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Original Article

Surveillance of risk factors for diabetic foot ulceration with particular concern to local practice

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ABSTRACT

Introduction: Diabetes mellitus is a global health problem with rising prevalence worldwide. Diabetes mellitus is a multisystem disease affects many systems and tissues. Foot problems are not uncommon with diabetes and foot ulceration is one of theses problems. Risk factors for foot ulcerations may differ from community to community based on many factors.
Objectives: To determine the risk factors for diabetic foot ulceration among Saudi diabetic patients with type 2 diabetes attending primary care center.
Methodology: Cross sectional study was designed. Four hundred subjects were selected randomly. Inclusion criteria were settled. Three hundred and fifty subjects (350) were participated. Especial assessment form was designed. Data was collected and analyzed using SPPS ver 14.
Results: Three hundred and fifty subjects were participated (57% male and 43% female). The prevalence of peripheral vascular disease was 15%, hulux vulgus 22.5%, inappropriate foot wear 41%, peripheral neuropathy 47.5%. Peripheral neuropathy and inappropriate foot wear were the commonest risk factors for foot ulceration.
Conclusion: Peripheral neuropathy and inappropriate foot wear were the commonest risk factors for foot ulceration.

Diabetes mellitus (DM) became global health problem. The prevalence of DM has increased continuously during the last years. Diabetes mellitus increases in distribution until it became as one of the big health problems in most countries especially; the low- and middle-income countries. Such expansion will have a major impact on the quality of life of hundreds of millions people and their families, overwhelm the capability of many national health-care systems, and impact adversely upon the economy of those countries that are in most need of development [1].

Prevalence of diabetes varies between countries due to different factors. The global number of people with diabetes in the age group between 20 and 79 years will be 6.4%, affecting 285 million adults in 2010, and will increase to 7.7% and 439 million adults by 2030. Between 2010 and 2030, there will be a 69% increase in numbers of adults with diabetes in developing countries and a 20% increase in developed countries [2].

In 2010, four out of the top five countries with diabetes were from the Arab world; United Arab Emirates (18.7%), Saudi Arabia (16.8%), Bahrain (15.4%) and Kuwait (14.6%) [3].

A steady increase in diabetes prevalence has been noted in Saudi Arabia [4] (Fig. 1). Consequently, this was followed by increase in the prevalences of diabetes complications. A lot of changes affected the Saudi community lead to this change in diabetes map in Saudi Arabia.

Foot problems are common and disabling complications with diabetes. It frequently leads to amputation.

In a community survey done in UK, the prevalence of diabetic foot ulcers was 5.3% in patients with type 2 diabetes [5]. Also in this survey they found that 7.4% of patients with type 1 and 2 had a history of active or previous foot ulcers [5]. In USA in a hospital based survey [6], the researchers found that the prevalence of diabetic foot ulceration was 5.8%.

In another survey done in Netherlands, a mean incidence of new ulceration among patients with type 2 alone was found to be 2.1% annually [7].

In Arab countries there are no sufficient data help in recognizing the magnitude of the problem. From the few studies published about the problem of diabetic foot in Arab world, a great variation

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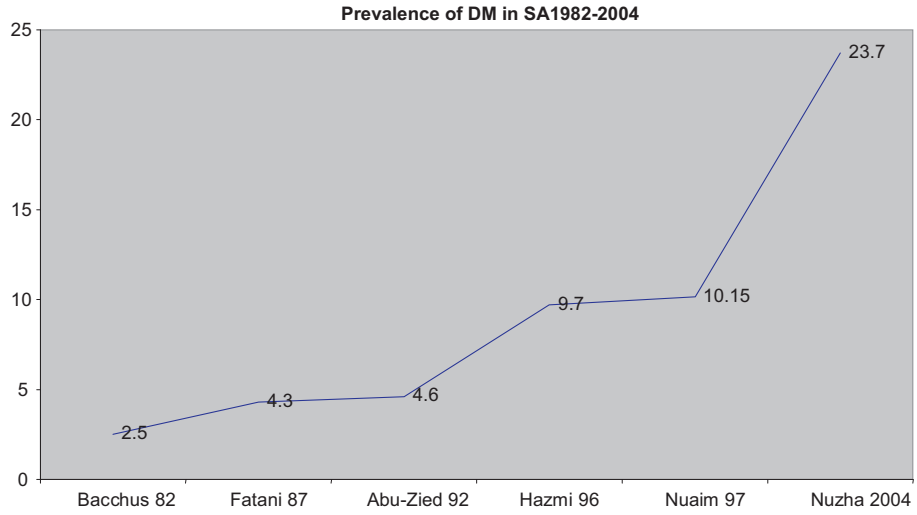

Fig. 1. Prevalence of diabetes in Saudi Arabia.

had been noticed in the prevalence of this problem due to different factors [8].

In a study done in Iran [9] aimed to examine the characteristics of patients with diabetic foot ulcers attending an outpatient diabetic clinic in Kerman province which is located in the southeastern of Iran, the investigator examined 247 patients with diabetes with mean age 52(±) 12 years, the prevalence of diabetic foot was 4%, callus 12% and 50% for heal cracks [9].

Another study [10] found that the prevalence of diabetic foot was 4.7% among a sample of 375 Saudi patients with type 2 diabetes. He did a comparison with a correspondence Swedish diabetic patients (age group 46-69years), prevalence of ulcers was (2.3%) in Saudi group which was significantly lower than in Swedish patients. This finding may explained by different styles of footwear [10].

An interesting study done in Saudi Arabia [11], authors in this paper reported that 59% of their studied patients had foot ulcers 19 and 65% of these patients with ulcers need Debridement.

In a retrospective study [12] the researchers stated that the prevalence of diabetic foot lesions was found to be 10.4%.

In another study [13] done in King Khalid University Hospital, Riyadh from January 2003 to June 2006 included 184 diabetic nephropathy patients who were referred to nephrology clinic; the researchers found that the prevalence of diabetic foot was 13.5%. Also the researchers in this study concluded that baseline creatinine clearance and proteinuria, high systolic blood pressure, advanced age and longer duration of diabetes were the most significant risk factors for developing complications [13].

In another study [14] aimed to know the characteristics and risk factors of 13 diabetic patients undergoing chronic hemodialysis at King Abdul-Aziz University Hospital in Jeddah found that 7.7% of the participants had gangrenous foot. She explained her findings to poor glycemic control, inadequate treatment of hypertension, high smoking rate and inadequate screening for microalbuminuria [14].

1. Methodology

A cross sectional study conducted from the beginning of January to the end of December 2012.

Four hundred patients were selected randomly. Every selected patient was informed about the study and gets his/her agreement to be included. Only 350 subjects with type-2 DM participated in the study. Table 1 showed the characters of study group. Literature review had been done. Three experts had been invited to extract the most correlated risk factors to diabetic foot ulceration. Definition of each risk factor had been stated.

Participants' medical records were reviewed and patients were assessed using new designed assessment form.

There were inclusion criteria which were:

- Saudi nationality
- Had medical record
- Had type 2 diabetes
- Had no current ulceration
- Had no recent surgical foot intervention
- Had no recent foot trauma

Data collected and analyzed using SPSS software

2. Results

The current study included 350 participants (200 male; 57% and 150 female; 43%).

Table 1 showed some personal and clinical characters of participants.

As shown in Table 2, 56% of the patients have hypertension, 72% have dislipidaemia, 69% checked glucose regularly, 34% have glycemic control of HbA1c <7.5, 78% of patients had families with diabetes, 37% of patients are practicing sport, 18% are smokers, 6% have heart complications, 22% have diabetic retinopathy, 54% have diabetic neuropathy and 24% of the patients have other diseases than diabetes, including dyspepsia, thyroid gland diseases, osteoarthritis (Fig. 2).

Table 1
Characters of study group.

Character	Male (*N*: 200)	Female (*N*:150)	*P* value
Age (mean) ± SD	51(±)11 years	52 (±) 10 years	0.38
Diabetes duration (mean) ± SD	13(±) 7 years	11(±) 8 years	0.31
Blood pressure (mean)	Sy 145.5 (±) 17.6 mmHg Dy 83 (±) 9.8 mmHg	Sy 147.9 (±) 18.4 mmHg Dy 84.3 (+/-) 9.8 mmHg	0.41 0.22
Lipid profile (means)	6.5 (±) 2.57 mmol/l	5.7 (±) 1.98 mmol/l	0.18
T.Chol	3.9 (±) 0.97 mmol/l	3.3 (±) 1.06 mmol/l	0.26
LDL	2.1 (±) 0.78 mmol/l	2.3 (±) 0.81 mmol/l	0.62
TG			
Smoking	22% (N 44)	12.6% (N 19)	0.0001