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Knowledge, Attitude and Practices of Diabetic Foot Patients Admitted to the Surgical Wards at Baghdad Teaching Hospital: A Cross-Sectional Study

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Abstract

Background: Diabetic foot disease is a common complication of Diabetes Mellitus (DM). It forms a huge burden on the surgical wards worldwide, yet it can be prevented extensively by patients with appropriate level of knowledge, attitudes and practices towards their diabetes.

Methods: A structured questionnaire was developed to assess the knowledge, attitudes and practices towards the prevention of DM and diabetic foot disease. The questionnaire scores were compared with similar studies and with the study sample itself. A total of 77 patients were included in the study.

Results: 58% of patients were males. Only 27% had finished secondary school education. 27% presented with diabetic foot complications for the first time. The mean total score of the sample was 28.4 ± 5.8 out of a possible total of 44. People with secondary school education and those suffering from DM for more than 15 years had better questionnaire scores overall. Higher knowledge of DM and diabetic foot disease were weakly correlated with attitudes and practices for those two diseases, respectively.

Conclusions: The weak association between scores of knowledge, attitudes and practices can be attributed mainly to poor compliance. A large number of subjects failed to translate their knowledge into actual attitudes and practices for ultimate prevention.

Key Words

Diabetes mellitus; Diabetic foot disease; Prevention; Knowledge; Practices.

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Introduction

Background

Diabetes Mellitus (DM) is a chronic metabolic disorder affecting all organ systems in the body, forming a serious burden on health care systems worldwide. According to WHO, more than 422 million people were known to have DM worldwide back in 2014, and it is estimated that about 590 million people worldwide will have the disease by 2035¹. The global prevalence of DM among adults over 18 years old has risen from 4.7% in 1980 to 8.5% in 2014². While in Iraq it has risen from 5% in 1978 to 19.7% in 2012³. According to Iraqi Diabetes Federation in 2017, prevalence of adult diabetes in Iraq was 7.6%⁴.

DM can cause cumulative damage to the nerves and vasculatures, particularly those of the legs and feet in the form of diabetic vascular disease which has three known components: arteritis and small-vessel thrombosis, neuropathy and large vessel atherosclerosis. Wound healing is also impaired due to affected collagen synthesis⁵. Patients with diabetic neuropathy have diminished or no sensation and

therefore might be unaware of any trauma to their feet. Additionally, DM causes immunosuppression facilitating wound/ulcer infection.

All of the abovementioned conditions predispose patients with DM to develop diabetic foot disease (DFD)⁶. The risk of foot ulceration varies with the number of risk factors. There is a 1.7 higher risk in patients with isolated peripheral neuropathy, 12 times higher risk in patients with peripheral neuropathy and foot deformity, and 26 times higher risk in those with peripheral neuropathy, deformity and previous amputation, as compared with DM patients without risk factors⁷. Qualitative studies have confirmed clinical observations in that diabetic foot ulcers have negative physical and psychosocial effects influencing the quality of life⁸. DFD is among the most prevalent complications of DM. Foot ulcers affect about 10 to 20% of diabetic patients at least once during their lifetime⁹. Some studies estimate that 5% of DFD patients will undergo amputation at some point in their life¹⁰. From the 159 million people who have diabetic foot disease, 20.5 million YLDs (Years Lived with Disability)

(2.6% of total global YLD) are attributable to diabetic foot problems. Compared to other conditions causing YLD, diabetic foot disease ranks in the top 10 causes of YLD and morbidity worldwide¹¹. Given that the patient is the primary foot carer, education is a key element in successful management of diabetes and DFD. Knowledge about different aspects of this disease empowers patients to play an active role in effective diabetes self-management and self-foot-care¹².

DFD imposes a major economic burden. The average annual expenditure on the management of diabetic foot diseases in the US is \$8659/Patient, with a total economic burden ranging from 9 to 13 billion dollars in addition to the costs for diabetes management¹³. Primary prevention has a 90% likelihood of providing cost-savings when annual prevention costs are less than \$50/person and/or annual DFU incidence is reduced by at least 25%. Efforts directed at patients with diabetes who were at moderate or high risk for DFUs were very likely to provide cost-savings if DFU incidence was decreased by at least 10% and/or the cost was less than \$150 per person per year¹⁴.

This article aims to assess the level of knowledge, attitudes and practices of diabetic foot patients to their disease using a structured questionnaire specifically developed for that purpose, and attempt to establish any correlations or differences in these parameters based on demographic and educational data and disease profiles of the patients.

Material and Methods

Study Design

This cross-sectional study was conducted among patients with type 1 and 2 diabetes in Baghdad Teaching Hospital, Baghdad, Iraq. Patients who were admitted to the surgical wards for debridement, amputation or follow up of their diabetic foot problems were conveniently selected for participation after acquiring their verbal consent. All patients who consented and who were a known case of DM with diabetic foot problems were included in this study. Patients who were unable to hold an interview (unconscious, psychotic and mentally challenged) and those who have been diagnosed with DM on the current admission were excluded from the study. The overall response rate was 91%.

Study Questionnaire

A structured questionnaire was employed to evaluate the participants' knowledge, attitudes and practices towards both their diabetes and diabetic foot complications. The questionnaire was built

after reviewing the literature and adopting items from different questionnaires used in relevant studies^{15, 16, 17, 18, 19}.

The questionnaire encompasses seven sections in the following sequence: demographic data, clinical profile, general knowledge about DM, preventive and curative attitudes and practices towards DM, general knowledge of diabetic foot disease, preventive and curative attitudes and practices towards diabetic foot disease and education concerning DM and diabetic foot disease.

For the general knowledge sections as well as the education section, "Yes" or "No" were the only acceptable answers, while for the attitudes and practices sections, "Yes", "Sometimes" and "No" were accepted.

Two- and three-level Likert scales were used to grade participants' responses and establish a "total score" for each section as well as an overall total score on the following basis:

'Yes' = 1 point

'Sometimes' = 0.5 points

'No' = 0 points

The overall total score was calculated by summing up the scores of the four knowledge and attitudes and practices sections. The education section's score was not used in this calculation given that it does not reflect an intrinsic knowledge or behavior (not the patient's own educational level) but rather represents the influence of outside factors on the patient's education (i.e.; health care provider and media education).

A pilot study was conducted to examine the effectiveness and practicality of the structured questionnaire and scoring method, which retained scientific desirable results. The questionnaire was approved by the Department of Community and Family Medicine at the College of Medicine, University of Baghdad.

2.3 Data Collection

Data was collected through direct interview with the patients, and their answers were ticked by the researchers after comparing them to fixed operational definitions to ensure unbiased documentation.

2.4 Ethical Consideration

All participants received a brief explanation of the goal, methods and value of the study before being asked for their verbal consent. Human subjects' names along with an identification code for each

participant were saved on a separate spread sheet that is password-protected and only accessible to the investigators. Identification codes were used instead of names and personal data during the data analysis process.

2.5 Statistical Analysis

Data entry and analysis was conducted using the Statistical Package for Social Sciences (SPSS) software (v.24.0). Descriptive statistics were presented as means, standard deviations, frequencies and relative frequencies. Independent Samples T Test, Pearson’s correlation coefficient and Fisher’s exact test were used for statistical analysis as appropriate. The chosen level of significance was 0.05 throughout the analysis.

Results

3.1 Sociodemographic Data

3.3 Questionnaire Scores

Table 1: The sample’s score in each section (mean score ± SD) compared to the maximum possible score of said section.

Section	Mean Score ± SD	Max. Possible Score
DM Knowledge	16.3 ± 3.6	23
Attitudes and Practices towards DM	4.4 ± 1.1	7
Diabetic Foot Disease Knowledge	4.4 ± 1.5	7
Attitudes and Practices Towards Diabetic Foot Disease	3.2 ± 1.4	7
DM and Diabetic Foot Education	3.1 ± 0.9	5
Overall Total Score	28.4 ± 5.8	44

For the “Diabetes mellitus and diabetic foot education” section of the questionnaire, 81.8% of the sample said they had received foot-care education from a healthcare provider, while only 40.3% of them said they had received medical education about their conditions from the media. Table 2 summarizes patients’ responses.

Table 2: Patients’ responses to the “DM and diabetic foot education” section.

Sample Score = 3.1 ± 0.9 (Max. score = 5)				
Questionnaire Item	Response			
	Yes		No	
	N	%	N	%
Has the patient ever				
<i>received dietary advice from a doctor?</i>	75	97.4	2	2.6
<i>received foot-care advice from a healthcare provider?</i>	63	81.8	14	18.2
<i>panicked when receiving advice about DM and diabetic foot?</i>	37	48.1	40	51.9
<i>received education about DM and diabetic foot from media outlets?</i>	31	40.3	46	59.7
<i>received a brochure about foot-care for diabetic patients?</i>	35	45.5	42	54.5

For the ease of comparison with other studies, each section's scores were divided into three equal class intervals (poor, moderate and good). The scoring

distribution for this sample according to these categories can be seen in figure 1.

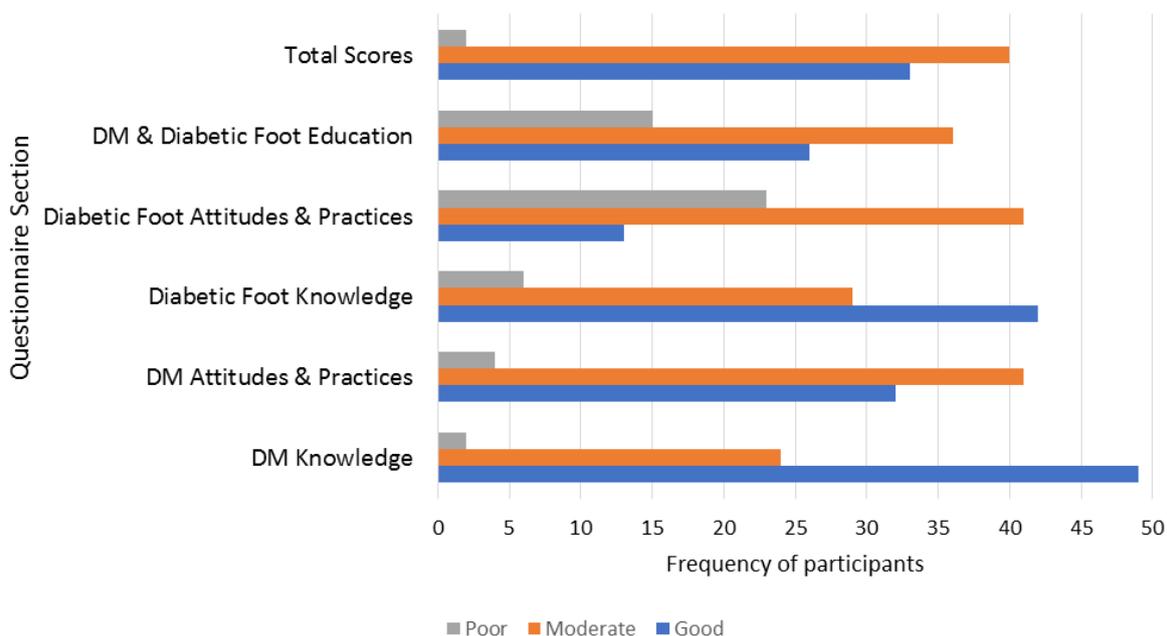


Figure 1: Scoring categories for each section of the questionnaire.

There was a statistically significant correlation between knowledge scores and attitudes and practices scores for both DM ($r = 0.39$, p -value = 0.001) and DFD ($r = 0.395$, p -value < 0.001) demonstrated in figure 2.

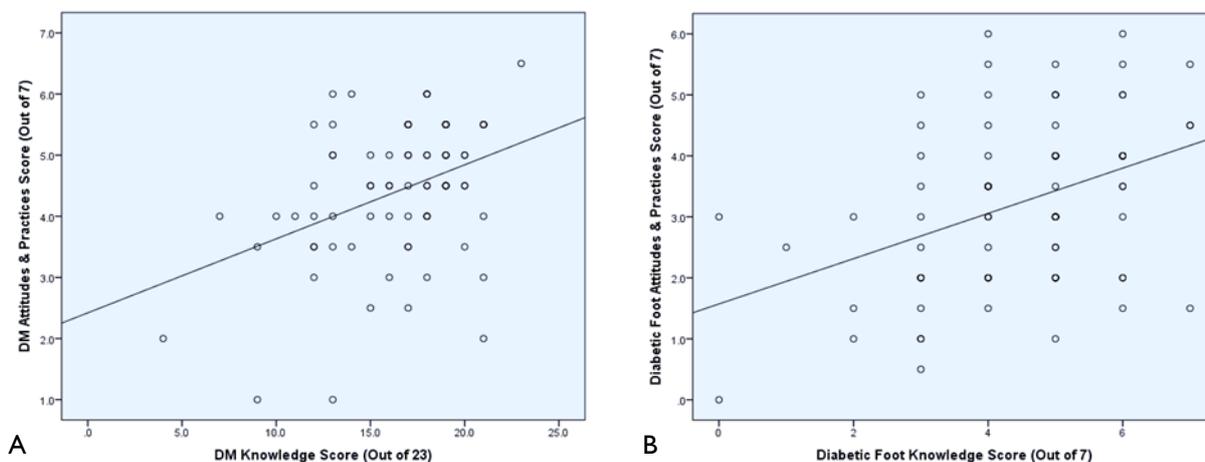


Figure 2: Positive, statistically significant correlation between DM knowledge scores and DM attitudes and practices scores ($r = 0.39$, p -value = 0.001). B: Positive, statistically significant correlation between diabetic foot knowledge scores and diabetic foot attitudes and practices scores ($r = 0.395$, p -value < 0.001).

There was a statistically significant difference between those who finished their secondary school education and those who did not in all questionnaire sections except the DM and DFD education as shown in table 3.

Table 3: The difference in questionnaire scores between those with and without a secondary school degree. (Independent samples T-test; level of significance = 0.05). Bolded rows indicate significant findings.

Score	Secondary School Degree (Mean ± SD)		T	df	P (2-tailed)
	With	Without			
DM knowledge score	17.7 ± 1.9	15.7 ± 4	2.9	69.5	0.005
DM attitudes and practices score	5.0 ± 0.7	4.2 ± 1.2	4.0	59.6	0.000
Diabetic foot knowledge	4.9 ± 0.9	4.2 ± 1.6	2.1	61.1	0.037
Diabetic foot attitudes and practices	3.8 ± 1.4	3.0 ± 1.3	2.2	75	0.028
DM and diabetic foot education	3.1 ± 0.9	3.2 ± 1.0	-0.5	75	0.650
Total	31.5 ± 3.2	27.2 ± 6.2	3.9	67.5	0.000

There was a statistically significant difference among those who have been diagnosed with DM for over 15 and those who have been diagnosed less than 15 years ago in terms of DFD sections and total questionnaire score as shown in table 4.

Table 4: The difference in questionnaire scores between those who have been diagnosed with DM for 15 years or less and those who have been diagnosed more than 15 years ago. Independent Samples T Test. Bolded rows indicate significant findings.

Score	Mean ± SD Duration since DM diagnosis		T	df	P (2-tailed)
	> 15 years	≤ 15 years			
DM knowledge	17.1 ± 2.7	15.9 ± 4	1.3	66.5	0.136
DM attitudes and practices	4.5 ± 1.1	4.4 ± 1.2	0.3	75	0.761
Diabetic foot knowledge	5.0 ± 1.3	4.2 ± 1.5	2.3	75	0.022
Diabetic foot attitudes and practices	3.7 ± 1.3	3.0 ± 1.4	2.4	75	0.019
DM and diabetic foot education	3.5 ± 0.8	2.9 ± 1.0	2.4	75	0.018
Total	30.3 ± 4.5	27.4 ± 6.2	2.1	73	0.040

Discussion

4.1 Knowledge and Its Effect on Attitudes and Practices

The study has shown that the sample had good knowledge scores, yet lower attitudes and practices scores in terms of DFD (table 1), hinting that patients already had certain level of knowledge of foot care but the practice of that particular knowledge was not always carried out. For example; patients were still smoking despite their knowledge of its negative effect on their DFD. This could be a reflection of negligence and poor compliance and it is consistent with other similar studies^{20,21}.

4.2 Level of Education

This study highlights the statistically significant association between level of education and patients' general knowledge about DM and DFD. It shows the least educated people tend to have least knowledge. Such demographic might be considered for targeted counseling and education. This finding is consistent with another study reported in the literature²². The significant association between level of education and DM and DFD attitudes and practices shows that the more educated the patient, the better attitudes and practices towards their own disease and contrariwise. This result is supported by the positive correlation between

knowledge and attitudes and practices scores as mentioned above.

The significant association between level of education and total questionnaire scores is not surprising. As the patients with higher education, good knowledge (as evident in the results), well adherence to preventive attitudes and practices (as explained thoroughly) will surely have better total scores than the less educated group.

4.3 Duration Since DM Diagnosis

The fact that diabetic foot complications are more disturbing than diabetes itself (more symptomatic and causes more disability and inconvenience to the patient) is a good motivational factor to drive the patient attention towards practicing good foot care in an attempt to end the suffering. That could explain the statistically significant difference among those who have been diagnosed with DM for 15 years or more and those who have been diagnosed for less than 15 years in terms of DFD sections and total questionnaire score.

4.4 Means of Educating Diabetic Foot Patients

The study sample's responses on the individual education items (table 2) reveals that while 97% had received dietary advice and 82% had received foot-care advice from their healthcare providers, only 45% had received education pertaining DM and diabetic foot as brochures (printed form). Studies have shown that while verbal education in itself is important, it should not be delivered alone as the sole method of patient education²³. The use of diagrams, videos and handouts should supplement verbal communication, allowing patients to retain the largest possible amount of relevant information. That could help them manage their disease, especially in populations with low level of education (73% of the sample had not finished their secondary school education). Furthermore, 60% of the sample claimed they had not received any education regarding DM or DFD from media outlets (newspapers, radio, television, internet social media and the like). This can worsen the impact of education on knowledge scores, as studies have shown that the use of mass media outlets is an important parameter in achieving effective patient education and increasing knowledge and practice parameters for chronic diseases²⁴.

Conclusion

The study sample showed good DM & diabetic foot knowledge, but poor DM & diabetic foot attitudes and practices. Large percentages of subjects failed to translate their knowledge in many aspects of DM & diabetic foot prevention into actual attitudes and practices pertaining to that knowledge. Educational achievement (finishing secondary school in

particular) and longer periods since diagnosis with DM were associated with a statistically significant increase in at least one of the questionnaire sections' scores, often more than one.

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