

ORIGINAL ARTICLE

RISK FACTORS ASSESSMENT OF DIABETIC FOOT ULCER USING THE SIXTY SECONDS SCREENING TOOL: A HOSPITAL BASED CROSS-SECTIONAL STUDY AT TIKUR ANBESSA SPECIALIZED HOSPITAL

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ABSTRACT

Background: Diabetic foot ulcer is one of the most feared and common complications of diabetes. It is a major cause of disability, morbidity and mortality among diabetic patients and about 15% develop foot ulcers in their lifetime. Annual foot exam in diabetic patients and education on foot care is a cost effective way of preventing foot ulcers and amputations.

Methods: A hospital based cross-sectional study was conducted at Tikur Anbessa Specialized Hospital Diabetes Center on 200 participants using the 60 seconds diabetic foot ulcer screening tool from April to August 2014.

Results: A total of 200 patients were included in the study. The male to female ratio was 1 to 2.64 (55 to 145). The median age was 50 years (IQR, 39-59 years) and median duration of diabetes mellitus was 11 years (IQR, 6-11 years). Among the 200 patients, 169 (84.5%) had type 2 diabetes mellitus, whereas; 31 (15.5%) had type 1 diabetes mellitus. Among the participants, only 9 (4.5%) had foot examination in the last 5 years. Thirty one (15.5%) participants had history of previous ulcer, 1 (0.5%) had history of amputation, 11 (5.5%) had deformity of shape and structure of the foot. Among the participants, 71 (35.5%) had at least one risk factor for the development of diabetic foot ulcer.

Conclusion: Diabetic foot problems are common among the diabetic patients examined at Tikur Anbessa Specialized Hospital Diabetes Center. Screening for diabetic foot ulcer is a very easy practice which will take maximum of 60 seconds per patient. Despite this fact it is barely practiced for outpatients visiting the diabetic clinics. We stress the need for a clinical diagnosis of diabetic foot ulcers using the 60 seconds screening tool.

Keywords: Diabetic Foot ulcer, Tikur Anbessa Specialized Hospital, Amputations.

INTRODUCTION

Diabetes is a complex metabolic disorder characterized by chronic hyperglycemia. The number of diabetic population in every country is increasing. According to International Diabetes Federation¹, the number of individuals with diabetes has reached 382 million in 2013 and this number will rise to 592 million by the year 2035. The estimated prevalence of diabetes in 2013 for Ethiopia is 4.89%, making the number of diabetic patients between the ages of 20-79 years more than 4.2 million. Type 2 diabetes accounts for 85-90% of diabetic patients in the world (1).

The major toll of diabetes, in terms of morbidity, mortality, and economic burden is the consequence of chronic complications such as retinopathy, neph-

ropathy, neuropathy and atherosclerosis. Diabetes is a growing cause of disability, and premature death. Clinical epidemiologic studies suggest that foot ulcers precede more than 85% of non-traumatic lower extremity amputations in diabetic individuals in the United States of America. The prevalence of Diabetic Foot Ulcer (DFU) ranges from 4-10%, with as high as 25% life time risk of developing ulcer (2).

The complication of DFU is common, expensive, disabling and fatal. In the USA, foot problems develop in approximately 68% of diabetics and they are the most common cause of hospitalization. About 30% of diabetics will be hospitalized at some point for foot problems, usually infections secondary to DFUs. The life time chance of a diabetic patient developing DFU ranges from 15-25%, with recurrence rate of 50-70% in 5 years period (3). Eighty five percent of lower extremity amputations in diabetic

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patients are preceded by DFUs. The 5 year mortality rate after diabetic limb amputation is 68%, which is higher than most malignancies (lung cancer) 86%, Colorectal cancer 39%, Breast cancer 23%, Hodgkin's disease 18%, Prostate cancer 8%) (4). Seventy to 80 billion USD is spent annually on DFUs, amputation and Peripheral Arterial Disease (PAD) in the United States (5, 7).

In Tikur Anbessa Specialized Hospital (TASH), 15% of all amputations have been shown to be associated with diabetes, while 58.2% of all admitted patients with diabetic foot problems end up in amputation with in hospital mortality rate of 21% (6, 7). In the USA, foot problems develop in approximately 68% of diabetics; the incidence in Ethiopia is comparable; in a cross sectional study done among 223 Ethiopian diabetic patients, 61.4% of patients had had skin cracks, corns, mycosis and blisters on their feet (8, 9).

The international diabetes federation, American Diabetes association, and Canadian diabetes association recommend that all PWD (Persons with diabetes) have their feet examined at least annually for the presence of risk factors specific to ulceration 12-14, thus 60-second diabetic foot screen tool was developed so that clinicians working with PWD would be able to incorporate this important assessment into their professional practice (12-16).

Foot screening for patients with diabetes is also neglected in developing countries. A study in Canada, for example, had showed that only 51% Canadians with diabetes receiving a foot screening in 2012 (17).

Early detection of diabetic foot problems will enable early intervention and hence prevention of disabling complications and amputation. To early detect these disorders evaluation of the diabetic foot should include using screening tools to identify high risk feet, a thorough medical and foot history taking, thorough physical examination, and doing the necessary diagnostic procedures according to the clinical findings.

Therefore, the aim of this study was introducing the 60 second screening tool in the routine follow up of diabetic patients and assessing the prevalence and characteristics of risk factors for diabetic foot ulcer.

MATERIALS AND METHODS

Study design: A hospital based cross sectional study was conducted at TASH Diabetic Center on patients visiting the outpatient department.

Setting: The study was conducted at TASH Diabetes Center. The Diabetes Center provides comprehensive diabetes care to around 600 diabetic patients per month. The Center runs two days per week diabetes clinic, one day pregnancy and diabetes clinic, one-day foot clinic, diabetic retinopathy screening every day and laser treatment twice per week.

Study population: Patients with type 2 diabetes diagnosed according to the World Health Organization (WHO) standard, and patients with type 1 diabetes of >5 years in duration were included in the study who attend TAH diabetic clinic on outpatient basis are the study participants.

Sample size estimation: A total of 200 patients who met the criteria were interviewed and examined over a period of 5 months (5 to 10 patients from each Monday and Wednesday diabetic clinic) included in the study by convenient sampling method. Data were collected by the investigators using the 60-second tool by documenting the history and physical examination findings of the 200 patients during the two days per week diabetic clinic visiting hours, from April to August 2014.

Data management and statistical analysis: Data were entered into Epi3.5.3 and analyzed using SPSS v.21. Descriptive statistics and numerical summary measures were calculated and tabulated.

RESULTS

A total of 200 diabetic patients were included in the study. The male to female ratio was 1 to 2.64 (55 to 145). The median age was 50 years (IQR, 39-59 years) and median duration of diabetes mellitus was 11 years (IQR, 6-11 years). Of the 200 study participants, only 9 (4.5%) of them had foot examination in the past five years. Among the study participants, 169 (84.5%) had type 2 diabetes mellitus and 31 (15.5%) had type 1 diabetes mellitus (Table 1).

Table 1: Demographic characteristics of the study participants in TASH, Addis Ababa, 2014 (N=200)

Variable	Frequency	Percent %
Sex		
Female	145	72.5
Male	55	27.5
Type of DM		
Type 1	31	15.5
Type 2	169	84.5
Age (in years)		
15-30	27	13.5
31-45	49	24.5
46-60	87	43.5
Duration with DM (in years)		
≤5	42	21
6-10	57	28.5
≥10	101	50.5

History and physical examination finding: Only 9 (4.5%) of the participants had foot examination in the last five years. Among the participants 31 (15.5%) had history of previous ulcer, 1(0.5) had history of amputation, 11(5.5%) had deformity of shape and

structure of the foot, 4(2%) had ingrown toe nail, 9 (4.5) had absent posterior tibialis and dorsalis pedis, 4(2%) had active ulcer, 1(0.5%) had callus, 30 (15%) had fissures and 17 (8.5%) had positive monofilament test. From the participants 74(37%) had at least one risk factor for the development of diabetic foot ulcer (Table 2).

Table 2: Findings from history and physical examination using 60-seconds tool at TASH, 2014 (N=200)

Variable	Frequency (n)	Percent %
History		
Had foot examination in the last 5 years	9	4.5
Previous ulcer	31	15.5
Previous amputation	1	0.5
Physical Examination		
Deformity	11	5.5
Ingrown toe nail (thickened toe nail)	4	2
Absent pedal pulses	9	4.5
Foot lesions		
Active ulcer	4	2
Blisters	0	0
Calluses (thick scale on plantar skin) 1 0.5%	1	0.5
Fissures (linear cracks-T. pedis) 30 15%	30	15
Neuropathy (>=4 out of 10 sites lacking sensation)		
Monofilament exam (>=4 negatives)	17	8.5
At least one risk factor for	71	35.5

DISCUSSION

The 60 second foot ulcer screening tool is very easy one to apply even in busy clinics settings, for it takes only 60 second to examine the foot of patients with diabetes.

Of the 200 study participants, only 9 (4.5%) of them had foot examination in the past five years. This is a very concerning number, as foot exam and diabetes education is a cheap and effective way of preventing foot ulcers and subsequent complications like amputations. In addition, the study had revealed that about seventy one (35.5%) patients have got at least one risk factor for the development of diabetic foot ulcer. Despite this fact, only 9 (4.5%) had at least a single foot examination in the past five years showing the missed opportunities to preventing the risk for development of DFU. This is very low compared to the 51% adult patients who had foot examination as reported by Canadian Institute of Health Information (17).

About 15% patients had history of foot ulcer which is very high compared to a study done in Nigeria that reported only 1% had history of foot ulcer (18). This difference could be due to the fact that the participants in the study had a good awareness towards early prevention of foot ulcers as they are active members of the Nigerian Diabetes Association while this might not be true for the cases in Ethiopia. None of the participant in the Nigerian study showed active foot ulcer during physical examination while 2% of patients from the present study had active foot ulcers.

In conclusion, this study demonstrated that high number of patients have got the risk factor for development of diabetic foot ulcer. Despite this fact, only few patients with diabetes get foot examination, even though it is a known fact that they are at higher risk for the development of foot ulcer. Thus, comprehensive diabetic care should include such an important screening tool, which is very convenient to do even in busy outpatient visiting hours (just a minute to save two feet).

Therefore, training of medical residents and nurses on the 60 second foot screening tool should be considered. It would be also helpful to include the 60 second foot screening tool in the follow up chart of the patients. This would make documentation and follow up easier. In addition, education for patients, families, caregivers and health care professionals, prevention by early identification of persons with feet at risk for ulceration and potential amputation and close monitoring of people with high-risk feet should be considered.

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