

**Original Article****KNOWLEDGE ON FOOT ULCER AMONG DIABETIC PATIENTS: A CROSS-SECTIONAL STUDY IN A PUBLIC HOSPITAL.**Haque MM<sup>1</sup>, Ahsan GU<sup>2</sup>, Hossain A<sup>3</sup>, Hawlader MDH<sup>4</sup>, Leena K<sup>5</sup>**Article History:**

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**Keywords:***Diabetic foot ulcer, Peripheral neuropathy, Peripheral vascular diseases, Ankle brachial pressure index.***Abstract:****Background:** *The main purpose of the study was the knowledge of foot ulcer among diabetic patients, a cross-sectional study in a public hospital. The number of patients who suffering from Diabetes mellitus is rapidly increasing in our country.***Methods:** *The study was an analytical cross-sectional study. The study population consisted of males and females who were suffering from diabetes mellitus in the emergency department of Fatima General Hospital. This study was conducted in the Emergency department of Fatima General Hospital. The sample size was 119,8 weeks from October 2017 to November 2017. Data was collected through a semi-structured questionnaire. the interview was focused on obtaining information about the higher-risk foot ulcers in Diabetic patients in Dhaka.***Results:** *The depth of knowledge of foot ulcers among the diabetic patient was poor. Employed patients were more knowledgeable than the unemployed. Also, smokers & female patients were more knowledgeable than the rest.***EWMCJ Vol. 12, No. 1&2, January 2024-July 2024: 34-42****Introduction:**

Diabetes, considered as a disease of developed countries, is one of the endocrine disorders that reached epidemic proportions worldwide. The metabolic deregulation associated with diabetes mellitus (DM) cause's secondary pathophysiologic changes in multiple organ systems that impose a tremendous burden on the individual with diabetes and on the health care system.

Diabetes is a group of diseases marked by high levels of blood glucose resulting from defects in insulin production, insulin action, or both (World Health

Organization, 2005). Diabetes can lead to serious complications and premature death, but people suffering from diabetes can take steps to control the disease and reduce the risk of complications (World Health Organization). Foot complications in persons with diabetes have become an increasingly significant public health concern in both developed and developing world. It is estimated that developing countries will bear the brunt of diabetes epidemics in the 21st century. Bangladesh is a developing country and its population is about 150 million. In Bangladesh, about one million diabetic patients were registered in various

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projects and affiliated associations. The duration of diabetes increases the risk of neuropathy. Foot ulceration is the common major endpoint among diabetic complications and diabetic neuropathy and peripheral vascular disease are the main etiologic factors in foot ulceration. Risk factors of foot ulcers are local skin changes, cardiovascular changes, autonomic neuropathy, motor neuropathy, and sensory neuropathy. Foot ulcer develops in approximately 15% of people with diabetes and is a preceding factor in approximately 85% percent of lower limb amputations. Foot ulcers cause substantial emotional, physical, productivity, and financial losses. The costliest and feared consequence of a foot ulcer is limb amputation which occurs 10 to 30 times more often in diabetic patients <sup>16</sup>.

In Bangladesh, the majority of people with diabetic foot disease also suffer from diabetic peripheral neuropathy. Intensive knowledge may be effective in the prevention of amputation or foot ulceration. Many patients lack the knowledge about diet and exercise which should be followed in case of diabetes. Long duration of diabetes mellitus, poor glycemic control, low socioeconomic condition, lack of proper diabetic foot care education and incorrect footwear are considered to be of great importance for the development of diabetic foot ulcer and thus leads to amputation in Bangladesh.

Foot care is the most important means in prevention of foot ulcer. Proper foot care and early recognition and management of risk factors can prevent or delay adverse outcomes of diabetes (American Diabetes Association, 2008). Preventive strategies will decrease the burden of foot problems in patients with diabetes mellitus. Patients' knowledge about prevention of foot care includes foot hygiene, care of toenails, foot skin care, daily inspection of feet and legs, foot exercise, and proper footwear. All these preventive measures can help improve foot health and prevent of foot ulcers. General knowledge about the disease is an important component to control diabetes and prevent foot ulcers. In this study, patients' knowledge about diabetes with special emphasis on general knowledge about diabetes, diet habits, exercise/physical activity, and foot care are given importance. If patients have adequate general knowledge about diabetes, diet habits, exercise, and foot care, they will be able to practice to prevent or delay diabetic foot ulcers. Studies have shown that dietary practice with prepared

meal plans led to weight loss, improvement of blood lipid and glucose profile, and other indicators of risk for cardiovascular disease and chronic complications of diabetes. Patients' self-management practices account for 90-98 % of the variance in glycemic control. So, diet habits and practices may play an important role in preventing or delaying diabetic foot ulcers <sup>14, 15</sup>.

#### **Methods and Tools:**

The study design was an analytical cross-sectional study. The study population was consisted of male and female who were visiting the emergency Department of Fatima General Hospital. With diabetic foot ulcer, this study was conducted in the Emergency department of Fatima General Hospital. The duration of the study was 8 weeks, identify the level of knowledge regarding the prevention of foot ulcers among patients with diabetes mellitus in Fatima General Hospital, to identify the knowledge of diabetic foot ulcers by the socio-demographic profile of Diabetic Patients, to identify the other associated factors such as economic, behavioral & clinical factors that are related to foot ulcer in diabetic patients <sup>11</sup>.

Background questionnaire: The interview was focused on obtaining information about the higher-risk foot ulcers in Diabetic patients in Dhaka. The findings of the study were based on the questionnaire conducted with the respondents. The findings were analyzed by statistical package for SPSS-16.

Diabetic Foot Ulcer and Its Preventive Management in Bangladesh: The literature, reviewed from databases such as CINHALL, PUBMED, SCIENCE DIRECT since 1999-2009, is performed to identify diabetic foot ulcers and their preventing management in Bangladesh. Very few studies have been explored about the prevention of foot care in the health system.

Ninety to ninety-five percent of diabetic patients in Bangladesh are type 2 diabetic patients. The onset of diabetes is often insidious and asymptomatic. Developing countries have typically focused only on communicable diseases. Non-communicable diseases like diabetes and diabetic foot care have been neglected. This disease needs more attention before these countries are overwhelmed by the diabetic epidemic. It is emphasized that the patients should act as their own doctors while physicians, nurses, and educators are only guides. Primary objectives of management are relief of symptoms, improvement of

quality of life, sense of well-being, achievement of normal metabolic control and prevention or delay of acute and chronic complications, and foot care advice. Educational advice is necessary for patients to promote compliance and alleviate fear about the disease condition.<sup>16</sup> The Diabetes Association in Bangladesh adopted a decentralized model and has spread care throughout the country. There are 54 affiliated associations in Bangladesh, almost one in every district. Fifty-four associations are all affiliated with DAB (International Diabetes Federation, 2009). They have followed certain standards i.e., they must be democratic, transparent, run by social workers, and must be non-profitable. In this way, Bangladesh has been able to create a comparatively excellent diabetes awareness program (International Diabetes Federation). In Bangladesh, there is no special foot care outpatient department or ward providing foot care in tertiary hospitals, but there is an overall diabetes care unit. A tertiary hospital examines and manages people who have diabetic foot risk and then refers them to a diabetic hospital (BIRDEM).<sup>11</sup> Studies have shown that 906 patients were analyzed and 200 patients with diabetic foot were purposively selected from a tertiary diabetic care hospital. Within 200 patients, 100 patients were late in detection and poorly managed, and 100 were detected early and properly managed<sup>12,13</sup>.

Among 906 patients, 2.8% (25 patients) were found to develop diabetic foot. The total cost of treatment was US\$13,308.16 with an average of US\$443.60 per patient.<sup>11</sup> Early diabetic foot consumed US\$18,918. Fifty percent of the costs were attributable to drugs for both groups of which 77% was for late diabetic foot and 29% was for hospitalizations. So, proper management can substantially reduce the cost care of for patients with diabetic foot<sup>11</sup>.

**Ethical Consideration:** Formal requests were taken from the hospital, patient & north-south University. No information in data about a subject was passed on to other persons or organizations without the subject's consent. Informed consent was taken from every respondent. Privacy and confidentiality regarding the study was maintained strictly.

**Limitation of the study:** The study was conducted in a selected Hospital with a limited sample.

### **Conceptual Framework:**

#### **Independent Variables**

Socio-demographic & Economic Factors - Age, Sex, Occupations, Marital status, Religion, Monthly income,

Residential area (Rural, Semi-urban, Urban), Educational status.

Behavioral **factor** - Habits (Smoking), Dietary (Vegetarian, Non-Vegetarian)

Anti-diabetic medication- (Oral, Insulin)

**Clinical Factors-** Fasting Blood Sugar, Random Blood Sugar, History of Ulceration, Sensory Loss, Duration of Diabetes. (1 - 6)

Dependent Variable

Knowledge of diabetic foot care - Good (8 or > 8 out of 12), Poor (<8 out of 12) (1 - 6)

### **Results:**

#### **Behavior Observation Score**

A hospital-based cross-sectional study was conducted among diabetic patients visiting the outdoor department of Fatima General Hospital, Tongi, Dhaka. The purpose of the study was to find out the knowledge of foot ulcers among diabetic patients. The target population comprised of patients about 45-55 years of age.

The data comprises 119 diabetic patients of which were suffering from diabetes mellitus. However, only age shows a significant relationship with knowledge of foot ulcers on diabetes mellitus. There are some variables such as sex, education, occupation, residence, smoking, duration of diabetes, and foot ulcer which tend to knowledge of foot ulcers among diabetes patients. From the study, we found out that out of 119 patients aged persons were more knowledgeable. Knowledge was measured using 20 questions covering good foot care practice in the areas of feet washing techniques, skin and nail care, and footwear care. Each "yes" answer carried one point and zero point for a "no". The points were then added up to provide a total knowledge score. The level of knowledge, whether good or poor, was determined based on the mean score<sup>21</sup>. Those who scored more than the mean were considered as good and scores lower than the mean were considered as poor. Another level of data analysis was conducted using the Chi-square test to test some associations. The P value of the variable was found to be 0.05 which also indicates a significant relationship between the knowledge of foot ulcer among diabetic patients. We also found that out of 119 patients, employed persons were better at the knowledge of foot ulcers than unemployed persons. Smoker & Female patients were also more knowledgeable about diabetic foot ulcers. However the P value found does not show any significant relationship between them<sup>7,8</sup>.

**Table-I**  
*Participant characteristics and their knowledge on foot ulcer and the unadjusted association between each co-variables*

Variables	Categories	Knowledge on foot ulcer		$\chi^2$	P Value
		Good	Poor		
Age	45-55	15 (25%)	43(75%)	3.6388	0.0564
	55+	27 (44%)	34 (56%)		
Sex	Female	24 (44%)	30 (56%)	2.9281	0.0870
	Male	18 (27%)	47 (73%)		
Education	<=10	17 (31%)	37 (69%)	0.3607	0.5481
	10+	25 (38%)	40 (62%)		
Occupation	Employed	26 (30%)	59 (70%)	2.2087	0.1372
	Unemployed	16 (47%)	18 (53%)		
Residence	Rural	21 (42%)	29 (58%)	1.2293	0.2675
	Urban	21(30%)	48 (70%)		
Smoking	No	18 (33%)	37 (67%)	0.1230	0.7257
	Yes	24 (37%)	40 (63%)		
Diabetes	<=2	15 (33%)	30 (67%)	0.1257	0.9391
	>=6	9 (36%)	16 (64%)		
	3-5	18 (36%)	31 (64%)		
Foot Ulcer	No	19 (33%)	38 (67%)	0.05624	0.8125
	Yes	23 (37%)	39 (63%)		

**Table-II**  
*Adjusted relationship and odds ratio between each variable and the knowledge of foot ulcer in patients with diabetes.*

Variables	Reference	Estimate	Odds Ratio	LCL	UCL	P Value
Age 55+	46-55	0.8918	2.439	1.0553	5.876	0.04
Sex- Male	Female	-0.9202	0.3984	0.1224	1.284	0.1209
Education- 10+	<=10	0.5040	1.6553	0.7113	3.979	0.2483
Occupation- Unemployed	Employed	-0.1219	0.8852	0.2569	3.062	0.8458
Residence- Urban	Rural	-0.5287	0.5893	0.2520	1.359	0.2161
Smoke- Yes	No	0.0330	1.0335	0.4535	2.351	0.9370
Diabetes- >=6	Diabetes <=2	-0.1944	0.8233	0.2620	2.475	0.7322
Diabetes- 3-5		-0.0259	0.9743	0.3855	2.453	0.9558
Foot Ulcer- Yes	No	0.2031	1.2252	0.5465	2.777	0.6225

### Discussion:

The purpose of our study was to assess the knowledge of foot ulcers among diabetic patients. The study was conducted among 119 diabetic patients visiting the outdoor department of Fatima General Hospital.

It was found that out of the 119 patients were found aged diabetic patients were more knowledgeable

which correlates with two studies, one in Bangladesh and the other in Saudi Arabia and Bangladesh combined, which concluded that aged persons are more knowledgeable than young or middle-aged persons.

On the other hand, an important result was that a significant proportion of the unemployed population

had poor knowledge of foot care (46.4%) There was no significant difference between males and females for this indicator. This finding was comparable with other related studies, which also reported the same pattern of scoring for knowledge and foot care. Many other studies showed the presence of inadequate knowledge of self-foot-care in diabetic patients. In Saudi Arabia, a group of studies highlighted a lower level of foot care knowledge than the optimum. All researchers indicated the need for foot care education programs and improving the way of delivering it <sup>1-6</sup>.

However, from our study, some of the factors showed the absolute significance of potential factors in diabetic foot care knowledge. Since it was a hospital-based study and did not generalize the whole population, increasing the sample size to conduct further research is imperative.

Earlier studies showed that education, smoking and family income were associated with increasing the foot ulcer of diabetic foot. It was observed that study participants with higher education, and higher wealth status had a higher percentage of good knowledge of diabetic foot ulcers compared to the study participants with no education, and poor wealth status, respectively <sup>20 - 25</sup>.

Another study showed that generally foot care was inadequate since 68.0% inspect their foot regularly, 57.2% dry their fingers and feet properly, and 44.0% wake barefoot. This poor level of foot care practice in

this study was in agreement with other previous studies. Some of the inadequacies of foot care practice in our subjects include also non-inspection of the inside of their footwear (23.8%) and wearing shoes without socks (29.6%). The poor practice of foot care in this study was attributed to the lack of proper knowledge of foot care among the participants.

The results of this study were interpreted carefully since it was based on a single center. Second, this was a clinic-based study. Hospital-based studies cannot provide a true picture of DF care knowledge of the community<sup>17,18,19</sup>.

**Conclusion**

From our study, it was found that diabetic foot ulcer knowledge was poor among 45-55 aged persons. So, they should be encouraged to engage in outdoor physical activities, exercise regularly, and regularly screen for potential risk factors by arranging Health programs. Urban people should be encouraged to lead a healthy lifestyle which includes having a balanced diet and regular screening of the potential risk factors by visiting health centers due to poor knowledge. Males were also poor knowledge, so, regular monitoring of blood sugar was a step that could help significantly in screening and prevention of DFU. As it was a hospital-based study that did not represent the general population, increasing the sample size and conducting a population-based study to identify the risk factors was highly imperative.

**QUESTIONNAIRE**

**Demographic data and co-morbidities of participants**

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Questionnaire

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1. Gender	<input type="radio"/> Male	<input type="radio"/> Female
2. Marital status	<input type="radio"/> Single	<input type="radio"/> Married
3. Type of Diabetes	<input type="radio"/> Type 1	<input type="radio"/> Type 2
4. Family history of diabetes	<input type="radio"/> Yes	<input type="radio"/> No
5. Residence area	<input type="radio"/> Rural	<input type="radio"/> Urban

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**Knowledge questions for diabetic foot**

Questionnaire	Agree	Disagree	I don't know
1. Not taking medicines regularly predisposes to complications			
2. Continuous care a must for a diabetic foot because it may get small painless injuries			
3. Diabetic wound care is a must because infections do not heal quickly			
4. A diabetic foot requires care to prevent infection			
5. Smoking causes blockage of the arteries which reduces blood flow to the foot			
6. Diabetic patient must follow a balanced diet			
7. Diabetic patient must exercise			
8. Diabetic patient should check his foot			
9. Does obesity contribute to diabetes?			
10. Does sleeplessness contribute to diabetes?			
11. Do sedentary habits contribute to diabetes?			
12. Does stress contribute to diabetes?			
13. Does hyperglycemia contribute to diabetic foot problems?			
14. Does ischemia contribute to diabetic foot problems?			
15. Does atherosclerosis contribute to diabetic foot problems?			
16. Does infection contribute to diabetic foot problems?			

**Foot care practice for a diabetic foot**

Questionnaire	Agree	Disagree	I don't know
1. I inspect my foot regularly			
2. I wash my foot regularly			
3. I wash my foot with warm water			
4. I cut my nails straight across and not too short			
5. I measured the size of my foot the last time I bought shoes			
6. I receive tips before buying shoes			
7. I check the inner part of my shoe constantly			
8. I walk barefoot frequently			
9. I clean my nails with sharp objects			
10. I wear tight rubber stockings			

**APPENDIX-D**  
**QUESTIONNAIRE (BENGALI)**

১. লিঙ্গ	• পুরুষ	• মহিলা
২. বৈবাহিক অবস্থা	• অবিবাহিত	• বিবাহিত
৩. ডায়াবেটিসের ধরণ	• টাইপ ১	• টাইপ ২
৪. আপনার ডায়াবেটিস কি বংশগত?	• হ্যাঁ	• না
৫. আবাসস্থল	• শহর	• গ্রাম

প্রশ্নপত্র	একমত	একমত নয়	আমি জানি না
১। নিয়মিত ওষুধ না খেলে জটিলতা দেখা দেয়			
২। ডায়াবেটিস রোগীদের নিয়মিত পায়ের যত্ন নিতে হবে কারণ এতে ছোট ব্যাথাহীন ক্ষত হতে পারে।			
৩। ডায়াবেটিস রোগীদের ক্ষতের যত্ন নেওয়া আবশ্যিক কারণ এটি ঠিক হতে বেশী সময় নেয়			
৪। ডায়াবেটিক পায়ে সংক্রমণ প্রতিরোধের জন্য যত্ন প্রয়োজন			
৫। ধূমপান ধমনীর বাধা সৃষ্টি করে যা পায়ে রক্ত চলাচল হ্রাস করে			
৬। ডায়াবেটিক রোগীকে অবশ্যই একটি সুষম খাদ্য অনুসরণ করতে হবে			
৭। ডায়াবেটিক রোগীকে অবশ্যই ব্যায়াম করতে হবে			
৮। ডায়াবেটিক রোগীর উচিত তার পা পরীক্ষা করা			
৯। স্থূলতা কি ডায়াবেটিসে অবদান রাখে?			
১০। নিদ্রাহীনতা কি ডায়াবেটিসে অবদান রাখে?			
১১। বসে থাকার অভ্যাস কি ডায়াবেটিসে অবদান রাখে?			
১২। স্ট্রেস কি ডায়াবেটিসে অবদান রাখে?			
১৩। হাইপারগ-ইসেমিয়া কি ডায়াবেটিক পায়ের সমস্যায় অবদান রাখে?			
১৪। ইস্কেমিয়া কি ডায়াবেটিক পায়ের সমস্যায় অবদান রাখে?			
১৫। এথেরোস্কেলোসিস কি ডায়াবেটিক পায়ের সমস্যায় অবদান রাখে?			
১৬। সংক্রমণ কি ডায়াবেটিক পায়ের সমস্যায় অবদান রাখে?			

## ডায়াবেটিক পায়ের জন্য পায়ের যত্নের অনুশীলন

প্রশ্নপত্র	একমত	একমত নয়	আমি জানি না
১। আমি নিয়মিত আমার পা পর্যবেক্ষণ করি			
২। আমি নিয়মিত পা পরিষ্কার করি			
৩। আমি গরম পানি দিয়ে আমার পা ধুয়ে ফেলি			
৪। আমি আমার নখ সঠিকভাবে কাটি এবং খুব ছোটও না			
৫। শেষবার জুতা কেনার সময় আমি আমার পায়ের আকার পরিমাপ করেছি			
৬। জুতা কেনার আগে আমি টিপস পাই			
৭। আমি ত্রুমাগত আমার জুতার ভিতরের অংশ চেক করি			
৮। আমি প্রায়শই খালি পায়ের হাঁট			
৯। আমি ধারালো জিনিস দিয়ে নখ পরিষ্কার করি			
১০। আমি টাইট রাবার স্টকিংস পরি			

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