
**The Cinderella of Diabetes Management: Health Care Workers Perception
Regarding Diabetic Foot-care and Barriers in Primary Care**

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**Abstract
Background**

Diabetes management requires patients to follow self-care recommendations for diet, physical activity, blood glucose monitoring, and medication. Diabetic foot problem has high morbidity and mortality which can be prevented by primary care physicians. This study evaluated the knowledge levels of primary care health care workers regarding diabetic foot care management and determined barriers.

Methods

A cross sectional study conducted in a CME conducted by Family Medicine Department at Oman Medical College (OMC). The survey focused on health care professional's attitudes, sources of knowledge and recommendations regarding diabetic foot management, as well as attitudes and barriers not doing it by the patients with diabetes. Data was collected on a self-filled questionnaire. Data analysed in SPSS.

Result

A total of 56 participants completed the questionnaire, more than half has adequate knowledge. Significant correlation is seen between years of experience, qualification, designation of study participants and their opinion regarding barriers of foot care among diabetic patients ($p < 0.05$). A significant number of highly experienced and qualified study participants agreed that depression causing lack of personal interest, lack of collaboration and teamwork among health professionals and patient, availability of anti-diabetic drug, delayed referral to specialist clinic if needed, time constraint and lack of enough information provided to the patient by physician/ nurse were key barriers of foot care among diabetic patients ($p < 0.05$).

Conclusion

Primary care physicians/ health care workers have adequate knowledge regarding appropriate foot care and risk factors however, specific knowledge about risk factors is deficient. Therefore, the need to acquire sufficient knowledge of foot care can be given which would have the ability to update the knowledge of evidenced-based foot care applications.

Keywords: knowledge, perception, diabetic foot care, CME, primary care, health care profession

Background

Diabetes is a common and growing problem worldwide and is recognized as a major health problem in Oman. The National Diabetes Prevention and Control Program (NDPCP) was established to prevent, manage, and monitor the progression of diabetes mellitus [1]. The most recent study conducted in Oman related to diabetes reports that the prevalence of diabetes is 12%. Diabetes related complications such as retinopathy and micro albuminuria are escalating in prevalence [2-3]. Diabetes management requires patients to follow self-care recommendations for diet, physical activity, blood glucose monitoring, and medication. Diabetic foot care at home is possible if a patient is provided with instructions from their physician [4-5]. There are numerous barriers to the implementation of universal good care, involving attitudes and beliefs of doctors, other health-care professionals, and patients, and the structure of health-care systems. Policymakers and health-care professionals should work together to remove the obstacles and facilitate the provision of adequate diabetic foot care [6-7].

With the expected increase in the number of diabetics in Oman, it is highly recommended to conduct further prospective research/ Preventive health programs [8-9]. Health authorities need to implement preventive policies and invest more financial capital on training programs and problem awareness programs and a structured multidisciplinary approach should be encouraged [10]. Adherence to these recommendations improves glycaemic control and reduces the risk of diabetes complications. Physicians can assist patients with their diabetes self-care by discussing self-care challenges during medical visits [11-12].

The purpose of this study is to examine the sources of knowledge, attitudes and practices of health care professionals regarding the foot care management in diabetes. Attendees at continuous medical education (CME) program at Oman Medical College (OMC) requested to respond anonymously to written questions about their sources of knowledge about diabetes and their attitudes toward diabetes treatment and barriers of not doing foot care.

Methods

A cross sectional study conducted in a physician's CME at OMC. All participants attending the CME requested to participate and included in the study and those who did not give consent was excluded from the study. These participants are practicing doctors and nurses of Ministry of Health (MOH) Oman and from OMC.

A favourable ethical opinion was obtained from institutional ethics board and an informed consent was obtained from study participants. Survey instrument made after literature search and

reviewed and agreed after several brain storming sessions with family medicine faculty facilitator and experts. Validity of the questionnaire was done in different dimension including apparent, face, content and construct which reflects the concepts to be measured. Validation of questionnaire on small group (pilot) was also performed. All participants after explaining the importance and objective of the study and taking informed consent, participants were requested to respond anonymously to written questions. The survey questionnaire was distributed, with no incentive offered to participants, and collected during the same session, so as to maximize respondents' compliance. The survey focused on physician attitudes, sources of knowledge and recommendations regarding diabetic foot management, as well as attitudes and barriers not doing it by the patients with diabetes.

The obtained data analysed using the Statistical Package for the Social Sciences (SPSS) Program. A number of statistical tests will be utilized, including descriptive analysis. Independent sample t-test and Mann-Whitney test will be used to compare differences between groups

Results:

The participants involved in this study were health care professionals and medical academicians. A total of fifty six participants (69.4% female), majority of which were general practitioners (25.5%), answered the provided questionnaire. Other participants comprised of family physicians (7.3%), senior specialist (6.3%), assistant professors (16.4%), associate professors (10.9%), professors (5.5%). Interestingly, 42.6% of the participants had more than 10 years of experience in health care profession and 46.8 % of the participants possessed Doctorate of Medicine (MD). In addition, major proportions of the study participants were native Arabic speakers (56.4%). The questionnaire data indicated 13.3 %, 15.5%, 17.8%, and 51.1% of the participants stated that they receive more than 20, 10-15, 5-10, less than 5 patients per week respectively. The demographic details of the participants are given in table: 1.

Table 1 : Demographic characteristics of study participants

Demographic feature	Percentage (%)
Age(years) :	
<30	41.5
30-40	22.6
40-50	15.1
50-60	9.4
>60	11.3

Gender :	
Male	30.6
Female	69.4
Highest degree :	
Arab board	6.4
MD	46.8
MRCGP	8.5
Nurses/Other	38.3
Years of experience (years) :	
<5	29.8
5-10	27.7
>10	42.6
Designation :	
GP	25.5
Family physician	7.3
senior specialist	3.6
assistant prof	16.4
associate prof	10.9
prof	5.5
Nurses/ other	30.9
native language:	
Arabic	56.4
English	9.1
Urdu	12.7

Hindi	7.3
other	14.5
consultation of no of diabetic patient /week :	
<5	51.1
5-10	17.8
10-15	15.6
>20	13.3
None	2.2

In this study, majority of the participants agreed that learning from medical journals, interaction with professional colleagues, CME (continuous medical education) activities, medical school, Social media, Educational websites, Medical Conferences, reading from books, interacting and teaching students, observing practicing physician and MOH informative guide/web site helped in development of professional experience and contributed to knowledge and practice toward diabetes foot-care management (Table: 2).

Table 2: Professional experience contributed to knowledge and practice toward diabetes foot-care management

S No		1 Strongly Agree (%)	2 Agree (%)	3 Neutral (%)	4 Disagree (%)	5 Strongly Disagree (%)
1.	learning from medical journals	22.2	61.1	16.7		
2.	Professional colleagues	35.2	53.7	11.1		
3.	CME activities	32.7	40.0	27.3		
4.	Medical school	40.0	34.5	23.6	1.8	

5.	Social media	16.7	42.6	31.5	9.3	
6.	Educational websites	33.3	44.4	22.2		
7.	Medical Conferences	30.9	60.0	9.1		
8.	Reading from books	32.7	54.5	10.9	1.8	
9.	Interacting and teaching students	34.0	50.9	13.2	1.9	
10.	Observing practicing physician	44.4	37.0	14.8	1.9	
11.	MOH informative guide and web site	31.5	50.0	13.0	3.7	1.9

According to the questionnaire data, more than half of the participants agreed (and strongly agreed) that duration of diabetes, self-care counselling, foot care education and examination during consultation and regular patients’ follow up were some of the key factors that influence foot care among diabetic patients. It was also strongly favoured that duration of diabetes mellitus, blood glucose monitoring and HbA1C, regular usage of anti-diabetic medications, referral to a podiatrist /specialist daily feet wash with cold water and then drying the feet completely were important factors that influence foot care. Use of talcum powder between toes and toe nail to be trimmed in curve and appropriate foot ware were strongly agreed upon as key influencers of foot care.

Also, it was agreed that patient should not walk bare foot and hypertension is a risk factor for diabetic foot. Interestingly, majority of the participants disagreed that smoking and high cholesterol are not risk factors for foot ulcer. Besides, it was strongly agreed upon that video instruction in diabetic patients group and Health care workers update in CME were also important factors for this issue (Table 3).

Table 3: Professional experience contributed to knowledge and practice toward diabetes foot-care management

S No	Knowledge and perception regarding factors influence on foot care	1 Strongly Agree(%)	2 Agree(%)	3 Neutral(%)	4 Disagree (%)	5 Strongly Disagree (%)
1.	Duration of	63.6	27.3	9.1		

	diabetes					
2.	Self-care counselling	67.9	30.4	1.8		
3.	Hypertension is a risk factor	48.1	25.9	20.4	5.6	
4.	Referral to a podiatrist /specialist	53.6	41.1	5.4		
5.	Blood glucose monitoring and Hb A1C	73.2	23.2	3.6		
6.	High cholesterol is not a risk factor	11.1	16.7	16.7	38.9	16.7
7.	Foot care education and examination during consultation	67.9	30.2	1.9		
8.	Use of anti-diabetic medications regularly	72.7	25.5	1.8		
9.	Feet should be washed daily with cold water	22.6	34.0	22.6	17.0	3.8
10.	Feet should be dried completely	61.8	25.5	7.3	5.5	
11.	Talcum powder should be used between toes	32.7	28.8	19.2	17.3	1.9
12.	Toe nail trimmed in curve	36.5	23.1	9.6	17.3	13.5
13.	Patient should not walk bare foot	78.2	16.4	3.6	1.8	
14.	Duration of diabetes mellitus	55.4	33.9	7.1	1.8	1.8
15.	Smoking is not a risk factor for foot ulcer	20.4	13.0	13.0	20.4	33.3
16.	Hot bath is a better choice	16.7	24.1	22.2	22.2	14.8
17.	Video instruction in diabetic patients group	50.0	35.2	13.0	1.9	
18.	Appropriate foot	65.5	34.5			

	ware					
19.	Health care workers update in CME	54.5	41.8	3.6		
20.	Regular patients' follow up	68.5	29.6	1.9		
Perception Regarding Barriers of foot-care						
21.	Language barrier	39.6	45.3	7.5	5.7	1.9
22.	Physician/nurse doesn't give enough information	42.9	42.9	8.9	5.4	
23.	Lack of family and social support	33.9	50.0	14.3	1.8	
24.	Beliefs about insulin or fear of insulin	37.5	46.4	10.7	5.4	
25.	Lifelong treatment reducing self-motivation	35.8	45.3	17.0	1.9	
26.	Time constrain	32.7	34.5	18.2	14.5	
27.	Cost is a barrier	25.9	24.1	25.9	18.5	5.6
28.	Lack of motivation is the culture	37.5	35.7	17.9	8.9	
29.	Depression causes lack of personal interest	46.4	37.5	14.3	1.8	
30.	lack of collaboration and teamwork	38.2	45.5	10.9	5.5	
31.	lack of patients' access to resources	31.5	44.4	16.7	5.6	1.9
32.	Low literacy levels in patient	32.7	34.5	25.5	7.3	
33.	Availability of anti-diabetic drugs	26.8	35.7	23.2	12.5	1.8

34.	Delayed referral to specialist clinic if needed	39.3	42.9	12.5	5.4	
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The perception of the participants regarding barriers of foot-care were also analysed based on the questionnaire. More than half the participants were in favour of language being a barrier of foot care. Apart from that it was strongly agreed upon that, lack of family and social support, beliefs about insulin or fear of insulin and time constrain were factors that pose a barrier towards foot-care. According to the questionnaire data, it was agreed by majority of participants that treatment cost was a barrier and lifelong treatment reduced self-motivation of the patients. In addition, low literacy levels in patient, lack of motivation and depression causing lack of personal interest are key factors that form a barrier of foot care among the diabetic patients (Table 3).

Surprisingly, majority of participants agreed that physician/nurse not giving enough information to the patient, lack of collaboration and teamwork, lack of patients’ access to resources, availability of anti-diabetic drugs and delayed referral to specialist clinic if needed were adding on the barriers of foot care (Table 3).

Upon evaluation and statistical analysis of the questionnaire data obtained in this study, it was revealed that there is a significant correlation between years of experience, qualification, designation of study participants and their opinion regarding barriers of foot care among diabetic patients ($p < 0.05$). A significant number of highly experienced and qualified study participants agreed that depression causing lack of personal interest, lack of collaboration and teamwork among health professionals and patient, availability of anti-diabetic drug, delayed referral to specialist clinic if needed, time constraint and lack of enough information provided to the patient by physician/ nurse were key barriers of foot care among diabetic patients ($p < 0.05$).

Discussion

Our study displayed the perception of health care workers regarding diabetic foot-care and its barriers. The study participants comprised of practicing doctors of Oman Medical College and Ministry of Health, Oman. Majority of participants in this study agreed that learning from medical journals, interaction with professional colleagues, CME (continuous medical education) activities, medical Conferences and other interactions helped in development of professional experience and contributed to knowledge and practice toward diabetes foot-care management. These views are parallel with a recent study which states that medical professionals upgrade their skills through continues medical education and other interactive activities [13].

This study also revealed that, more than half of the participants agreed (and strongly agreed) that duration of diabetes, self-care counselling, foot care education and examination during consultation and regular patients’ follow up were some of the key factors that influence foot care among diabetic patients. These findings are in compliance with a number of studies held recently. One study held at a hospital in China evaluated factors that affect the level and

knowledge and practice of diabetic foot self-care. It concluded that duration of diabetes affected diabetic foot care. It also indicated that patients having regular follow up had a higher score of foot self-care behaviour. Also, patients receiving good information and getting educated regarding diabetic foot ulcer were likely to have a good knowledge about diabetic foot self-care [14].

In addition, majority of the participants of this study disagreed that smoking and high cholesterol are not risk factors for foot ulcer. This observation is in compliance with a prospective study indicating, that duration of diabetes, high levels of glycated haemoglobin, smoking and trauma were significant influencers of foot ulcers[15]. Besides, it was strongly agreed upon that video instruction in diabetic patients group and health care workers update in CME were also important factors for this issue. Apparel to this finding, a recent study exhibited the effect of telemedicine technology for the treatment of diabetic foot ulcers, it concluded that telemedicine improved the knowledge, wound assessment skills of health care professionals and interaction with patients[16].

According to our study, lack of family and social support, cost, lifelong treatment, reduced self-motivation of the patients and time constrain were factors that pose a barrier towards foot-care. This opinion is supported by the findings of a prospective study held at University of Texas found that majority foot ulcer patients had symptoms of depression, which may be due to social, psychological and economic factors[17]. It was suggested that since foot ulcer treatment is costly and takes longer duration to heal, economic instability arises for the patient [18].

Statistical analysis of the questionnaire data obtained in this study indicated a significant correlation between years of experience, qualification, designation of study participants and their opinion regarding barriers of foot care among diabetic patients ($p < 0.05$). A significant number of highly experienced and qualified study participants agreed that depression causing lack of personal interest, lack of collaboration and teamwork among healthcare professionals and patient, availability of anti-diabetic drug, delayed referral to specialist clinic if needed, time constraint and lack of enough information provided to the patient by physician/ nurse were key barriers of foot care among diabetic patients ($p < 0.05$). This is in agreement to the results of a study held in UK, involving health care professionals who attended 2015 and 2016 Master class diabetic foot conferences, which identified barriers to diabetic foot care. These included: patient referrals, organization of care, access to specialist services, and communication between disciplines, patient care, funding, education and infection. This study also stated that shortage of resources and lack of education of both people with diabetes and healthcare professionals were also among the factors that influence foot care. Besides, it was concluded that delayed referral to specialist was a crucial barrier to diabetic foot care [19]. Health care professionals need sufficient knowledge and skills in foot care to prevent, diagnose, and care for foot problems. Thus, it is important that foot care knowledge be supported with practical training [20].

Conclusion

This study has summarized key factors influencing diabetic foot-care. Some of the potential barriers of foot-care among diabetic patients have been revealed. The opinions of health care professionals in this study cannot be overlooked. Hence, it is imperative to take careful measures for the improvement of facilities and services for diabetic foot care. It is recommended that primary care doctors should be trained in diabetic foot care.

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