vitiligo, and Among the 18 patients with unknown HbA1c levels, 3 reported history of vitiligo and 15 did not. The p-value = 0.628, suggests that the association between HbA1c levels and vitiligo is not statistically significant at a conventional significance.

Bullosis Diabeticorum shows that the association with high HbA1c levels is statistically significant. As only one patient of 36 patients with HbA1c levels between 7-8, 2 patients with HbA1c levels above 8, having history of Bullosis Diabeticorum. While the 6 patients with

HbA1c levels below 7, none of them having Bullosis Diabeticorum, and Among the 18 patients with unknown HbA1c levels, on one reported history of Bullosis Diabeticorum. The p-value = 0.356, suggests that the association between HbA1c levels and Bullosis Diabeticorum is statistically non-significant at a conventional significance.

Periungual telangiectasia, show no association with different HbA1c levels, as no cases were reported by any of the 87 diabetic patients in this study.

Acrochordons Among the 6 patients with HbA1c levels below 7, 2 patients reported acrochordons, and in the group of 36 patients with HbA1c levels between 7-8, 12 patients had acrochordons, accounting for 33.3% of the group. Moving on to the 27 patients with HbA1c levels above 8, 9 patients reported acrochordons. While 18 patients did not. the 18 patients with unknown HbA1c levels, only 3 reported history of acrochordons and 15 did not. The p-value of 0.595, indicates that un association between high HbA1c levels and acrochordons is statistically non-significant at a conventional significance.

Acanthosis nigricans shows that the association with high HbA1c levels is not statistically significant. Out of the 6 patients with HbA1c levels below 7, only one reported history of acanthosis nigricans. and 9 patients of 36 patients with HbA1c levels between 7-8, & 5 patients with HbA1c levels above 8 having acanthosis nigricans, and among the 18 patients with unknown HbA1c levels, 4 reported history of acanthosis nigricans and 14 did not. The p-value = 0.923, suggests that the association between HbA1c levels and acanthosis nigricans is not statistically significant at a conventional significance.

Pruritus Out of the 6 patients with HbA1c levels below 7, only one reported history of pruritus, while others deny any. Among the 36 patients with HbA1c levels between 7-8, 17 patients have Pruritus (47.2%), while the rest having no symptoms (52.8%). In the group of 27 patients with HbA1c levels above 8, 13 patients had pruritus, accounting for 48.1% of the group. Moving on to the 18 patients with unknown HbA1c levels, 5 patients reported pruritus. While 13 patients did not. Pruritus shows strong association with high HbA1c levels as the p-value = 0.227, which suggests that the association between HbA1c levels and Pruritus is statistically non-significant at a conventional significance.

Dry skin regarding to HbA1c Level, dry skin, shows weak association with high HbA1c levels as among the 6 patients with HbA1c levels below 7, 3 patients reported history of dry skin, while 3 did not. For the 36 patients with HbA1c levels between 7-8, 24 have dry skin (66.7%) while 12 deny any history of Dry skin (33.3%). In the group of 27 patients with HbA1c levels above 8, 13 patients had dry skin, accounting for 48.1%% of the group. Moving on to the 18 patients with unknown HbA1c levels, 10 patients reported dry skin. While 8 patients did not. The p-value of 0.499 indicates that the association between HbA1c levels and dry skin is not statistically significant.

4.7 Distribution and percentage general information about following up on skin symptoms in diabetic patients, treating them and preventing them

Distribution and percentage general information about following up on skin symptoms in diabetic patients, treating them and preventing them. Table4.9

Table 4.8 Distribution and percentage general information about following up on skin symptoms in diabetic patients, treating them and preventing them

<i>Variables/Factors</i>	<i>Categories</i>	<i>N</i>	<i>%</i>
Have you noticed any changes in the severity or frequency of your skin conditions based on your diabetes control	Yes	24	227.6
	No	20	23
	Not sure	43	49.4
Are you currently receiving treatment for your skin conditions .	Antibiotics	5	5.6
	Antifungals	21	24.3
	Antivirals	0	0
	Other	4	4.6
	More than one	7	8
	None	50	57.5
Have you noticed any improvements or changes in your skin conditions with treatment	Yes	24	64.9
	No	13	35.1
How often do you visit a dermatologist about your skin conditions	Every 3-6 months	9	10.3
	Ones/year	7	8
	Rarely	32	36.8
	Never	38	44.9
Do you take any preventive measures to avoid skin complications associated with diabetes	Rotating the location of the insulin needle	5	5.7
	Drying the feet, head and hands after showering	11	12.6
	Wearing appropriate shoes when leaving the house	2	2.3
	Multiple	38	43.7
	None	31	35.6

Are you satisfied with the management of the following skin conditions	Yes	52	59.8
	No	35	40.2

Among 87 participants 24 (27.6 %) answered yes to noticed change in the severity or frequency of their skin conditions based on their diabetes control ,20 (23%) answered no. while the majority of them were not sur 43(49.4%).

Regarding to use of a treatment 50(57.5%) not use any treatment,37(42.5%) had treatment which distributed as antifungals 21(24.3%), antibiotics 5(5.6%), other4(4.6), more than one7(8%) and no one use antivirus drugs.

Among 37 patients who taken a treatment only 24(64.9%) noticed improvements in their skin conditions with treatment, while 13(35.1%) had no improvements in their skin conditions.

Regarding to the follow up of the skin conditions 9(10.3%) visit a dermatologist every 3-6 months 7(8%), ones/year 32(36.8%), rarely and 38(44.9%) never visit a dermatologist for follow up.

Among 87 participants 54(62.1%) of them use preventing measures to avoid skin problems as follow 5(5.7%) Rotating the location of the insulin needle, 11(12.6%) Drying the feet, head and hands after showering, 2(2.3%) Wearing appropriate shoes when leaving the house, 38 (43.7%) use multiple measures including drugs and 31(35.6) not use any measures. In all participants 52(59.8%) were satisfied with their management of skin conditions and 35(40.2%) were not.

Chapter 5 Discussion

A descriptive cross-section study was conducted among diabetic patients have skin manifestation. Eighty-seven patients were enrolled in this study. All of them were taken from ALThawra, AL-Jomhory, and Al-Kuwait hospitals, Sana'a City, Yemen.

5.1 Discussion about characteristics variable of the patients including sociodemographic, type of diabetic, duration of disease, type of treatment used and level of HBA1c.

A total of eighty-seven (87) participants in this study male formed 56(64.4%) of them and female 31(35.6%). Similar study done at Al-Hussein Teaching hospital in AL-Nasiriyah city, Thi-Qar province, Iraq on 2020. From 122 diabetic patients, 60(49.18%) males and 62(50.81%) females(Kawen & Al-Waeli, 2020). Similarly, Bose, R., et al study on 2020, including 120 participants, 68 out of 120 patients were male and 52 were female(Bose & Kumar, 2020). Other study done on 2017 by Srirath kambil et al examined two hundred and sixty-eight (286) patients of those 172(60.16%) were males and 114(39.86%) females(Sani et al., 2020). Similarly, Chatterjee, N., et al. in their study examined five hundred and three 503(73.9%) patients. Of these 330(65.6%) were male and 173(34.3%) were female(Henry & Singh, 2020).

A total of eighty-seven 87 cases in our study, 52 out of 87 patients age was more than 50 years, while least common age group was that between 10-20 years 2(2.3%). Study by Ahmed, K., et al on 2020 detect the main age between 122 diabetic patients involving in the study was 58.63 ± 9.42 (Kawen & Al-Waeli, 2020). Also Sani, H., et al in their study on 2020 shown that 47(47%) out of 100 cases involved in their study age group between (41-60) years were the commonest, while least age group in their study were between 0-20 years(Sani et al., 2020). Other study done at Rajah Muthiah Medical College by Poorana, B., et al on 2019 reported the common age was between 51-60 years(Poorana et al., 2019).

Our study demonstrated that more than two third of participant were had Type 2DM (77%) and others had Type 1DM (23%).similarly Bose, R., et al in their study examined 120 patients out of them 116 were had type 2 diabetes and 4 were had type 1 diabetes(Bose & Kumar, 2020). Other study done at Rajah Muthiah Medical College by Poorana, B., et al on 2019 reported that out of 300 participants 297(99%) had Type 2DM(Poorana et al., 2019). Also Chatterjee, N., et

al. in their study examined six hundred and eighty 680 diabetic patients shown six hundred and forty-eight (648) of participate had Type 2 DM and thirty-two (32) Type 1(Chatterjee et al., 2014).

In present study maximum number of patients 33 (37.9%) had duration of > 10 years and least number of patients 9(10.3%) duration was <1years. Similar study by Ahmed, K., et al on 2020 demonstrated the mean duration of DM between 122 diabetic patients involving in the study was 6.73 ± 3.3 (Kawen & Al-Waeli, 2020). In contrast Chatterjee, N., et al. reported that maximum number of patients 290 had duration of 1-10 years followed by two hundred and one (201) had >10 years of diabetes and 12 patients were newly diagnosed as diabetics(Chatterjee et al., 2014). Study by Bose, R., et al show 87(72.5%) out of 120 patients included in their study has diabetes for less than five years and 33(27.5%) were more than five years(Bose & Kumar, 2020). Another study done by Sani, H., et al (2020) shown maximum number of patients had diabetes for 0-10 years were 72 out of 100 patients and minimum number of patients had diabetes for more than 20 years were 4 out of 100 patients(Sani et al., 2020).

Also, our study found that fifty-one 51(58.6%) of patients were only on oral hypoglycemic agents. And thirty-two 32 (36%) of patients on insulin. Similar study by Ahmed, K., et al on 2020 demonstrated treatment, oral hypoglycemic was higher 57 (46.72%) in treatment of diabetic patients followed by 38 (31.14%) for insulin therapy and 26 (21.31%) for combination therapy while diet control only was less average 1 (0.81%)(Kawen & Al-Waeli, 2020).

In addition, our study shows that the majority of cases on regular treatment to DM but most of subjects 41.4 % and 31.0% had poor glycemic control with high level of HbA1c between 7-8 and more than 8 respectively. Similar study done at Al-Hussein Teaching hospital in AL-Nasiriyah city, Thi-Qar province, Iraq on 2020, reported the mean level of HbA1c is 8.76 ± 1.61 (Kawen & Al-Waeli, 2020). Other study done at Rajah Muthiah Medical College by Poorana, B., et al on 2019 including 300 patients reported that 100(34.3%) had HbA1c levels 7.1-8, 70(23.3%) had level 6.5-7 and 68(22.7%) had level >8(Sani et al., 2020). Chatterjee, N., et al. shown in their study that HbA1C was >7 in 504 patients of whom 343 had skin manifestation(Chatterjee et al., 2014).

5.2 Discussion about distribution and percentage of different skin manifestations

Our study found that the infectious skin manifestations at all were common than non-infectious with fungal infection was the predominant in infectious (49.4%). Similarly, Nawaf Al-Mutairi in their study on cutaneous manifestations of diabetes in 106 patients report that infectious (68%) were the major skin manifestations where fungal infection occurring in 41 patients and followed by bacterial infection in 27 cases (Al-Mutairi et al., 2006). Also Henry D, et al (2020) reported that the infectious manifestations were common than non-infectious with fungal infection was the commonest (Henry & Singh, 2020). Similar study done at Rajah Muthiah Medical College show that the infectious skin manifestation was the commonest in DM (Poorana et al., 2019). In contrast Ahmed, K., et al (2009) reported the skin disorders found in patients with DM, one hundred and eight (30.9%) of patients had skin infections. The commonest cutaneous infection was bacterial, observed in sixty-seven (19%) of diabetics followed by fungal in thirty-one (8.9%) and viral in 10 (2.9%) of diabetics.

In present study that found tinea pedis in 18 cases which most common type of fungal skin infection. While 16 out of 32 cases has bacterial skin infections. Similarly. Henry D, et al (2020) report that the maximum number of patients 133 (52.99%) fungal, 25 (9.96%) bacterial and 2 (0.80%) viral. Their study shown highest number of patients with fungal skin infections were tinea corporis 65 (25.9%) (Henry & Singh, 2020). Another study done by Romano, G., et al (1998) examined 457 patients were found most common were dermatophytosis and candida infections, while bacterial or viral infections were less often observed (Ruderman et al., 2021).

Also, our study shown that's 32 cases has viral skin infections, warts found in 19 cases while shingles found in 12 cases. Henry D, et al (2020) reported 2 out of 251 cases had herpes zoster (Henry & Singh, 2020).

Our study shows that the dry skin (57.5%) and pruritus (41.4%) were the commonest non-infectious skin manifestations in DM. while our study shows the least number of cases was bullosis diabeticorum in 3 cases. Similarly, Roby Bose, et al. reported that the pruritus was the commonest non-infectious skin manifestations in DM (Bose & Kumar, 2020). In contrast study done at Al-Hussein Teaching hospital in AL-Nasiriyah city, Thi-Qar province, Iraq shown that the acanthosis nigricans was the commonest (Kawen & Al-Waeli, 2020). Henry D, et al (2020)

reported in non-infectious skin manifestations the maximum number of patients had skin tags 65(25.9%) and least one diabetic bulla(Henry & Singh, 2020).

5.3 Discussion about Association between the type of the DM and different skin manifestation

In our study which involved 87 cases of diabetic patients, that shows the cutaneous infections were more common in T2DM than in T1DM. Chatterjee, N., et al (2014) reported that skin infections more common in type 2 than type 1 diabetic mellitus(Chatterjee et al., 2014).

In our study the dry skin and pruritus were the commonest non-infectious skin manifestations in both T1DM and T2DM. Chatterjee, N., et al (2014) reported 13 patients out of the 32 (41%) type 1 diabetics shown that skin lesions, the commonest being diabetic xerosis, infections. While shown in type 2 diabetics 490 (75.61%) showed skin lesions, here 81 cases had skin infections, 49 diabetic dermopathy were the most frequent(Chatterjee et al., 2014). Ahmed, K., et al (2009) reported 25 of cases of pruritus found in type 2 DM, no reported pruritus in type 1 DM in their study(K. Ahmed et al., 2009).

Also our study report that the necrobiosis lipiodica found in 13 cases, 10 out of 13 cases has T2DM, while 3 cases has T1DM. Chatterjee, N., et al (2014), reported 4 cases of necrobiosis lipiodica in type 2 diabetes(Chatterjee et al., 2014). Ahmed, K., et al (2009) reported necrobiosis lipiodica found in 5 cases of all involved patients this cases had type 2 diabetic mellitus(K. Ahmed et al., 2009).

In our study the vitiligo was more common in T2DM 14(20.9%) than T1DM 2 (10%). Similar study done by Ahmed, K., et al (2009) had the same result(K. Ahmed et al., 2009). In contrast to study done by Van Hattem, S., et al (2018) which mentioned prevalence of vitiligo more common in type 1 DM(Van Hattem et al., 2008).

5.4 Discussion about Association between the duration of the DM and different skin manifestation

In present study maximum number of patients 33 (37.9%) had duration of > 10 years and least number of patients 9(10.3%) duration was <1years. Also shows that the occurrence of the skin manifestation including infectious and non- infectious were increase with the increase in

duration of DM. similar study of Van Hattem, S., et al (2018).shows that patients who have had diabetes for extended years tend to develop more skin problems(Van Hattem et al., 2008). In contrast study by Kawen, A. A., et al (2020) demonstrate no significant differences among skin disorders in diabetic patients and duration of diabetes mellitus(Kawen & Al-Waeli, 2020). Bose, R., et al (2020) show 87(72.5%) out of 120 patients included in their study has diabetes for less than five years and 33(27.5%) were more than five years(Bose & Kumar, 2020).

Our study detects that infectious skin conditions especially fungal and viral more common in patients has DM for more than 10 years, non-infectious skin conditions which more occur with increase duration of diabetic mellitus was pruritus, dry skin, acrochordons and acanthosis nigricans.

5.5 Discussion about Association between the level of HBA1c and different skin manifestation

In present study show, of 87 cases, most cases had HBA1c level between 7-8 (41.4%), followed by >8 in (31%). Majeed, M., et al (2004) 127 cases out of 200 cases involved in their study had high level of HBA1c (>7%), 73 cases had normal HBA1c (5-7%). And their study skin manifestations are more common in patients who have poor glycemic control HBA1c >7%.

Result of this study show that the infectious and non-infectious skin problems had an association with the level of HBA1C, which were in infectious more common in patients had HBA1C levels > 8 and 7-8 respectively, while in non-infectious majority of it were in in patients had HBA1C levels 7-8. Similar study on diabetic patients with cutaneous manifestations who attended dermatology OPD at Rajah Muthiah Medical College, Chidambaram show statistically significant association with the HBA1C levels(Poorana et al., 2019). Other similar result found at Al-Hussein Teaching hospital in AL-Nasiriyah city, Thi-Qar province, Iraq (Kawen & Al-Waeli, 2020). In contrast Study done by Sani, H. in (2020). show no correlation between infections like tinea pedis and blood sugar level(Sani et al., 2020).Another study done by Romano, G., (1998) reported in type 2 diabetes patients 35 out of 81 cases with skin infection had poorly controlled HBA1c >9. While also reported commonest non-infectious skin manifestation which had HBA1c >9 were diabetic dermopathy 18 cases(Romano et al., 1998).

Chapter 7 CONCLUSION AND RECOMMENDATION

6.1 Conclusion

Majority of patients with DM either T1DM or T2DM had one or more skin manifestation. The commonest skin presentation in diabetic patients at all is dry skin followed by fungal infections.

Fungal infections are the commonest infectious skin problems in DM which commonly appear in foot of the patient.

6.1.1 Association between type of the DM and different skin manifestation

Skin manifestations are more common in T2DM than in T1DM including infectious and non-infectious. All skin manifestation can appear in both in different percentage and no specific manifestation in each type.

6.1.2 Association between the duration of the DM and different skin manifestation

Skin manifestations have correlation with duration of DM, with majority of infectious skin problems appear after 5 years and commonly after 10 years and less likely before one year. while non-infectious skin problems appear after one year most likely between 6-10 years.

6.1.3 Association between the level of the HbA1C and different skin manifestation

Majority of diabetic patients with skin manifestation in this study had poor DM control according to level of HbA1C.

6.2 Recommendation

The Ministry of health should raise the level of public awareness regarding seriousness of the problem by doing awareness campaigns and educational health program to explain the disease, proper foot care practice and lifestyle modifications to preventing develop of skin manifestations in diabetic patient.

Develop comprehensive educational materials and programs to increase knowledge among diabetic patients about the effects of diabetes on skin health, emphasizing the importance of proactive skin care practices.

Implement personalized counseling sessions with diabetic patients to address individual attitudes and behaviors towards skin care, promoting adherence to recommended practices.

Improve collaboration between dermatology and diabetes care teams to ensure comprehensive management of skin conditions in diabetic patients.

Enhance monitoring and management of glycemic control in diabetic patients, with a focus on its potential impact on skin health.

Conduct further research to explore the effectiveness of different educational interventions and health promotion strategies on improving diabetic control awareness and skin management practices.

Future research should take large sample to show exact number of prevalence of different skin manifestation in diabetic patient.

Further research should explain level of fasting blood sugar, random blood sugar and HBA1c with relation to skin lesion.

Need future research to add detailed about some special type of skin lesion appear in association to diabetes mellitus.

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APPENDIX

APPENDIX A1: UNIVERSITY ETHICAL APPROVAL TO AL-GOMHORY HOSPITAL

Republic of Yemen
 Ministry of Higher Education
 and Scientific Research
 21 SEPTEMBER UNIVERSITY FOR
 MEDICAL AND APPLIED SCIENCES
 UNIVERSITY PRESIDENT

الجمهورية اليمنية
 وزارة التعليم العالي والبحث العلمي
 جامعة ٢١ سبتمبر للطب والعلوم التطبيقية
 رئيس الجامعة

الأستاذ. الدكتور محمد جفاف
 رئيس هيئة مستشفى الجمهورية التعليمي

الموضوع: تسهيل مهمة بحث
 المصترم: ١٩٦٥
 ٥٧١

تهديكم جامعة ٢١ سبتمبر للعلوم الطبية والتطبيقية أطيب تحياتها وتقديرها
 وإشارة إلى الموضوع أعلاه تكرموا مشكورين بالتوجيه الى من يلزم بتسهيل مهمة بحث طلاب
 كلية الطب الدفعة الثانية مستوى خامس قسم جلدية تحت اشراف
 د/ مطيع ابو عريج و د/ بشير النابهي بحسب عنوان البحث الموضح قرين اسمائهم:-

الاسم	عنوان البحث
١ عزيز منصور محمد احمد الصراني	a study of the prevalence of skin manifestation among diabetes patients attending outpatient clinics al-thawra general hospital Sana'a- Yemen ,2023.
٢ وميم فتحي احمد حمود الحارسي	
٣ صدام حسين عبدالله حميد	
٤ زين العابدين علي ناصر الزبيعي	
٥ هشام عبدالقالي عبدالعزيز عبدالرزاق	
٦ صادق زيد راجح حسين الزبيدي	
٧ علي محمد صغير هاشم	
٨ عقيل فيصل محسن علي النقيري	
٩ عماد الدين علي محسن صالح الوعيل	
١٠ عبدالقادر فرج صالح الرصاص	
١١ خليل جميل حسن محمد فارح الصارم	
١٢ اسلمه عادل مصلح الجرائش	
١٣ حبيب ثابت محمد سعيد الوخر	

،،،،، ولكم جزيل الشكر،،،،،
 استاذ الدكتور
 معاليه
 رئيس الهيئة
 الطبية والتعليمية

الخبير
 الطبي
 الدكتور
 محمد
 جفاف

Sana'a - Taiz street - Al-Sawad
 Tel: (01/882100) Fax: (01/896585) B.O.P: (17021)
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 Support@21umst.edu.ye

APPENDIX A2: UNIVERSITY ETHICAL APPROVAL TO ALTHAWRA HOSPITAL

Republic of Yemen
Ministry of Higher Education and Scientific Research
21 SEPTEMBER UNIVERSITY FOR MEDICAL AND APPLIED SCIENCES
RECTORSHIP

الجمهورية اليمنية
وزارة التعليم العالي والبحث العلمي
جامعة ٢١ سبتمبر
رئاسة الجامعة

المستقر

الاستاذ الدكتور / مظهر مرشد
رئيس هيئة مستشفى الثورة العام

الموضوع: تسهيل مهمة بحث

تهديكم رئاسة جامعة ٢١ سبتمبر للعلوم الطبية والتطبيقية أطيب تحياتها وتقديرها وإشارة إلى الموضوع أعلاه تكموا مشكورين بالتوجيه الى من يلزم بتسهيل مهمة بحث طلاب كلية الطب الدفعة الثانية مستوى خامس (جلدية).

تحت اشراف د/ مطيع ابو عريج ، د/ بشير النايهي بحسب عنوان البحث الموضح قرين اسمائهم:-

الاسم	عنوان البحث
١. عزيز منصور محمد العمراني	a study of the prevalence of skin manifestation among diabetics patients attending outpatient clinics al-thawra general hospital Sana'a- Yemen ,2023.
٢. وسيم قنحي احمد حمود الحارسي	
٣. صدام حسين عبدالله حميد	
٤. زين العابدين علي ناصر الربيعي	
٥. هشام عبدالنالي عبدالعزيز عبدالرزاق	
٦. صادق زيد راجح حسين الزبدي	
٧. علي محمد صغير هاشم	
٨. عقيل فيصل محسن علي القفاري	
٩. عماد الدين علي محسن صالح الوعيق	
١٠. عبدالقادر فرج صالح الرصاص	
١١. خليل جميل حسن محمد قارع الصارم	
١٢. اسامه عثل مصلح الجراش	
١٣. حبيب ثابت محمد سعيد الوحر	

ولكم جزيل الشكر،

استاذ الدكتور /

مجاهد علي معصار

رئيس الجامعة

جامعة ٢١ سبتمبر
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APPENDIX A3: ARABIC QUESTIONNAIRE



نحن مجموعة طلبة من جامعة 21 سبتمبر كلية الطب البشري.
نقوم بهذا البحث بتصريح من الجامعة.
نحن مهتمين بعمل بحث عن الاعراض والعلامات التي تظهر على جلد مريض السكري نتيجة للمرض.
عن البحث:
تظهر بعض الاعراض والعلامات بشكل شائع على جلد مريض السكري
وهنا نحب أن نؤكد لكم على سرية المعلومات التي ستمدوننا بها ولن يتمكن غير فريق الدراسة من الاطلاع على أي
من البيانات الواردة في هذه الاستمارة

المطلوب منك في البحث.
اجب مستعملاً معلومات الشخصية.
ضع علامة على اجابتك.
يمكنك اختيار أكثر من إجابة.

ولاً: المعلومات الشخصية

العمر:

أ- 10-20 عاما ب- 21-30 عاماً () ج- 31-40 عاما د- 41-50 عاماً () هـ - اكبر من 51 عاماً. ()

الجنس:

أ - ذكر () ب - انثى. ()

مكان الإقامة

أ - الريف () ب - الحضر ()

الحالة الاجتماعية

أ- عازب-هـ () ب - "مزوج-هـ" () ج - ارملة-هـ () د - مطلقه-هـ ()

المستوى التعليمي:

أ - غير متعلم () ب - أساسي () ج - ثانوي () د - جامعي ()

المهنة :

ثانياً: بيانات أساسية حول السكري والأدوية المستخدمة : -

نوع السكري

أ- النوع الأول () ب- النوع الثاني ()

نوع الادوية

أ- حقن () ب- حبوب () ج-حمية غذائية () د-تمارين ()

مدة الإصابة بالسكري:

أ-اقل من سنة () ب- 1-5 سنوات () ج- 5-10 سنوات () د- اكثر من 10 سنوات ()

التزامك باستخدام الادوية:

أ-ملتزم () ب- غير ملتزم ()

هل تراقب السكري بالفحص التراكمي (HbA1C):

أ- نعم () ب- لا ()

إذا كانت الإجابة نعم كم كانت اخر نتيجة:

أ- اقل من سبعة () ب- من سبعة الى ثمانية () ج- اكثر من ثمانية ()

ثالثاً : الاعراض الجانبية الظاهرة على الجلد لأدوية السكري:

أ- للمرضى الذين يستخدمون الحقن الانسولين : يرجى اختيار الاعراض الجانبية التي ظهرت في أماكن الحقن : 1- بقع نزفية جلدية () 2- ترهل الجلد () 3- ضعف الجلد () 4- كتلة جلدية. ()	ب- للمرضى الذين يستخدمون الادوية الفموية : 1- هل تعاني من حساسية تجاه أي دواء فموي : أ- نعم () ب - لا () (2- اذا كانت الإجابة نعم يرجى تحديد الاعراض الجانبية 1-احمرار الجلد بعد التعرض للشمس () 2- تقرحات مملوءة بسائل نقي. ()
--	--

رابعاً: أي من الاعراض التالية استدعت زيارتك طبيب الجلدية :

❖ مظاهر جلدي التهابية:

لا	نعم	• أعراض جلدية التهابية فطرية
		هل تعاني من فطريات في فروى الرأس
		هل تعاني من فطريات في الوجه
		هل تعاني من فطريات في الفم
		هل تعاني من فطريات في الظهر
		هل تعاني من فطريات في اليد
		هل تعاني من فطريات في الاظافر
		هل تعاني من فطريات في أصابع القدم
		هل تعاني من فطريات في المناطق التناسلية

• اعراض جلدية التهابية بكتيرية:

هل اصبت بالدمامل او صنفور (تورم واحمرار وقيح خراج):

أ- نعم () ب- لا ()

كم كان عددها بنفس مكان الإصابة:

أ- واحد () ب- اثنين () ج- اكثر من ذلك. ()

هل تعاني من توذم في أي مكان ف الجسم:

ب-نعم () ب- لا. ()

هل التوذم:

ت-واضح الحواف () ب- غير واضح الحواف. ()

هل يوجد احمرار حول هذا التوذم:

ث-نعم () ب- لا. ()

هل كان التوذم مصحوب بألم:

ج- نعم () ب- لا. ()

هل كان التوذم مصحوب بحمى:

ح- نعم () ب- لا. ()

• اعراض جلدية التهابية فيروسية: -

هل تعاني من ثلثول في أي منطقة في الجسم:

أ- نعم () ب- لا. ()

هل تعاني من الحزام الناري :

ب- نعم () ب - لا. ()

❖ مظاهر جلدية غير التهابية:

• اعرض تغير لون الجلد:

هل اصبت ب البهاق :

أ- نعم () ب- لا. ()

هل تعاني من احمرار دائم في الوجه وخصوصا في الوجنة؟:

أ- نعم () ب- لا. ()

هل تعاني من تصبغات جلدية:

أ-نعم () ب- لا. ()

إذا كانت الاجابه نعم ،ما طبيعة هذا التصبغات .

أ- زيادة () ب- نقصان ()

إذا كانت الإجابة نعم في أي مكان:

أ- الوجه () ب- الرقبة () ج- الابط ()

د- الأطراف العلوية () ز- الأطراف السفلية. ()

• اعراض أخرى: -

هل تعاني من حكة مزمنة :

النعيم () ب- لا ()

هل تعاني من جفاف في الجلد:

النعيم () ب- لا ()

إذا كانت الاجالة نعم في أي مكان:

أ- اليدين () ب- القدمين () ج- فروة الرأس () د - أماكن أخرى. ()
هل عانيت من تغير لون الاظافر:

أنعيم () ب- لا. ()

إذا كانت الإجابة نعم ما هو لون الاظافر:

أ-اصفر () ب- اسود () ج- لون اخر اذكره.....

هل تعاني من احمرار حول الاظافر:

أ- نعم () ب- لا. ()

هل تعاني من الم عند لمس الاظافر:

أ- نعم () ب- لا. ()

هل تعاني من تشققات في الجلد :

أنعيم () ب- لا. ()

إذا كانت الإجابة نعم م اين مكان التشققات:

أ-اليدين () ب- القدم () ج- مكان اخر () (اذكره.

هل تعاني من زيادة في سمك الجلد:

أنعيم () ب- لا. ()

إذا كانت الإجابة بنعم أين مكن زيادة السمك:

أباطن اليدين () ب- اسفل القدمين () ج- مكان اخر اذكره.

هل هناك ندبة في الساق وتغير اللون:

أنعيم () ب- لا. ()

هل هاك زوائد جلدية بارزة في الجسم:

أنعيم () ب- لا. ()

إذا كانت الإجابة نعم في أي مكان:

أ- الرقبة () ب- الأبط () ج- مكان آخر اذكره.

هل هناك إحساس بخشونة الجلد في الرقبة؟:

أ-نعم () ب- لا. ()

هل الخشونة في الرقبة مصحوبه بتغير في اللون:

أ- نعم () ب- لا. ()

هل عانيت من انتفاخات في جزئ من الجلد؟:

أ-نعم () ب- لا. ()

إذا كانت الإجابة نعم ما طبيعة ها الانتفاخات:

أ- هل مملوء بسائل نقي () ب - هل مملوء بخراج ج- هل مملوء بدم. ()

خامسا: أسئلة عامة حول متابعة الاعراض الجلدية في مرضى السكري وعلاجها والوقاية منها وأسباب تدهورها : -

هل لاحظت أي تغيرات في شدة او تكرار الحالات الجلدية بناء على سيطرتك على مرض السكري:

أ- نعم () ب- لا. ()

هل تتلقى حاليا علاجاً لحالات الجلد الخاصة بك :

أ- نعم () ب- لا. ()

إذا كانت الإجابة نعم يرجى تحديد العلاج الذي تتلقاه:

أ-مضادات حيوية حبوب () -ابر () -مراهم ()

ب - مضادات فيروسية حبوب () -مراهم () -ابر ()

ج- مضادات فطرية حبوب () -مراهم () -ابر ()

هل لاحظت أي تحسن ات او تغيرات في حالات الجلد الخاصة بك مع العلاج؟ :

أ- نعم () ب- لا () ج- غير قابل للتطبيق. ()

كم مرة تزور طبيب الأمراض الجلدية بشأن حالات الجلد الخاصة بك :

أ- بانتظام (كل 3-6 اشهر () ب - بشكل مناسب (مرة واحدة بالسنة ()

ج- نادرا (اقل من مرة واحدة () د - ابدا ()

هل تتخذ أي تدابير وقائية لتجنب المضاعفات الجلدية المرتبطة بالسكري:

أ- نعم () ب- لا ()

إذا كانت الإجابة بنعم , يرجى اختيار التدابير الوقائية التي اتخذتها :

أ- تدوير مكان ضرب ابرة الانسولين ()

ب - تجفيف القدمين والرأس واليدين بعد الاستحمام. ()

ج- لبس الأحذية المناسبة عند الخروج من المنزل ()

د - استخدام مرطب الجلد. ()

ز- استخدام واقي الشمس ()

هـ - غير ذلك. ()

هل ترضى عن إدارة حالات الجلدية التالي ؟:

أ- نعم () ب- لا ()

إذا كانت الإجابة لا ، يرجى اختيار أسباب عدم الرضى:

أ- عدم توفير المختص المناسب ()

ب- التشخيص الخاطئ ()

ج- عدم الالتزام بإرشادات الطبيب. ()

أشرك على وقتك وتعاونك في تعبئة هذا الاستبيان، ستساعدنا إجاباتك على تحسين وسائل العناية بالجلد لدى مرضى السكري والخروج بتوصيات من شأنها تخفيف معاناتهم مستقبلا إذا كان لديك أي استفسارات أخرى، فلا تتردد في طرحها.

APPENDIX A4: ENGLISH QUESTIONNAIRE

A questionnaire study of the prevalence of skin manifestation among diabetic patients attending dermatological outpatient clinics of public hospitals, Sana'a city-Yemen-2023.

Please answer using your personal information.

Mark your answer .

You can choose more than one answer.

First: Personal information

Age

From 10 to 20 years ()

From 21 to 30years ()

From 31 to 40 years ()

From 41 to 50 years ()

Above 51 years ()

Gender

Male ()

Female ()

Place of residence

Rural ()

Urban ()

Marital status

Single ()

Married ()

Widow ()

Divorced ()

Second: Basic information about diabetes and the medications used: -

Type of diabetes:

Type I (IDDM) ()

Type II (NIDDM) ()

Type of medications:

Diet ()

Exercises ()

Pills ()

Injections ()

Duration of diabetes:

Less than one year ()

1-5 years ()

5-10 years ()

More than 10 years ()

Your commitment to using medications:

Committed ()

Not committed ()

Do you monitor diabetes with a cumulative test (hba1c):

Yes ()

No ()

If the answer is yes, please record the last result:

Less than seven ()

From seven to eight ()

More than eight ()

Third : side effect of drug used to treat hyperglycemia.

Side effect of insulin injection:

Lipohypertrophy ().

Lipoatrophy ().

Insulin allergy ().

Side effect of oral hypoglycemic drug :

Hypersensitivity reaction ().

Photosensitivity reaction ().

Fourth : symptoms appear in diabetic patient.

Inflammatory symptoms

Fungal skin infection

Tinea capitis (). Tinea faciei ().

Oral candidiasis (). Tinea corporis ().

Tinea manum (). Tinea pedis ().

Onychomycosis ().

Bacterial skin infection

Furuncles () Carbuncle ().

Cellulitis (). Erysipelas ().

Viral skin infections.

Warts (). Shingles ().

2- Non inflammatory symptoms.

Are you suffering from change in skin pigmentation

Yes () No ()

If Yes please put mark below :

Are You affected by vitiligo ()

Are You affected by hyperpigmentation

Yes () No ()

If yes where

Are You affected by rubeosis faciei

Yes () No ()

Are you suffering from itching

Yes ()

No ()

Are you suffering from skin dryness

Yes ()

No ()

If answer Yes where

Are you suffering from skin fissure

Yes ()

No ()

If answer Yes where

Are you suffering from skin thickening

Yes ()

No ()

If answer Yes where

Do you have nail change

Yes ()

No ().

If answer Yes please

Mention nail change which happened

Nail colour ()

thickness ()

Does the patient has skin tag

Yes ()

No ().

If answer Yes mention site

Does the patient has Acanthosis nigricans

Yes ()

No ()

Does the patient has diabetic bulla

Yes ()

No ()

Does the patient has microbiosis lipidoca

Yes ()

No ()

Does the patient has diabetic dermopathy

Yes ()

No ()

Fifth: General questions about following up on skin symptoms in diabetic patients, treating them, preventing them, and the causes of their deterioration: -

1- Have you noticed any changes in the severity or frequency of your skin conditions based on your diabetes control:

Yes () No ().

2- Are you currently receiving treatment for your skin conditions:

Yes () No ().

3- If the answer is yes, please specify the treatment you are receiving:

- Antibiotics (pills - needles - ointments) ()
- Antivirals (pills - ointments - needles) ()
- Antifungals (pills, ointments, needles) ()

4- Have you noticed any improvements or changes in your skin conditions with treatment:

- Yes ()
- No ()
- Not applicable ().

5- How often do you visit a dermatologist about your skin conditions:

- Regularly (every 3-6 months) ()
- Appropriately (once a year) ()
- Rarely (less than once)
- Never ()

6- Do you take any preventive measures to avoid skin complications associated with diabetes?:

Yes () No ().

7- If the answer is yes, please choose the preventive measures you have taken:

- Rotating the location of the insulin needle()
- Drying the feet, head and hands after showering ().
- Wearing appropriate shoes when leaving the house ()
- D-Using a skin moisturizer ().
- Using sunscreen ()
- Other ().

8- Are you satisfied with the management of the following skin conditions?:

Yes () No ().

9- If the answer is no, please choose the reasons for your dissatisfaction:

- Failure to provide the appropriate specialist ()
- B-Incorrect diagnosis ()
- Failure to adhere to the doctor's instructions ().

APPENDIX A5: PICTURE USED IN QUESTIONNAIRE

الاعراض الالتهابية (inflammatory) fungal



() Tinea capitis
القوبا الحلقية الراسية (فطريات الرأس)



() Tinea faciei
القوبا الحلقية الوجهية (فطريات الوجه)



() Tinea Manum
القوبا الحلقية اليدوية (فطريات اليد)



() Tinea intertrigo
القوبا الحلقية الانتريتراليجو (فطريات ثنايا الجلد)



() Tinea pedis
القوبا الحلقية لقدمية (فطريات القدم)



() Tinea Corporis
القوبا الحلقية الجسدية (فطريات الجسد)



() Oral candidiasis
التهاب الفم القطري



() Onychomycosis
فطريات الأظافر

٢. Bacterial



() carbuncles
التمل



() furuncles
صفنور



() cellulitis
التهاب النسيج الخلوي



() erysipelas
الحمرة



(Non inflammatory) (الاعراض غير الالتهابية)



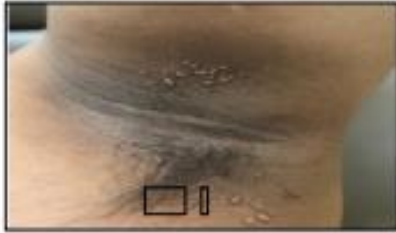
() Rubeosis faciei
احمرار الوجه



() xanthelasma
اللوحة الصفراء



() Acanthosis nigricans
الشواك الاسود



(Skin tag
طفوخ جلدية



(Vitiligo
البهاق



(callus
الكلس



(Diabetes thick skin
طفوخ جلدية



(Yellow nail
أظفار صفراء



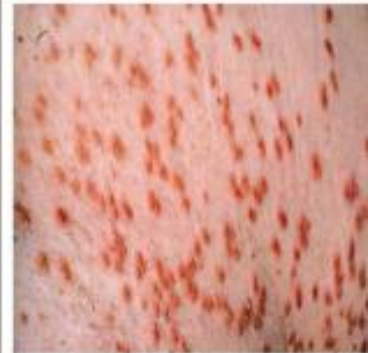
(Bullous diabeticorum
تقرح السكري البثورى



(lipodystrophy
تناقص الدهون



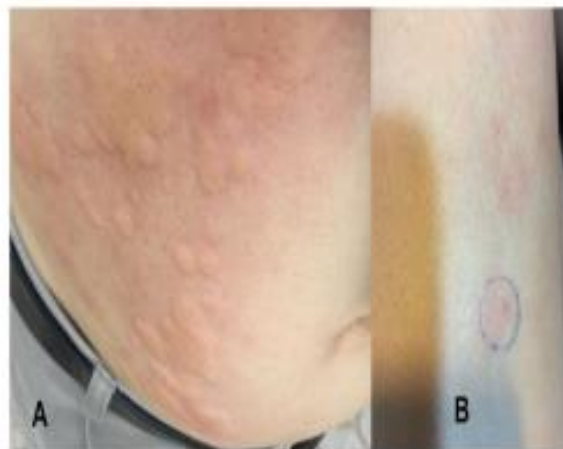
(Diabetic dermopathy
امراض الجلد السكرية



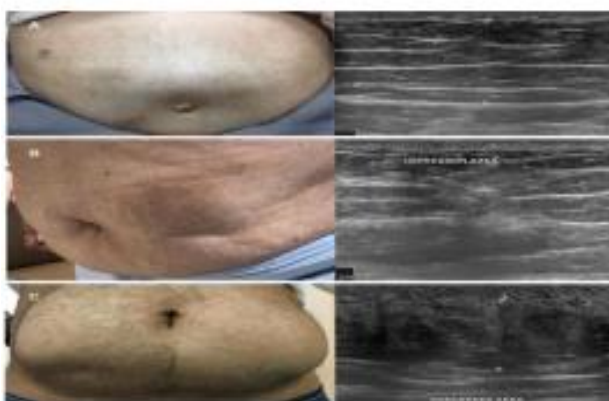
(Eruptive xanthomas
تؤلولات زانثوماتية انفجارية



() Granuloma annulare
الورم الحبيبي الحويبي



() Allergic reactions to insulin
رتود فعل تحسسية للأنسولين



() lipohypertrophy
زيادة الدهون



hyperpigmentation at insulin injection
() sites
زيادة تصبغ الجلد في مواقع حقن الأنسولين

الخلاصة

الخلفية: يعتبر الجلد أكبر عضو في جسم الانسان ويتأثر بالعديد من الامراض المختلفة في الجسم بما في ذلك مرض السكري حيث ان مرض السكري يسبب الكثير من الاعراض والمشاكل المختلفة في الجلد وبطرق متنوعة. هذه المشاكل يمكن ان تكون المؤشر الاولى على اصابة الشخص بالسكري او مؤشر لمدى درجة السيطرة على المرض. بينما العديد منها لا يتم تشخيصها ايضا البعض من هذه المشاكل يمكن ان تكون خطيرة وتحتاج الى المحافظة على مستوى السكر في الدم في الحدود الطبيعية من اجل علاجها.

الهدف: أجريت هذه الدراسة لتحديد مدى أنتشار الاعراض المختلفة التي تظهر على جلد مريض السكري نتيجة اصابته بالمرض واثراء المعرفة الطبية بطبيعة هذه الاعراض وطرق تشخيصها والوقاية منها وعلاجها.

المنهجية: أجريت دراسة وصفية مقطعية في المستشفيات العامة في صنعاء بين مرضى السكري المترددين على العيادات الجلدية الخارجي. وتم تنفيذ استبيان منظم عن طريق المقابلة الشخصية بين المريض والباحث وتم تدعيم الاستبيان بمرفق يحتوي على الصور للأعراض المختلفة. وقد تم تحليل البيانات التي تم الحصول عليه باستخدام برنامج SPSS.

النتائج: بلغ حجم العينة 87 مشاركا. حيث مثل النوع الأول 20 مشاركا بنسبة 23% ومثل النوع الثاني 67 مشاركا بنسبة 73%. وقد وجد ان الاعراض الناتجة عن العدوى الجلدية توزعت كالاتي العدوى الفطرية ظهرت في 43 مشاركا من المشاركين وبنسبة 49.4% العدوى البكتيرية في 32 مشاركا وبنسبة 36.8% العدوى الفيروسية في 31 مشاركا وبنسبة 35.6%. وقد كان جفاف الجلد هو العرض الأكثر شيوعا بين الاعراض الأخرى وظهر في 50 مشاركا من المشاركين وبنسبة 57.4% وتوزعت بقية الاعراض بين المشاركين كالاتي الحكة الجلدية في 36 مشاركا وبنسبة 41.4%، الزوائد الجلدية في 26 مشاركا وبنسبة 29.9%، الشواك الاسود في 19 مشاركا وبنسبة 21.8%، البهاق في 16 مشاركا وبنسبة 18.4%، البلى الحيوي الشحماني في 13 مشاركا وبنسبة 14%، تققع سكري في 3 مشاركا وبنسبة 3.5%.

الاستنتاج: قد يوجد لدى مرضى السكري من النوع الأول او الثاني عرض جلدي او أكثر والتي تظهر بشكل أكبر عند المرضى الذين لديهم سكري من النوع الثاني.

الكلمات المفتاحية: مرض السكري، العلامات الجلدية، انتشار، جلدية، اليمن.



دراسة انتشار المظاهر الجلدية بين مرضى السكري المترددين للعيادات الجلدية الخارجية في المستشفيات العامة، مدينة صنعاء-اليمن 2023-2024

مشروع بحث كاستيفاء جزئي لمتطلبات الحصول على درجة البكالوريوس طب عام وجراحة

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2024

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