The Egyptian Journal of Hospital Medicine (January 2018) Vol. 70 (6), Page 1025-1029

Assessment of Self-Awareness and Perception of Diabetic Foot Disease among People with Type 2 Diabetes Mellitus in Tabuk

Ahmad Awadh Alatawi, Mohammed Hamad Alrashedi, Abdulelah Mohammed Alqarni, Abdullah Hamad Almotiri, Sultan Saleh Albalawi, Mohammed Abdullah Alshamrani, Abdulelah Faiz Alasmari

Faculty of Medicine, University of Tabuk, Tabuk/ KSA

Corresponding Author: Ahmad Awadh Alatawi, Email: qqqzy0@gmail.com,Telephone: +966 544918175

ABSTRACT

Background: effective self-management of type-2 diabetes mellitus (T2DM) is crucial to reduce the risk of diabetes-specific complications. Self-management activities included adherence to diet and nutrition advice, physical activity, taking mediations as prescribed and weight and stress management. Evidence suggested that there is poor adherence to self-care practices among diabetes patients globally. Thus, it has become necessary to identity factors that play significant roles in influencing the T2DM patients, adherence to self-care practices. Knowledge about the illness is likely to inform patients about specific actions in the diabetes management process. Thus, the more knowledge patients have about their illness, the more likely they are to comprehend their illness.

Methods: We have conducted a descriptive cross-sectional study in Tabuk city population, Saudi Arabia. The study was conducted during the period from October to December 2017. The participants were selected by random sampling. Sampling included the different geographical areas of the city. The total sample included 120 pupils. All the pupils were approached to obtain the desired sample size. A self-administered questionnaire about diabetes mellitus and diabetic foot disease was filled by the participants.

Results: In this study age of participants was ranged from 30 to 65 year old, with a mean (SD) of 46.67 (9.218) ,the majority were males (65%) and 73.4% were with basic educational level. The mean of duration of T2DM among the people was 7.49(SD=7.377) with range=35. Three quarters of participants reported positive family history of T2DM. Regarding number of family members with history of T2DM, the mean was 1.3(SD=0.975) and range was 5. Participants who reported that their blood sugar was uncontrolled were more than those who reported that their blood sugar was controlled, (Uncontrolled blood sugar 58.3% and controlled blood sugar 41.7%).

Conclusion: More attention is needed on primary prevention programs that focus on awareness and assessment of the diabetic foot disease, and the danger of complications of T2DM and its risk factors.

Keywords: self-awareness, perception, diabetic foot, type 2 diabetes mellitus, Tabuk.

INTRODUCTION

More than 350 million people worldwide were known to have diabetes mellitus (DM) in 2013 and an estimated 592 million are expected to have the disease by 2035. Most of these people are between 40 and 59 years of age, and live in low- and middle-income countries (LMICs)[1,2]. It is also estimated that 50% of people with DM are undiagnosed. The World Health Organization (WHO) estimated that DM will be the seventh leading cause of death in the next 15 years [1]. Effective self-management of type-2 diabetes mellitus (T2DM) is crucial to reduce the risk of diabetes-specific complications, such as hypertension, amputation, nephropathy, neuropathy, retinopathy, cardiovascular disease, impotence, and skin lesions[3,4]. Self-management activities included adherence to diet and nutrition advice, physical activity, taking mediations as prescribed and weight and stress management (5,6). Evidence suggested that there is poor adherence to self-care practices among diabetes patients globally[7]. Thus, it has become necessary to identity factors that play significant roles in influencing the T2DM patients and adherence to self-care practices. Knowledge about the illness is likely to inform patients about specific actions in the diabetes management process. Thus, the more patient's knowledge have about their illness, the more likely they are comprehend their illness and take up self-care behaviors such as diet, exercise and blood sugar testing among others. Diabetes health literacy which is an indication of knowledge has been shown to affect self-care practices among persons living with diabetes[8]. In their study, **van der Heide *et al.*** [8]. examined the mediating role of diabetes knowledge on the relationship between diabetes health literacy and self-care practices found that lower health literacy was significantly associated with less diabetes knowledge, higher glycated hemoglobin (HbA1c) level, less self-control of glucose level and less physical activity. The same study also found that patients with more diabetes knowledge were less likely to smoke and more likely to control glucose levels and that diabetes knowledge mediated the association between health literacy and glucose self-control and between health literacy and smoking[8].

Received: 14/12/2017
Accepted: 24/12/2017

DOI: 10.12816/0044356

A poor and inadequate glycemic control among the patients with type 2 diabetes constitutes a major public health problem and a major risk factor for the development of diabetes complications[9]. One of the most common and distressing complications that affects diabetic patients is diabetic foot disease (DFD)[10,11]. DFD comprises a constellation of vascular and neurological pathologic changes that are the direct result of DM, causing local tissue destruction by sensory neuropathy and compromise of the vascular system of the affected lower extremities in the diabetic persons[1,12]. These contributory factors co-exist in more than 10% of patients at the time of diagnosis of T2DM[11,12]. DFD is a major challenge for the healthcare system in both high-income countries and LMICs, with substantial economic consequences for the patients, their families and society[10,11]. It is estimated that one in every five persons with DM (type 1 and type 2) has a 15% probability of developing a foot infection in a year and 5% of DM patients with DFD will eventually undergo amputation[13,14,15]. Despite various interventions, DFD remains a common and significant clinical problem affecting quality of life and quality of care that disrupts patient's psychosocial and physical state and has a negative impact on their overall perception of the disease[16-18]. DFD leads to physical limitation and functional disability[16-19]. Commonly, DFD develops in areas of the foot exposed to continuous pressure, friction and repetitive trauma. Harmful footwear such as those with unergonomic interiors, high heels and narrow foreparts, are one of the major precipitating causes implicated in the progression to DFD and amputation. Inappropriate shoes are sometimes considered 'enemies of the oppressed foot'[20,21]. Evidence showed that knowledge is associated with better attitudes and practices of foot care and should consequently bring clinical benefit – although this is not always the case, as the quality of care offered at primary healthcare (PHC) level in our settings is often unsatisfactory[22,23]. More studies are required to be performed to evaluate whether clinical benefit may arise from education-targeted community programmes in comparison with the usual care provided[23]. Awareness of good foot care is essential amongst T2DM patients and health care providers to reduce the incidence of foot disease and this would involve: preventing and managing local trauma and/or infection, dealing with foot deformities, managing abnormal pressure points, improving poor glycemic control, managing pre-existing vascular damage and/or peripheral neuropathy, managing associated cardiovascular diseases, improving awareness and self-practice of foot care)[23,24]. The aim of the present study was to assess the level of awareness of DFD and to emphasize the importance of diabetes knowledge in self-care practices as it demonstrated the effects on self-care practices.

METHODS

We have conducted a descriptive cross-sectional study in Tabuk city population, Saudi Arabia. This study was conducted during the period from September to December 2017. The participants were selected by random sampling. Sampling was included form the different geographical areas of the city. The total sample obtained 170 pupils . All the pupils were approached to obtain the desired sample size. Respondents below 30 years old were excluded and the final total sample were 120 pupils. A self-administered questionnaire was done about diabetes mellitus and diabetic foot disease to be filled by participants. A letter that explains the objectives of the study and asks for participants consent was sent with the questionnaire. The questionnaire required information about duration and family history of type2 DM, perceived knowledge of DFD and the preventive measures of DFD and type of the treatment, control and compliance of treatment. The questionnaire responses were analyzed using the Statistical Package for the Social Science (SPSS Inc. Chicago, IL, USA) version 23. Categorical variables were described by frequencies and percentages. Descriptive analysis involved Chi-square test was used to test significance of association between categorical variables. The level of significance was set at $P< 0.05$. The research was approved by the local Research Committee of the Faculty of Medicine, University of Tabuk. Pupils were asked to give their written consents before participation in this study.

RESULTS

Table 1 showed general characteristics of the participants. Age of the participants ranged from 30 to 65 year old, with a mean (SD) of 46.67 (9.218) ,the majority were male (65%) and 73.4% were with basic educational level. **Table 2** showed characteristics of T2DM among people with T2DM. The mean of duration of T2DM among people was 7.49(SD=7.377) and range=35. Three quarters of participants reported positive family history of T2DM. Regarding number of family members with history of T2DM, the mean was 1.3(SD=0.975) and range=5. Participants who reported that their blood sugar is uncontrolled were more than those who reported their blood sugar is controlled, (uncontrolled blood sugar 58.3% and controlled blood sugar 41.7%). **Table 3** showed perception of DFD as a complication of T2DM. More than half of participants were aware of that how serious is DM

can effect on foot sensation (56.7%) and a third do not know that DM can cause gangrene of foot (33.3%). More than third of participants think that carelessness of blood sugar levels was not lead to amputation of the foot(35%) and 31.7% reported that their foot sensation changed since they diagnosed with T2DM. **Table 4** showed types of treatment, compliance to treatment and adherence to follow up of the participants**.** The majority of participants were on anti-diabetic agents (61.7%). About 68.3% of participants were not on regular healthy diet, 40% only were regular on taking their medications for T2DM and more than half of them (58.3%) were regular on doing lab tests of blood sugar levels. **Table 5** showed significant relation between control of T2DM and perceived self-knowledge adequacy of T2DM (p=0.013)**.** Of the total study sample, 36.6% of participants reported un-control of their blood sugar and inadequate self-information and self-knowledge about T2DM. 21.7% of participants believed that they have enough self-information and self-knowledge about T2DM, but with uncontrolled blood sugar.

Table 1: General characteristics of the participants n= 120

Character		
Age	Mean (SD) (y)	46.67 (9.218)
	Range (y)	35
Gender	Male (n (%))	78 (65%)
	Female (n (%))	42 (35%)
Education	Not educated (n (%))	08 (6.6%)
	Primary/ secondary (n (%))	88 (73.4%)
	Graduate (n (%))	24 (20%)
Income	Poor (n (%))	52 (43.4%)
	Average (n (%))	28 (23.3%)
	High (n (%))	40 (33.3%)

Table 2: General characteristics of T2DM of the participants n= 120

Character		
Duration of T2DM	Mean (SD)	7.49 (7.377)
	Range (y)	35
Family History	Yes (n (%))	90 (75%)
	No (n (%))	30 (25%)
Family members with 2DM	Mean (SD)	1.3 (0.975)
	Range (y)	5
T2DM Control	Yes (n (%))	50 (41.7%)
	No (n (%))	70 (58.3%)

Table 3: Perception of DFD as a complication of T2DM

Question	**Frequency**	**Percent**
Do you know how serious is DM can effect on foot sensation		
Yes	68	56.7%
No	52	43.3%
Total	120	100.0%
Do you know that DM can cause gangrene of foot		
Yes	80	66.7%
No	40	33.3%
Total	120	100.0%
Do you think that carelessness of Blood Sugar levels will lead to amputation of the foot		
Yes	78	65%
No	42	35%
Total	120	100.0%
Do your foot sensation affected after having DM		
Yes	38	31.7%
No	82	68.3%
Total	120	100.0%

Table 4: Types of treatment, compliance to treatment and adherence to follow up of the participants

Question	Frequency	Percent
Types of T2DM treatments used by participants		
Diet only	22	18.3%
Anti-diabetic agents	74	61.7%
Insulin	24	20%
Are you regular on healthy diet		
Yes	38	31.7%
No	82	68.3%
Are you regular on your medications at time		
Yes	48	40%
No	72	60%
Are you regular on doing lab tests of blood sugar levels		
Yes	70	58.3%
No	50	41.7%

Table 5: Control of T2DM among perceived self-knowledge adequacy of T2DM

	Do you think that you have enough information and knowledge about T2DM		**Total**
	Yes (n) (%)	**No (n) (%)**	
Are your Blood Sugar under control?	30(25%)	20(16.7%)	50(41.7%)
Yes	26(21.7%)	44(36.6%)	70(58.3%)
No			
Total	56(46.7%)	64(53.3%)	120(100%)

P=0.013

DISCUSSION

In this studyو hundred and twenty participants gave informed consent and received the questionnaire. 62.8% in average, were aware of about DFD, while, another study reported 23.2%[25]. In this study, 31.7% of participants reported that their foot sensation changed since they diagnosed with T2DM, while another study reported 76%[26]. About 61% of participants treated with anti-diabetic agents, in another study, 95% of participants were on medication for T2DM[26].

We reported in this stud that 31.7% only of participants were on regular healthy diet, similar results reported that 33.2% claimed to be always compliant with healthy diet[26]. In this study, we reported only 40% of participants were regular on taking their medications. Another study reported 48%[27].

In this study, participants who were regular on doing lab tests of blood sugar levels were 58.3%. Another study reported that participants who were regular on checking their blood sugar were 65%[27].

CONCLUSION

More attention is needed in primary prevention programs that focus on awareness and assessment of diabetic foot disease and the danger of complications of T2DM and its risk factors. Lifestyle changes such as modifying dietary habits can benefit those who are at risk of developing DFD.

Knowledge of risk factors, symptoms and epidemiology of DFD are essential to prevent development of and identify DFD. This study emphasizes the importance of educating the population about the various risk factors and symptoms of DFD.

REFERENCES

1. **Diabetes. World Health Organization Media Centre (2015):** Available on www.who.int/mediacentre/factsheets/fs312/en/

2. International Diabetes Federation (2013): Available on: www.idf.org/diabetesatlas

3. Mbanya JC, Motala AA, Sobngwi E, Assah FK and Enoru ST(2010): Diabetes in sub-Saharan Africa. Lancet,375:2254–2266

4. **de-Graft Aikins A, Owusu-Dabo E and Agyemang C (2013):** Diabetes in Ghana: a review of research on prevalence, experiences and healthcare. Social Science Series, (1):41–55

5. **Schillinger D, Grumbach K, Piette J, Wang F, Osmond D, Daher C, Palacios J, Sullivan GD, and Bindman AB (2002):** Association of health literacy with diabetes outcomes. JAMA., 288(4):475–82

6. **Norris SL, Lau J, Smith SJ, Schmid CH, and Engelgau MM (2002):** Self-management education for adults with type 2 diabetes a meta-analysis of the effect on glycemic control. Diabetes Care, 25(7):1159–71

7. **García-Pérez LE, Álvarez M, Dilla T, Gil-Guillén V, and Orozco-Beltrán D (2013):** Adherence to therapies in patients with type 2 diabetes. Diabetes Ther., 4(2):175–94

8. **van der Heide I, Uiters E, Rademakers J, Struijs JN, Schuit AJ, and Baan CA(2014):** Associations among health literacy, diabetes knowledge, and self-management behavior in adults with diabetes: results of a Dutch cross-sectional study. J Health Commun., **19**:115–31

9. **Khattab M, Khader YS, Al-Khawaldeh A, and Ajlouni K (2010):** Factors associated with poor glycemic control among patients with Type 2 diabetes. Journal of Diabetes and Its Complications, **24**:84–89

10. **Leung P (2007):** Diabetic foot ulcers – A comprehensive review. Surgeon, **5**(4):219–231.

11. **Boulton A, Vileikyte L, Ragnarson-Tennvall G, and Apelqvist J (2005):** The global burden of diabetic foot disease. Lancet, **366**:1719–1724.

12. Beers MH, Porter RS, Jones TV, Kaplan JL, and Berwits M (2006): Diabetes mellitus and disorders of carbohydrate. The Merck manual of diagnosis and therapy. **18th** edition. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5125263

13. **Desalu O, Salawu F, Adekoya A, Busari O, and Olokoba A (2011):** Diabetic foot care: Self-reported knowledge and practice among patients attending three tertiary hospitals in Nigeria. Ghana Med J., **45**(2):60–65

14. McCulloch D (2017): Patient education: Foot care in diabetes mellitus(Beyond the Basics)**.** Available from: **https://www.uptodate.com/contents/foot-care-in-diabetes-mellitus-beyond-the-basics**

15. **Roaeid R, and Kadiki O (2011):** Prevalence of long-term complications among type 2 diabetic patients in Benghazi, Libya. J Diabetol., **3**(5):1–8

16. Ricco J, Phong LT, Schneider F, Illuminati, G, Belmonte, R, Valagier, A, and Régnault D(2013): The diabetic foot: A review. J Cardiovasc Surg., **54**(6):755–762

17. García-Morales E, Lázaro-Martínez JL, Martínez-Hernández D, Aragón-Sánchez J, Beneit-Montesinos JV and González-Jurado MA. (2011): Impact of diabetic foot related complications on the health related quality of life (HRQol) of patients – A regional study in Spain. Int J Low Extrem Wounds., **10**(1):6–11 Available

18. Winkley K, Stahl D, Chalder T, Edmonds M, and Ismail K (1999): Quality of life in people with their first Diabetic foot ulcer: A prospective cohort study. J Am Podiatr Med Assoc., 5:406–414 Available 19. **Peters E, and Lipsky B (2013):** Diagnosis and management of infection in the diabetic foot. Med Clin North Am., **97**(5):911–946.

20. **Boulton A, and Jude E (2001):** Friends of the oppressed foot? Diabetes Care, **24**(4):615–616.

21**. Nyamu P, Otieno C, Amayo E, and Mcligeyo S (2003):** Risk factors and prevalence of diabetic foot ulcers at Kenyatta National Hospital, Nairobi. East Afr Med J., **80**(1):36–43

22. **Leslie K, and Nkombua L (2012):** Evaluation of general practitioners' routine assessment of patients with diabetes in Tshwane, South Africa. S Afr Fam Pract., **54**(1):68–71

23.**Lincoln N, Radford K, Game F, and Jeffcoate W (2008):** Education for secondary prevention of foot ulcers in people with diabetes: A randomised controlled trial. Diabetologia, **51**(11):1954–1961

24. **Seyyedrasooli A, Parvan K, Valizadeh L, Rahmani A, Zare M, and Izadi T (2015):** Self-efficacy in foot care and effect of training: A single-blinded randomized controlled clinical trial. Int J Community Based Midwifery,**3**(2):141–149

25. **Taksande BA, Thote M, and Jajoo UN (2017):** Knowledge, attitude, and practice of foot care in patients with diabetes at central rural India. J Family Med Prim Care, **6**(2):284-287

26. **Thea T (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. Afr J Prim Health Care Fam Med., **8**(1): 1170

27. **Peraje V, Annarao G and Namratha K (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**(4): 847–852.