

Assessment of Knowledge toward Complications of Diabetic Septic Foot among Diabetics Patients in Saudi Arabia

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ABSTRACT

Background: diabetic foot ulcer is a major health problem around the world with a high morbidity and mortality rates. The good knowledge and practice pattern could decrease the diabetic foot ulcer complications.

Objectives: this study aimed to evaluate knowledge of the diabetic patients regarding the complications of diabetic foot ulcer in Saudi Arabia (KSA).

Patients and Methods: this is a cross sectional community based study conducted from March 2017 to July 2017 among 920 diabetic patients. The subjects were interviewed in the shopping malls, pharmacies and coffee shops and asked to fill out a pre-tested questionnaire about the knowledge of complications.

Results: the duration of diabetes was more than 10 years among 65% of them. About 40.9% of subjects were using oral hypoglycemic agents, 57.8% were using insulin for management of diabetes. The most common diabetic complication was retinopathy, while the most common foot ulcer complication was foot numbness and stiffness. The level of knowledge was good among most of subjects (77%), while 23% had insufficient knowledge regarding the diabetic foot ulcer. The good awareness was significantly associated with higher educational levels.

Conclusion: the level of awareness about complications of diabetic foot was sufficient among most of Saudi subjects. But, there was an urgent need for raising the awareness and identifying the risk factors, educating the patients through increasing the patients and doctors relationship. The knowledge alone was not sufficient for assessing the practice pattern thus major studies must be conducted to assess the knowledge, attitude and practice pattern among Saudi subjects.

Keywords: knowledge, diabetes mellitus, diabetic foot care.

INTRODUCTION

Diabetes mellitus (DM) is a main disease that affects most of populations around the world and its prevalence was supposed to be increased by year 2030 to 366 million by 2030⁽¹⁾. The situation in KSA is similar to other parts of the world as about 20.5% of Saudi adult subjects suffer from diabetes as estimated by the International Diabetes Federation (IDF)⁽²⁾. Also, the present study showed that more than 25% of adult populations were suffering from diabetes and this rate was supposed to be doubled⁽³⁾. Diabetic foot also represented a major health problem of high mortality and morbidity rates⁽⁴⁾. Also, diabetic foot prevalence was 8-17% among diabetic patients with higher rates of amputations caused by diabetes than other causes including foot ulcers and non-traumatic causes^(5, 6). The foot complications that related to diabetes could be preventable through appropriate control of blood sugar with proper medications and enhancing the good lifestyle habits thus decreasing the risks of microvascular complications⁽⁷⁻⁹⁾. Also, routine foot examination and using good footwear would prevent diabetic foot ulcer and prevent the expected complications^(10, 11). Major foot complications were present among diabetic

patients with poor awareness and practice pattern⁽¹²⁾. The education of diabetic patients could prevent foot complications and facilitate healing process^(13, 14). This study aimed to assess the Knowledge of Saudi diabetic patients regarding the complications of diabetic foot ulcer in Saudi Arabia, 2017.

METHODS

Study design

This is a cross-sectional study conducted from March 2017-July 2017 among 920 diabetic patients. The subjects were interviewed in the shopping malls, pharmacies and coffee shops and asked to fill out a pre-tested questionnaire about the knowledge of diabetic foot complications.

Study population and sample size:

After considering the size of adult population in KSA, a random sample of 920 adult Saudi subjects were enrolled in the study using the web calculator⁽¹⁵⁾ with a margin of error of 5%, and confidence interval of 95%.

Study tools

The questionnaire was collected from previous studies and revised by 3 experts in chronic disease

complications then certified and translated into simple Arabic language to make it easy for the participants to answer the full questionnaire. The questionnaire consisted of 3 parts that included the demographics of the studied population, the second part considered the clinical history of patients and the third part regards the knowledge about the complications of diabetic foot.

Ethical approval:

An ethical approval was obtained from the Faculty of Medicine, Mohammad Bin Saud Islamic University. Also, the participants signed an informed consent before participating in the study.

Statistical Analysis

The SPSS version 22 application was used for data processing. The variables were shown as percentage and frequencies. The univariate logistic regression was considered significant if P value < 0.05.

RESULTS

Demographics of the studied subjects:

The mean age of respondents was 51 years old and 55.5% of subjects were females, while 44.5% were males. Most of participant (46%) had a bachelor degree, 29.3% had attended secondary school and 24.7% were at primary school. The characteristics of the studied population were shown in **table 1**. The age of included subjects ranged from 16-35 years old in 50.9%, 36-50 years in 32.9% and 16.2% aged more than 50 years old. More than half of participants were males (55%) and 45% were females. As for the educational level, the majority of respondents (60.2%) had a college degree, 26.9% had a secondary school degree and 12.9% had primary school degree. About 61% of subjects were employed and 39% were jobless (**Figure. 1**).

Table 1: demographic's of included subjects(920)

	Mean ± SD	Range
Age (years)	51± 3.5	37-59
	No.	Percentage (%)
Gender		
Female	511	55.5%
Male	409	44.5%
Educational Level		
College	424	46%
Secondary School	270	29.3%
Primary School	226	24.7%
Working status		
Employee	561	61%
Jobless or retired	359	39%

History of diabetes

The clinical history of enrolled participants was distributed in **table 2**. The duration of diabetes was less than or equal ten years among 35% of subjects and more than 10 years among 65% of them. About 40.9% of subjects were using oral hypoglycemic agents, 57.8% were using insulin for management of diabetes, but only 1.3% of subjects were not using any medications and were only modifying lifestyle. Almost 66% of

subjects showed no signs of diabetic complications, while 22.1% showed retinopathy, 6.8% had neuropathy and the least had artery diseases (3.6%) followed by stroke among 1.5% of participants. The prevalence of diabetic foot among respondents showed that 20.9% showed signs of numbness and stiffness, 11% had calluses, 5% showed exudate or bloody discharge, 3.9% had lower limb amputation while 7.3% had foot ulcer.

Table 2: clinical history of respondents (920):

	No.	Percentage (%)
The duration of diabetes		
≤10 years	322	35
>10 years old	598	65
Management of diabetes		
Oral hypoglycemic agents	376	40.9
Insulin	532	57.8
Modifying lifestyle	12	1.3
Diabetic complications		
No complications	607	66%
Retinopathy	203	22.1
Neuropathy	63	6.8
Artery diseases	33	3.6
Stroke	14	1.5
Diabetic foot prevalence		
Numbness and tightness	193	20.9
Calluses	101	11
Blood/discharge	46	5
Lower limb amputation	36	3.9
Foot ulcer	67	7.3

Assessment of knowledge of included subjects:

The respondent's awareness about complications of septic diabetic foot showed that the majority of the subjects (60%) didn't know the causes of diabetic foot disease. The knowledge regarding the complications of diabetic foot were including decreased blood flow in the feet (66.5%), loss of sensation in the foot (69.9%), ulcers in the feet (77.1%), foot gangrene

(83.3%), foot infections impacts on ulcers (65.3%) and the importance of routine feet investigations (58.8%). On the other hand, only 35% and 45% had inadequate knowledge regarding the effects of loss of sensation and reduced blood flow to the foot on increasing the risks of ulcers. Also, the majority of them don't read handouts for proper management of feet (74.3%) or ask doctors for education on foot care (Table 3).

Table 3: awareness regarding the complications of the diabetic foot:

	Correct	Incorrect
The most common causes of diabetic ulcer are neuropathy and ischemia	368 (40%)	552 (60%)
Diabetic patient may have decreased blood flow in feet	612 (66.5%)	308 (33.5%)
Loss of sensation in feet is a complication of diabetes	643 (69.9%)	277 (30.1%)
Diabetic patient may progress ulcers in feet	709 (77.1%)	211 (22.9%)
Diabetes may develop foot gangrene	766 (83.3%)	154 (16.7%)
The risks of ulcers are increased with loss of foot sensation	322 (35%)	598 (65%)
The risks of ulcers are increased with reduced blood to the feet	414 (45%)	506 (55%)
Foot infections would result in foot ulcers?	601 (65.3%)	319 (34.7%)
Routinely investigation of feet is a must for prevention complications.	541 (58.8%)	379 (41.2%)
I must use handouts to take care of your feet	236 (25.7%)	684 (74.3%)
I must ask doctors for education on foot care?	170 (18.5%)	750 (81.5%)

Level of knowledge among respondents:

The level of knowledge was good among most of subjects (77%), while 23% had insufficient knowledge regarding the diabetic foot ulcer (Table. 4).

Table 4: respondent’s knowledge regarding the diabetic foot:

Knowledge level	Frequency	Percent (%)
Good	709	77
	211	23
	920	100,0

Association between subject’s knowledge of the diabetic foot complications and demographics:

Univariate logistic regression model was used for assessing the association between the knowledge and the diabetic foot complications (Table 5). The good awareness was significantly associated with higher educational levels, but there was no correlation between knowledge with age and gender.

Table 5: association between knowledge of the diabetic foot complications and demographics of included participants:

	Good (n=709)		Poor (n=211)		P-value
	No.	%	No.	%	
Age					0.761
37-48	311	43.9%	94	44.5%	
49-59	398	56.1%	117	55.5%	
Gender					0.481
Female	392	55.3%	119	56.4%	
Male	317	44.7%	92	43.6%	
Educational Level					0.001
College	347	48.9%	77	36.5%	
Secondary School	199	28.1%	71	33.6%	
Primary School	163	23%	63	29.9%	

DISCUSSION

The present study revealed that the prevalence of the diabetic foot complications was lower than other studies and this could be attributed to that most of the subjects were using oral hypoglycemic medications and insulin for management of diabetes. Accordingly, foot ulcers represented 25% of the diabetic complications among patients with type 2 diabetes mellitus (16). Also, in Hail, KSA, the diabetic foot ulcers were presented among 26% of the diabetic subjects (17). In addition, Al-Wahbi reported a higher prevalence of diabetic foot in KSA and the Arab world (18). The most common foot complications in the present study were numbness and tightness which was similar to other studies showing that feet numbness was the chief complain of diabetic subjects (19, 20). The majority of subjects had adequate knowledge about the complications of the diabetic feet diseases and this was constituent with the study of Al-Hariri (17) in Al-Dammam City, KSA where a good and favorable knowledge was present among the most of the

diabetic patients toward the diabetic foot care and complications. The same results indicated a good knowledge about diabetic foot care and complications was found among the diabetic subjects in primary health care facilities in KSA (21). However, in South Africa, the awareness of participants about the diabetic foot complications was suboptimal among most of the participants (22).

The higher levels of educations were correlated with good knowledge. Accordingly, the educational level was significantly associated with good knowledge and impacts the care of the diabetic foot injury (17). Other results were constituent with our results where the most proper knowledge was found among the most educated subjects (4, 22, 23).

CONCLUSION

The level of awareness about complications of the diabetic foot was sufficient among most of Saudi subjects. But, there was an urgent need for raising the awareness and identifying the risk factors, educating the patients through

increasing the patients and doctors relationship. The knowledge alone was not sufficient for assessing the practice pattern thus major studies must be conducted to assess the knowledge, attitude and practice pattern among Saudi subjects.

REFERENCES

1. **Rathmann W, Giani G (2004):** Global prevalence of diabetes: estimates for the year 2000 and projections for 2030. *Diabetes care*, 27: 2568-2569.
2. **IDF (2014):** International Federation of Diabetes Middle East and North Africa: Available at <http://www.idf.org/membership/mena/saudi-arabia>.
3. **Salman A, Robert AA, Al-Ayed MY, Sweidan BA, Aljlouni MM (2016):** Awareness of Diabetic Foot among Type 2 Diabetes in a Tertiary Care Hospital, Saudi Arabia: A Cross-Sectional Study. *Endocrinology&Metabolism International Journal*, 3: 1-11.
4. **Al Odhayani AA, Al Sayed Tayel S, Al-Madi F (2017):** Foot care practices of diabetic patients in Saudi Arabia. *Saudi Journal of Biological Sciences*, 24: 1667-1671.
5. **Dang CN, Boulton AJ (2003):** Changing perspectives in diabetic foot ulcer management. *The international journal of lower extremity wounds*, 2: 4-12.
6. **Mairghani M, Elmusharaf K, Patton D, Burns J, Eltahir O, Jassim G et al. (2017):** The prevalence and incidence of diabetic foot ulcers among five countries in the Arab world: a systematic review. *Journal of wound care*, 26: S27-s34.
7. **Gayle KA, Tulloch Reid MK, Younger NO, Francis DK, McFarlane SR, Wright-Pascoe RA et al. (2012):** Foot care and footwear practices among patients attending a specialist diabetes clinic in Jamaica. *Clinics and practice*, 2: e85.
8. **Chandalia HB, Singh D, Kapoor V, Chandalia SH, Lamba PS (2008):** Footwear and foot care knowledge as risk factors for foot problems in Indian diabetics. *International journal of diabetes in developing countries*, 28: 109-113.
9. **Dinesh PV, Kulkarni AG, Gangadhar NK (2016):** Knowledge and self-care practices regarding diabetes among patients with Type 2 diabetes in Rural Sullia, Karnataka: A community-based, cross-sectional study. *J Family Med Prim Care*, 5: 847-852.
10. **Matricciani L, Jones S (2015):** Who cares about foot care? Barriers and enablers of foot self-care practices among non-institutionalized older adults diagnosed with diabetes: an integrative review. *The Diabetes educator*, 41: 106-117.
11. **Tan CC, Cheng KK, Wang W (2015):** Self-care management programme for older adults with diabetes: An integrative literature review. *Int J Nurs Pract.*, 21 (2): 115-124.
12. **Chellan G, Srikumar S, Varma AK, Mangalanandan TS, Sundaram KR, Jayakumar RV et al. (2012):** Foot care practice - the key to prevent diabetic foot ulcers in India. *Foot (Edinburgh, Scotland)*, 22: 298-302.
13. **Viswanathan V, Madhavan S, Rajasekar S, Chamukuttan S, Ambady R (2005):** Amputation prevention initiative in South India: positive impact of foot care education. *Diabetes care*, 28: 1019-1021.
14. **Saurabh S, Sarkar S, Selvaraj K, Kar SS, Kumar SG, Roy G (2014):** Effectiveness of foot care education among people with type 2 diabetes in rural Puducherry, India. *Indian J Endocrinol Metab*, 18: 106-110.
15. <http://www.calculator.net/sample-size-calculator.html?type=1&cl=95&ci=5&ps=3%2C976%2C000&x=37&y=6>
16. **Singh N, Armstrong DG, Lipsky BA (2005):** Preventing foot ulcers in patients with diabetes. *Jama*, 293: 217-228.
17. **Al-Hariri MT, Al-Enazi AS, Alshammari DM, Bahamdan AS, Al-Khtani SM, Al-Abdulwahab AA (2017):** Descriptive study on the knowledge, attitudes and practices regarding the diabetic foot. *Journal of Taibah University Medical Sciences*. Available at: <http://dx.doi.org/10.1016/j.jtumed.2017.02.001>
18. **Al-Wahbi AM (2006):** The diabetic foot. In the Arab world. *Saudi medical journal*, 27: 147-153.
19. **Goweda R, Shatla M, Alzaidi A, Alzaidi A, Aldhawani B, Alharbi H et al. (2017):** Assessment of Knowledge and Practices of Diabetic Patients Regarding Diabetic Foot Care, in Makkah, Saudi Arabia. *Journal of Family Medicine and Health Care*, 3: 17.
20. **AL-ASMARY AS, MOSTAFA OSA, AL-KHALDI YM (2013):** Diabetic Patients' Knowledge and Practice Regarding Prevention of Diabetic Foot. *The Medical Journal of Cairo University*, 81: 197-205.
21. **Alghshaneen MA, Almuhanha MF, Almuhanha AM, Alghobaish FF, Alajji NA, Alabdullah HJ et al. (2017):** Diabetic Foot Awareness among Diabetic Patients in Saudi Arabia. *Egyptian Journal of Hospital Medicine*, 68: 1289-1290.
22. **Goie TT, Naidoo M (2016):** Awareness of diabetic foot disease amongst patients with type 2 diabetes mellitus attending the chronic outpatients department at a regional hospital in Durban, South Africa. *African journal of primary health care & family medicine*, 8: e1-e8.
23. **Farasat T, Sharif S, Manzoor F, Zafar M, Naz S (2017):** Prevalence of Retinopathy Detected by Fundoscopy among Newly Diagnosed Type 2 Diabetic Patients Visiting a Local Hospital in Lahore. *Pakistan Journal of Zoology*, 49: 1-9.