

ORIGINAL ARTICLE

Awareness of diabetic foot among medical students at Umm Al-Qura University: a cross-sectional study

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ABSTRACT

Background: Diabetic foot (DF) is a common complication among diabetic patients and the most common cause of hospital admissions for diabetics. This study was conducted to assess the awareness level about DF among medical students at Umm Al-Qura University.

Methodology: An observational cross-sectional study was conducted on medical students of Umm Al-Qura University in Makkah, Saudi Arabia, in February 2018. Electronic questionnaires were used to collect data on DF. The estimated sample size was 167.

Results: Of the total, 54.5% of respondents selected 42-47 mmol/mol (Hgb A1C = 6.0%-6.4%) as a pre-diabetic blood glucose value, and 41.9% thought that DF complications begin after 8-10 years. About 68.9% had received formal or informal education about diabetes. Poor glycemic control was the most common risk factor of DF stated by 58.1%. Respondents (30.5%) thought that drainage of pus from a wound is the most dangerous sign of DF, and 64.1% considered that amputation is the most dangerous complication of DF. Drying feet after washing helps prevent complications, which was stated by 67.7%, where 53.9% did not check their shoes for any objects that may have fallen into them, and 86.8% did not follow any technique in examining their feet every day.

Conclusion: The general awareness of DF complications is low. Medical students need more awareness about DF and its complications. More educational programs and campaigns are recommended.

Keywords: Diabetic foot, diabetic foot ulcer, diabetes, diabetic patients.

Introduction

Diabetes mellitus (DM) is a major public health problem worldwide that expanded significantly over the past 20 years. Patients with diabetes are exposed to many complications such as diabetic foot ulcer (DFU) [1]. Diabetic foot (DF) is a common complication among diabetic patients and the most common cause of hospital admissions for diabetics [2]. The main common risk factors for foot ulcers in diabetic patients are peripheral neuropathy and ischemia [3]. Loss of sensation caused by neuropathy or ischemia may lead to foot ulcers [4]. Patients with foot ulcers are often 65 years old and have diabetes for at least 10 years [3]. About 15% of diabetic patients will be diagnosed with foot ulcers in their lives. Foot ulcers increase mortality and morbidity in diabetic patients [5].

DM may lead to peripheral neuropathy and peripheral vascular disease, which can lead to foot ulcers that, in turn, lead to infection and amputation [6]. In Saudi Arabia, a study revealed that the overall prevalence of DF complications among people with diabetes was 3.3%

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[7]. Statistics showed that DM is the leading cause of the non-traumatic lower extremity amputations worldwide and accountable for 60% of amputations in developed countries [8]. A study has been done by Rasovic and Wukich, which found that patients with DF complications have an increased mortality rate as compared to patients without foot complications, and patients who had an amputation had a reduced survival rate [9]. A different study explained the negative outcome of both physical and mental health and lower extremity function on the self-reported quality of life of hospitalized patients with DF infections [10].

Awareness of the prevention of DFU through glycemic control can be raised, which prevents neuropathy and peripheral vascular disease, and awareness can be raised by educating the patient to care about their foot by looking and washing feet daily and wearing socks with closed shoes [11,12]. Further education can inform patients that when they see a callus, not remove it by themselves but that they should go to the hospital to remove the callus [13]. The patient should not walk without shoes (barefoot) [14].

Brief foot education is not enough to prevent foot ulcers; it is needed to make a combination between repeated and organized education with intervention at the right time [15]. Specific educational strategies, such as awareness and educational campaigns, and basic principles of foot care should be established for both the consultant physician and the patients to create awareness for effective foot care [16].

The study aimed to assess the awareness level about DF and DFUs among medical students at Umm Al-Qura University, Saudi Arabia.

Subjects and Methods

This observational cross-sectional study was conducted at Umm Al-Qura University in Makkah, Saudi Arabia, during February 2018.

The sample size was calculated using the online software of Epi Info, created by the Centers for Disease Control and Prevention (CDC) (www.openepi.com), using a confidence level of 95%. The estimated sample size was 167. Electronic questionnaires were used to collect knowledge about when DF begins, what are the risk factors of DF, what are the sign and symptoms of DF, what is the level of controlled blood glucose, has the population received any education about a DF, or what is the complication of DF. The questionnaires were designed by using the link (<https://docs.google.com>); the link was sent to medical students by WhatsApp application and the collected data were entered into the Statistical Package for the Social Sciences program which was used for data analysis, version 26.0.

Results

The number of participants in this study was 167, and the male and female proportion is shown in Table 1.

Table 1. The year of students and the number of respondents in male and female groups.

Year of study	Male	Female	Total
Fourth	85	82	167
Percent (%)	50.9	49.1	100

The study participants were asked questions to assess their awareness about DF, and the details of them are shown in Table 2.

The awareness of respondents for three basic questions related to general knowledge is shown in Figure 1.

The awareness of respondents for questions related to complication and risk is shown in Figure 2.

The awareness of respondents for questions related to daily life habits is shown in Figure 3.

Discussion

DF is the most common cause of hospital admissions for diabetics [16]. Peripheral artery disease and peripheral neuropathy are the most common risk factors of foot problems in people with diabetes type 1 or 2. Ulcers may develop, and if the tissues continue to receive insufficient oxygen, tissue death (gangrene) occurs. Gangrene is a serious and life-threatening condition [17]. Patients with DF complications have an increased mortality rate as compared to patients without foot complications [18]. The main components of management and prevention of DFU include a well-organized education, blood sugar control, advanced dressing, and advanced therapies [15,16].

The present study found that the majority of medical students had received an education for diabetes and were aware that drying the feet after washing it helps to prevent complications. That amputation is the most dangerous complication of DF.

It was also found that few of them followed some technique to examine their feet every day and were aware of when DF complications begin and that the most dangerous sign of DF is walking difficulties.

The present study showed that the medical students, who had information and knowledge about diabetes more than other population, did not examine their feet, which might mean that the other population who do not have a lot of information and knowledge are most likely not to examine their feet.

There are factors affecting the DF directly and indirectly, so awareness should be increased about these factors to achieve good results of the population awareness [19].

It is recommended that diabetic patients should control their glucose level in the normal range 10 and check for any foreign objects in the shoes before wearing it as it will reduce the possibility of injury and to wear socks [11].

Table 2. The awareness of DF of all respondents.

Questions	Selections	Percent (%)	Respondents (N)
1. Which of the following blood glucose value is considered pre-diabetic?	Below 42 mmol/mol (Hb A1C < 6.0%)	9.0	15
	42-47 mmol/mol (Hb A1C = 6.0%-6.4%)	54.5	91
	48-51 mmol/mol (Hb A1C ≥ 6.5%-6.9%)	26.3	44
	More than 52 mmol/mol (Hb A1C more than 7%)	10.2	17
2. All the following are risk factors of DF. Which do you think is the most common?	Male gender	.6	1
	10 years' duration of DM	4.8	8
	Smoking	1.2	2
	Poor glycemic control	58.1	97
	History of previous ulceration/amputation	10.8	18
	Abnormal foot structure	0.6	1
	Peripheral arterial disease	24.0	40
3. Which of the following signs is the most dangerous of DF?	persistent pain	7.2	12
	Swelling of the feet or legs	6.6	11
	Drainage of pus from a wound	30.5	51
	A limp or difficulty walking	12.6	21
	Red streaking away from a wound or redness spreading out from a wound	18.6	31
	New or lasting numbness in the feet	24.6	41
4. Which of the following is considered the most dangerous complication of DF?	Amputation	64.1	107
	Calluses	2.4	4
	Foot ulcer	7.8	13
	Neuropathy	13.2	22
	Poor circulation	12.0	20
	Skin changes	.6	1
5. When do you think that DF complications begin?	0-3 years	3.6	6
	4-7 years	10.8	18
	8-10 years	41.9	70
	11-13 years	12.0	20
	>15 years	31.7	53
6. Have you ever received any formal or informal diabetes education about caring for your feet?	Yes-formal education (health professional or nurse)	34.1	57
	Yes-informal education (family or friends)	13.2	22
	Yes-information sheets/pamphlets	3.6	6
	Yes-about diabetes but nothing about my feet	18.0	30
	No	31.1	52
7. Do you think that drying your feet after washing, it is helpful in preventing complication?	Yes	67.7	113
	No	9.0	15
	Unsure	23.4	39
8. Do you check your shoes for any objects that may have fallen into them before you put them on?	Yes	46.1	77
	No	53.9	90
9. Do you follow any technique in examining your feet every day?	Yes	13.2	22
	No	86.8	145

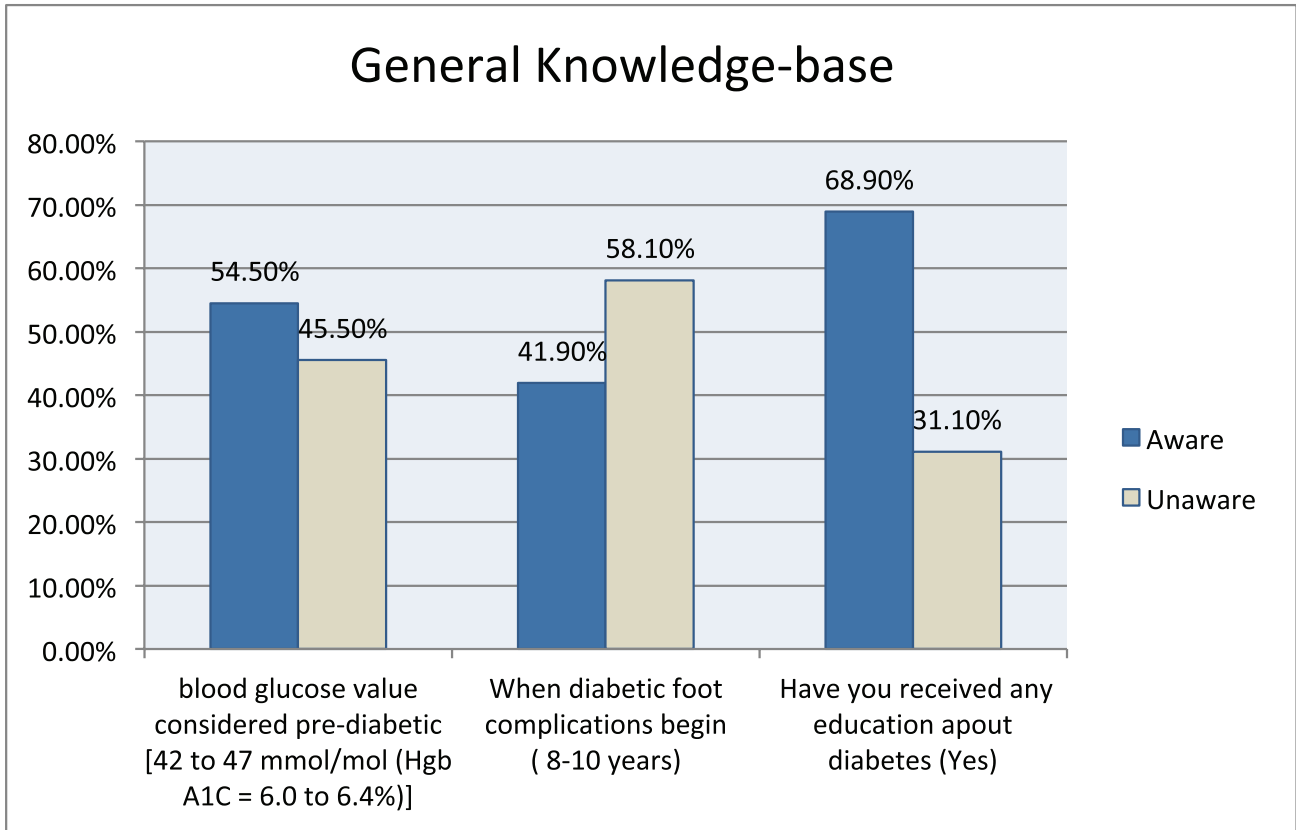


Figure 1. The awareness of respondents for questions related to general knowledge.

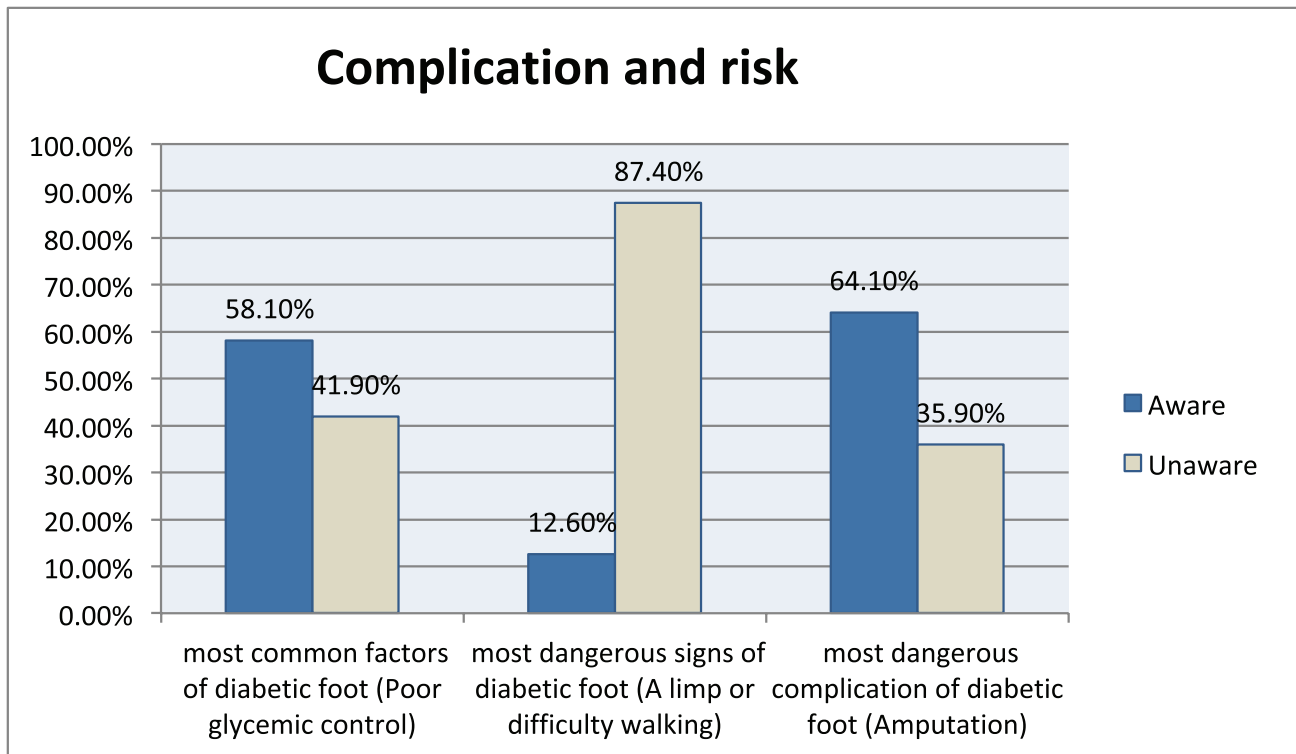


Figure 2. The awareness of respondents for questions related to complication and risk.

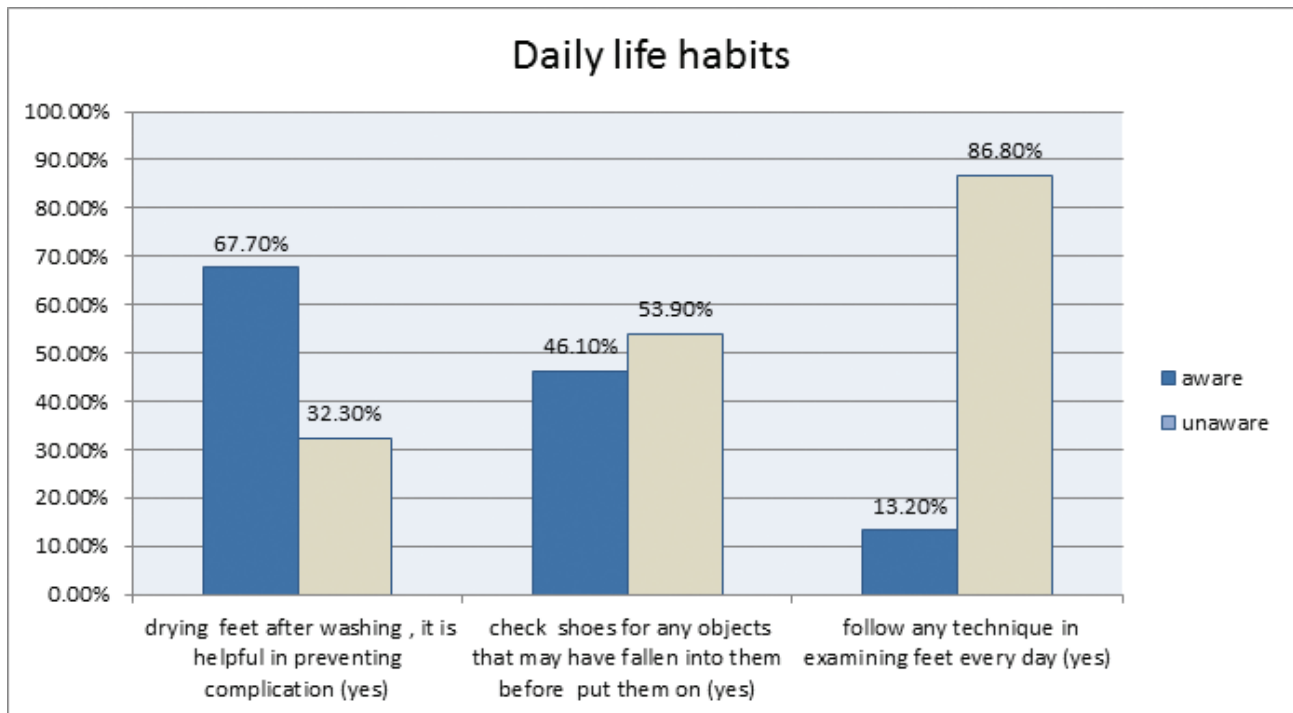


Figure 3. The awareness of respondents for questions related to daily life habits.

Furthermore, the patient who have neuropathy and peripheral vascular disease must check their feet in healthcare centers if they feel any pain in the feet to avoid developing DF in the future, and if any kind of ulcer or inflammation appears in the feet, they must go to the doctor as soon as possible [12].

The authors recommend different healthcare facilities, medical college, and the Ministry of Health to run intensive educating campaigns over the year to increase the awareness about DF, risk factors, guidelines to prevent ulcer, and injury, when they should visit the doctor [18].

Conclusion

The majority of medical students have received an education for diabetes. They were aware that amputation is the most dangerous complication of DF. Few of them followed some technique to examine their feet every day and were aware of when DF complications begin, and the most dangerous sign of DF is walking difficulties. More educational programs and campaigns about DF and its complications are recommended to increase the student's awareness about DF and the complications.

List of Abbreviations

DM	Diabetes mellitus
DF	Diabetic foot
DFU	Diabetic foot ulcer

Conflicts of interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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None.

Consent for publication

Informed consent was obtained from all participants.

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