LAMPIRAN

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Idea Nursing Journal Vol. VI No. 2 2015
ISSN : 2087-2879

HUBUNGAN LAMA MENDERITA PENYAKIT DENGAN PENGETAHUAN PERAWATAN KULIT DAN KAKI PADA PASIEN DIABETES MELLITUS TIPE 2 DI RUANG MAMPLAM RUMAH SAKIT UMUM DAERAH dr. ZAINOEL ABIDIN BANDA ACEH

Relationship with Knowledge of Older Suffering Disease and Feet On Skin Care Patients Type 2 Diabetes Mellitus in Mamplam Room General Hospital of dr. Zaenoel Abidin Banda Aceh

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ABSTRAK

Pengetahuan pasien diabetes mellitus tentang perawatan kulit dan kaki sangat penting dalam hal mencegah komplikasi dari penyakit ini yaitu ulkus pada kaki dan kulit. Angka insiden komplikasi ulkus pada kaki berkisar antara 8-10%. Faktor yang mempengaruhi salah satunya ialah lama menderita penyakit atau pengalaman. Penelitian ini bertujuan untuk melihat hubungan lama menderita penyakit dengan pengetahuan pasien diabetes mellitus Tipe 2 di ruang mamplam rumah sakit umum daerah dr. Zaenoel Abidin Banda Aceh. Penelitian ini bersifat deskriptif analitik dengan pendekatan *cross sectional study*. Sampel penelitian ini adalah pasien Diabetes Mellitus Tipe 2 sebanyak 68 orang menggunakan teknik *total sampling*. Instrumen penelitian adalah kuesioner, data dikumpulkan melalui wancara dan observasi pada tanggal 1 sampai 14 Februari 2015. Data dianalisa secara univariat dan bivariat, dengan uji statistic *chi-square test* (χ^2) dengan tingkat kemaknaan 0,05 (95%). Berdasarkan hasil uji statistic *chi-square test* (χ^2) diperoleh nilai χ^2 hitung = 0,662 nilai tersebut lebih besar dari α = 0,05 maka diperoleh ada hubungan antara Lama Menderita Penyakit Dengan Pengetahuan Perawatan kaki dan Kulit Pada Pasien Diabetes Mellitus tipe 2 di Ruang Mamplam RSUD dr. Zaenoel Abidin Banda Aceh. Kepada perawat selalu memberikan informasi tentang penyakit yang diderita oleh pasien meskipun pasien tidak memintanya.

Kata Kunci: Lama Menderita Penyakit, Pengetahuan, Diabetes Mellitus.

ABSTRACT

Abortion is a fetus weighing less than 500 g or having completed less than 20 weeks gestational age at the time of expulsion from the uterus, having no chance of survival. The abortus woman attitude is affected by the support that given by husband, family, friends and health care provider. Many factors assumed as etiology of spontaneous abortion, include mother factor, fetal factor and others eksternal factors. Mother factors such as age, paritas, previous history of abortus, genital infection, chronic disease, unwell uterus, mioma, poor lifestyle, drugs, fear and stress, sex activity and orgasme during pregnant and fatique-induced activity. Fetal factor related to abortion such as abnormality of chromosom. The others eksternal factors include fisical injury, radiation, pollution, pesticides and on overcapacity megnet area. Regarding the rules of maternity nurses as educator, the patients must be given appropriate information and education in order to prevent and know early conditions affected abortus.

Keywords: Long Times Illness, Knowledge, Diabetes Mellitus *Health polytechnic lecturers RI health department Aceh*

PENDAHULUAN

Diabetes mellitus merupakan penyakit metabolik, dengan prevalensi antara 10-15% dan berdasarkan hasil penelitian insiden untuk terjadinya ulkus pada kaki antara 8-10% (Alex et al., 2010) Sehingga dibutuhkan kemampuan pasien dalam mengatur pola hidup termasuk dalam menjaga kebersihan kulit dan kaki. Hal ini sangat penting terutama untuk menurunkan angka komplikasi penyakit (Holman & Lorig, 2004). Kemampuan tersebut merupakan identik dengan sejauhmana usaha pasien mengatur pola hidupnya atau manajemen diri *(Self manajemen). Self manajemen* pasien diabetes mellitus kepada beberapa kegiatan yaitu pemantauan tanda-tanda dan gejala, mempertahankan dan meningkatkan perilaku kesehatan, dan mengatasi dampak negatif dari

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penyakit pada fungsi fisik pasien, perasaan emosional, dan hubungan interpersonal (Huang, Zhao, Li, & Jiang, 2014) Banyak penelitian menunjukan manajemen diri yang baik dapat meningkatkan atau mengontrol kadar glukosa darah dan mengurangi komplikasi (Ilanne-Parikka et al., 2010). Hal tersebut termasuk kemungkinan yang paling buruk dari komplikasi diabetes yaitu amputasi anggota gerak bagian bawah akibat dari berkurangnya aliran darah ke daerah perifer (Bowering, 2001). Kondisi ini 84% diawali dengan nekrosis, gangren, atau cacat kulit yang dalam pada daerah pergelangan kaki pasien diabetes yang merupakan jalan masuk untuk infeksi lebih parah. (Barshes et al., 2013) Banyak faktor yang dapat menyebabkan terjadinya luka pada ganggren pada pasien diabetes diantaranya adalah kualitas pelayanan perawatan perawatan kaki yang buru, sehingga harus dilakukan upaya pencegahan dan pendeteksian dini (Alvarsson, Sandgren, Wendel, Alvarsson, & Brismar, 2012). alam hal ini tidak hanya tergantung kepada pemberi pelayanan perawatan semata tetapi juga hasil kerjasama antar multidisiplin ilmu (Barshes et al., 2013). Namun tuntutan terhadap pengetahuan dan motivasi pasien dalam melakukan perawatan kaki dan kulit sangat penting. Keterbatasan pengetahuan dalam perawatan kaki merupakan faktor risiko penting untuk masalah kaki pada pasien diabetes (George et al., 2013). Sehubungan dengan hal tersebut secara umum ada banyak faktor yang mempengaruhi pengetahuan pasien, yaitu umur, pendidikan, pekerjaan, paparan media masa, hubungan sosial dan pengalaman yang diperoleh pasien sejak menderita penyakit penyakit (Notoadmodjo, 2003) Pengalaman adalah salah satu hal yang sangat penting bagi penderita diabetes mellitus, diharapkan dengan pengalaman tersebut pasien dapat mandiri untuk mendeteksi dini dan mencegah komplikasi yang akan timbul dari penyakit diabetes yang dideritanya. Data hasil pengumpulan data awal menunjukan bahwa dari 5 orang pasien yang ditanyakan tentang cara perawatan kaki dan kulit, maka 3 orang menjawab kurang mengetahui cara perawatan luka diabetik dan 2 orang sudah mengetahui tujuan dari perawatan kaki dan kulit yaitu untuk pencegahan komplikasi luka, dari hasil observasi juga didapatkan 5 orang pasien memiliki resiko tinggi luka ulkus, ganggren, dan nekrosis, 60% dari pasien tersebut sudah berulang kali menjalani perawatan diabetes.

Penelitian ini bertujuan untuk mengetahui hubungan lama menderita penyakit dengan pengetahuan pasien diabetes mellitus Tipe 2 di ruang mamplam rumah sakit umum daerah dr. Zaenoel Abidin Banda Aceh.

METODE

Penelitian ini bersifat deskriptif analitik dengan desain *cross sectional study*. Sampel penelitian adalah pasien Diabetes Mellitus Tipe 2 yang menjalani perawatan di ruang Mamplam RSUD Dr. Zaenoel Abidin Banda Aceh dari tanggal 1 sampai dengan 14 Februari 2015 yang berjumlah 68 orang, tehnik pengambilan sampel dengan *Total Sampling*. Data dikumpulkan dengan wawancara dan observasi. Tahapan Pengolahan data yaitu; e*diting,* c*oding, transfering dan tabulating.* Analisa data univariat dalam bentuk tabel distribusi frekuensi dan analisa Bivariat menggunakan sistem komputerisasi dengan uji statistik chi-square (χ^2), derajat kebebasan (df) 1, tingkat kemaknaan (α) 0,05 (5%).

HASIL

Analisis Univariat

Karakteristik Responden

Tabel 1. Karakteristik Responden Penelitian Hubungan lama menderita penyakit dengan pengetahuanperawatan kulit dan kaki pada pasien diabetes mellitus tipe 2 di ruang mamplam RumahSakit Umum Daerah dr. Zainoel Abidin Banda Aceh

No	Karakteristik	Frekuensi	Persentase
1	**Umur**		
	a. Usia Pertengahan	42	**61,8**
	b. Usia Lanjut	26	**38,2**
	Jumlah	68	**100**
2	**Jenis Kelamin**		
	a. Laki-laki	26	**38,2**
	b. Perempuan	42	**61,8**
	Jumlah	68	**100**

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No	Karakteristik	Frekuensi	Persentase
3	**Pendidikan**		
	a. Dasar	14	**20,6**
	b. Menengah	24	**35,3**
	c. Tinggi	30	**44,1**
	Jumlah	68	**100**
4	**Pekerjaan**		
	a. Tani	9	**13,2**
	b. IRT	17	**25,0**
	c. PNS	12	**17,6**
	d. Wiraswasta	15	**22,1**
	e. Pedagang	5	**7,4**
	f. Pensiunan	10	**14,7**
	Jumlah	**68**	**100**

Sumber: Data Primer (Diolah, 2015)

Data karakteristik responden terdiri dari; umur, pendidikan, jenis kelamin, pekerjaan dan secara rinci dapat dilihat pada tabel.1

Berdasarkan tabel 1 didapatkan karakteristik pasien penderita Diabetes Mellitus Tipe 2 yang menjadi responden dalam penelitian ini ialah; dari segi umur sebagian besar responden berusia pertengahan yaitu antara 45 - 59 tahun sebanyak 42 orang (81,8%), pembagian usia ini berdasarkan teori Hurlock (1999), dari segi jenis kelamin responden yang didominasi oleh perempuan sejumlah 42 orang (61,8%), dari segi pendidikan sebagian besar responden adalah tingkat pendidikan tinggi sebanyak 30 orang (44,1%), sedangkan dari segi pekerjaan sebagian besar responden adalah ibu rumah tangga, sejumlah 17 orang (25,0%).

Lama Menderita Penyakit

Pembagian katagori lama menderita penyakit pada penderita diabetes mellitus dalam penelitian ini dibagi kedalam dua katagori, yaitu < 5 tahun dan ≥ 5 tahun seperti pada tabel. 2 berikut ini:

Tabel 2. Distribusi frekwensi responden berdasarkan lama menderita penyakit diabetes mellitus tipe 2 di ruang mamplam Rumah Sakit Umum Daerah dr. Zainoel Abidin Banda Aceh

No	Lama Menderita Penyakit	Frekuensi (f)	Persentase (%)
1	- < 5 Tahun	25	**36,8**
2	- ≥ 5 Tahun	43	**63,2**
	Jumlah	**68**	**100**

Sumber: Data Primer (Diolah, 2015)

Berdasarkan tabel 2 dibawah didapatkan bahwa sebagian besar responden sudah mengalami penyakit lebih dari 5 tahun yaitu 43 orang atau 63,2%.

Pengetahuan Responden Tentang Perawatan Kaki dan Kulit.

Pembagian katagori pengetahuan responden terbagi atas 2 katagori, yaitu tinggi dan rendah, ditunjukan pada tabel 3 berikut ini.

Berdasarkan tabel 3 diatas dapat diketahui bahwa secara umum pengetahuan responden tentang perawatan kulit dan kaki berada pada katagori tinggi, yaitu 35 orang (51,5%) dari 68 orang pasien Diabetes Mellitus yang menjadi responden.

Distribusi Jawaban responden berdasarkan isi kuesioner

Sedangkan distribusi jawaban responden berdasarkan jawaban yang benar diuraikan pada tabel 3.

Tabel 3. Distribusi frekwensi pengetahuan responden tentang cara perawatan kaki dan kulit di ruang mamplam Rumah Sakit Umum Daerah dr. Zainoel Abidin Banda Aceh

No	Pengetahuan Terhadap Perawat Kulit dan Kaki	Frekuensi (f)	Persentase (%)
1	- Tinggi	35	**51,5**
2	- Rendah	33	**48,5**
	Jumlah	**68**	**100**

Sumber: Data Primer (Diolah, 2015)

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Tabel 4. Distribusi jawaban responden berdasarkan jawaban benar tentang cara perawatan kaki dan kulit di ruang mamplam Rumah Sakit Umum Daerah dr. Zainoel Abidin Banda Aceh

No	Perawatan Kaki	Jumlah
1	Perawatan kaki dapat dilakukan dengan pemeriksaan telapak kaki.	31%
2	Perawatan kaki tidak dilakukan dengan pemeriksaan jari-jari kaki.	81%
3	Perawatan kaki tidak dilakukan dengan pemeriksaan disela-sela jari.	60%
4	Perawatan kaki dapat dilakukan pada saat mandi	90%
5	Untuk merawat kaki dapat digunakan air hangat	31%
6	Untuk merawat kaki tidak perlu menggunakan sabun	35%
7	Agar kaki tidak retak pelembab dapat digunakan pada daerah kaki	59%
9	Untuk menlidungi aki agar tidak terluka tidak perlu memakai alas kaki di dalam rumah	75%
8	Saat memotong kuku yang terlalu keras perlu direndam didalam air hangat.	37%
10	Pemilihan sepatu sangat berpengaruh terhadap kesehatan kaki	60%
	Rata-rata	56%
	Perawatan Kulit	
11	Agar kulit tidak kering digunakan pelembab lation agar kulit terjaga kelembaban.	84%
12	Keringat yang berlebihan dapat menyebabkan infeksi	81%
13	Agar kulit tidak terlalu kering menghindari mandi dengan air panas	90%
14	Agar kulit tidak kering menjaga kadar keringat yang tidak berlebihan	66%
15	Pada celah-celah kulit dapat ditaburi dengan bedak agar terjaga kelembaban	68%
16	Pakaian jenis kain katun dapat menyerab keringat.	69%
17	Mengkomsusmsi jus buah setiap hari tidak mendukung terjaganya kelembaban kulit	75%
18	Penggunaan air panas saat mandi dapat menjaga kehalusan kulit	65%
	Rata-rata	72%

Pada tabel 4. Diatas tergambar bahwa sebagian besar responden telah mengetahui hal-hal yang harus diperhatikan dalam perawatan kaki dan kulit. Untuk perawatan kaki rata-rata responden menjawab dengan benar mencapai 54% sedangkan untuk perawatan kulit rata-rata responden menjawab dengan benar 72%.

Analisis Bivariat

Untuk mengetahui Hubungan Lama Menderita Penyakit Dengan Pengetahuan Perawatan Kulit dan Kaki Pada Pasien Diabetes Mellitus Di Ruang Mamplam RSUD dr. Zainoel Abidin Banda Aceh, maka didapatkan X^2 hitung seperti pada tabel 5.

Berdasarkan tabel. 5 didapatkan bahwa dari 25 responden yang menderita penyakit kurang dari 5 tahun terdapat sebanyak 13 orang atau 52% berpengetahuan rendah tentang perawatan kulit dan kaki, sedangkan dari 43 orang responden yang menderita penyakit lebih dari 5 tahun terdapat 23 orang responden atau 53,5% memiliki pengetahuan yang tinggi tentang perawatan kulit dan kaki.. Dari hasil uji statistik

Tabel.5 Hubungan Lama Menderita Penyakit Dengan Pengetahuan Perawatan Kulit dan Kaki Pada Pasien Diabetes Mellitus Di Ruang Mamplam RSUD dr. Zainoel Abidin Banda Aceh

Lama Menderita Penyakit	Tingkat Pengetahuan		Total	α	χ^2
	Rendah	Tinggi			
< 5 Tahun	13 (52 %)	12 (48 %)	25 (100 %)		
≥ 5 Tahun	20 (46,5 %)	23 (53,5%)	43 (100 %)	0,05	0,662
Jumlah	33	35	68		

Sumber: Data Primer (Diolah, 2014)

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didapatkan nilai $\chi^2 = 0.662 > \alpha$ 0,05 berarti terdapat hubungan antara Lama Menderita Penyakit Dengan Pengetahuan Perawatan Kulit dan Kaki Pada Pasien Diabetes Mellitus Di Ruang Mamplam RSUD dr. Zainoel Abidin Banda Aceh.

PEMBAHASAN

Hasil uji statistik didapatkan nilai p-value 0,662 > α 0.05 berarti penelitian ini menemukan terdapatnya hubungan antara Lama Menderita Penyakit Dengan Pengetahuan Perawatan kaki dan Kulit Pada Pasien Diabetes Mellitus tipe 2 di Ruang Mamplam RSUD dr. Zaenoel Abidin Banda Aceh Tahun 2015. Hal ini sesuai dengan pendapat Notoadmodjo (2003) bahwa faktor yang mempengaruhi pengetahuan seseorang adalah pengalaman, sebab semakin lama responden menderita penyakit diabetes mellitus maka pengalamannya terhadap tersebut juga bertambah. Pengalaman yang sudah diperoleh secara tidak langsung juga akan menambah pengetahuan seseorang, sehingga semakin banyak pengalaman seseorang semakin tinggi pula pengetahuannya (Arikunto & Suhartini, 1997), (Notoadmodjo, 2003). Penelitian ini menemukan bahwa tinggi rendahnya pengetahuan responden karena sebagian besar responden sudah lama menderita penyakit Diabetes Mellitus. Secara tidak langsung pasien telah menjadikan pengalamannya dalam meningkatkan pengetahuan. Selain itu aspek-aspek yang dinilai dari responden dalam penelitian ini berhubungan dengan upaya atau kegiatan keseharian mereka dalam hal mengurangi resiko infeksi lebih lanjut, hal ini sesuai dengan salah satu dari 4 standar perilaku kesehatan utama bagi penderita diabetes yang beresiko infeksi pada kaki dan kulit (Mcinnes et al., 2011). Namun penelitian terkait juga pernah dilakukan pada 3 buah rumah sakit besar di Nigeria pada tahun 2009, dari 352 responden 30% memiliki pengetahuan yang baik menyangkut hal-hal yang biasa dilakukan setiap hari seperti dalam hal memilih sepatu, dan selebihnya memiliki pengetahuan yang buruk sehingga berdampak kepada perilaku mereka sehari-hari seperti tidak memakai sepatu dengan ukuran yang sesuai mencapai 88,6%, tidak mengenali tanda-tanda kemerahan pada kaki dan kulit 61,4%, sehingga penelitian ini merekomendasikan pendidikan khusus kepada pasien tersebut (Desalu, Salawu, Jimoh, Adekoya, & Busari, 2011). Faktor lain yang memiliki potensi mempengaruhi pengatahuan responden dalam penelitian ini ialah jenis kelamin, pendidikan dan pekerjaan. Dari segi jenis kelamin 42 orang atau 61,8% responden adalah perempuan, yang sebagian besarnya adalah ibu rumah tangga (IRT) sebanyak 25% dengan pendidikan 44,1% tingkat tinggi, meskipun ke-3 variabel tersebut harus dibuktikan secara statistik hubungannya dengan pengetahuan responden. Faktor lain yang memiliki potensi dalam mempengaruhi pengetahuan yang tidak bisa dikesampingkan adalah peran dari tenaga kesehatan khususnya perawatan yang ada di rumah sakit. Peran mereka sangat menentukan sekali dalam memberikan bimbingan atau promosi kepada pasien bagaimana cara pasien dapat menghindari komplikasi penyakitnya baik secara langsung atau dengan menyediakan fasilitas promosi kesehatan (Aalaa, Malazy, Sanjari, Peimani, & Mohajeri-Tehrani, 2012). Hal ini dapat dilihat langsung pada unit rawat jalan RSUDZA yaitu poli endokrin dengan penyediaan poster-poster bagimana perawatan kaki dan kulit pasien diabetes dan bentuk program promosi kesehatan lain yang tidak terungkap dalam penelitian ini.

KESIMPULAN

Hasil penelitian ini telah melihat tentang hubungan antara antara Lama Menderita Penyakit Dengan Pengetahuan Perawatan kaki dan Kulit Pada Pasien Diabetes Mellitus tipe 2 di Ruang Mamplam RSUD dr. Zainoel Abidin Banda Aceh. Namun tidak dapat dipungkiri bahwa selain faktor pengalaman lama menderita penyakit ada banyak faktor lain mempengaruhi pengetahuan responden tersebut yang harus dibuktikan kebenarannya. Namun yang jelas faktor-faktor tersebut sedikit banyaknya berkontribusi dalam meningkatkan kualitas hidup pasien diabetes mellitus sehingga dapat mengurangi resiko komplikasi terutama pada kaki dan kulit. Dalam proses penelitian ini peneliti mendapat banyak bantuan dari berbagai pihak terutama manajemen RSUD dr. Zainoel Abidin Banda Aceh.

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Pourkazemi *et al. BMC Endocrine Disorders* (2020) 20:40
https://doi.org/10.1186/s12902-020-0512-y

BMC Endocrine Disorders

RESEARCH ARTICLE Open Access

Diabetic foot care: knowledge and practice

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Abstract

Background: Diabetic foot ulcers (DFUs) are common problems in diabetes. One of the most important factors affecting the quality of diabetes care is knowledge and practice. The current study aimed at determining the knowledge and practice of patients with diabetes regarding the prevention and care of DFUs.

Methods: The current analytical, cross sectional study was conducted in Guilan Province (north of Iran) on 375 patients registered in the medical records as type 2 diabetes mellitus. Demographic characteristics, knowledge, and practice of participants were recorded in a questionnaire during face-to-face interviews conducted by the researcher. Descriptive and inferential statistics were performed using SPSS version18.

Results: The mean score of knowledge was 8.63 ± 2.5 out of 15, indicating that the majority of participants had a poor knowledge (84.8%). The mean practice score was 7.6 ± 2.5 out of 15, indicating that a half of them had poor performance (49.6%). There was a significant and direct correlation between knowledge and practice. Knowledge level, place of residence, marital status, and history of admission due to diabetic foot were predictors of practice score.

Conclusions: According to the low level of knowledge and practice in patients with diabetes regarding the prevention and care of DFUs, and considering the significant relationship of some demographics of patients with knowledge and practice scores, a targeted educational program is needed to promote knowledge of patients with diabetes.

Keywords: Diabetic foot, Diabetes mellitus, Knowledge, Practice, Foot ulcer

What is already known about this subject?

- Diabetes accounted for 1.3 million deaths (2.4% of all death). The prevalence of diabetes varies among countries in Eastern Mediterranean Region (EMR).
- Prevalence of diabetes mellitus in Iran ranged 20 to 30% in different provinces with higher frequency among females from 1990 to 2013.
- Among people living with diabetes mellitus, 20% are at risk for foot ulceration as a result of neuropathy.
- Diabetic foot ulcers (DFUs) are one of most common diabetes complications with 0–4% prevalence.
- Good knowledge and practice regarding DFU reduces the risk of diabetic foot complications and ultimately amputation.

What are the new findings?

- In the current study, 84.8% of the participants had poor knowledge and only 8.8% had good practice. There was a direct and significant correlation between knowledge and practice.
- The lowest knowledge scores belonged to the use of talcum powder or other powders and not using lotions between the toes.

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– The strongest variables related to practice were knowledge, place of residence, marital status, and history of admission due to diabetic foot, indicating that these four variables were the predictors of practice score.

How might this impact on clinical practice in the foreseeable future?

– Patients' knowledge about foot ulcer prevention should be promoted based on guidelines both in community and hospitals.
– Adherence to guidelines prevents DFU; targeted interventions directed toward patients/health care providers can lead to reduced DFU complications.

Background

Diabetes mellitus is a group of common metabolic disease characterized by hyperglycemia. Due to multiple and prolonged complications, diabetes affects almost all systems of the body [1]. Diabetes caused 1.3 million deaths (2.4% of all death) and 56 million disability adjusted life years (DALYs) in 2013. The diabetes DALY rate increased from 589.9 per 100,000 in 1990 to 883.5 per 100,000 populations in 2013. Total DALYs from diabetes increased by 148.6% during 1990–2013; population growth accounted for a 62.9% increase, and aging and increase in age-specific DALY rates accounted for 31.8 and 53.9%, respectively [2]. The prevalence of diabetes varies among countries in EMR. In Saudi Arabia, the prevalence of diabetes was reported 13.4% Saudis aged 15 years or older [3] and in Pakistan 12.1% for males and 9.8% for females aged ≥25 years [2]. A systematic review on the prevalence of type 2 diabetes in Iran showed a range of 3 to 20% in different provinces [4].

Of people living with diabetes, 20% are at high risk of foot ulceration as a result of neuropathy [5]. Diabetic foot ulcers (DFU_S) comprise 12–15% of total estimated cost of diabetes in the developed countries, increasing to 40% in the developing countries [6]. DFUs are one of the most common diabetes complications with 4 to 10% prevalence in the affected population [7]. The overall incidence of DFU is 5.8–6.0% in some particular diabetic in the U. S, while it is 2.1–2.2% in smaller populations in Europe [8]. Treating foot ulcers can be expensive and it is evident that about 49–85% of all DFU_S can be prevented by raising awareness and taking proper measures [7]..

Among the complications of diabetes, DFU_S affects the patient's quality of life in case of amputation. However, it is possible to prevent amputation using educational and care strategies [9]. Data show that 25% of patients with diabetes develop a foot ulcer in their lifetime and that the cost of treating a DFU_S is more than twice that of any other chronic ulcer [10]. Diabetic foot amputation remains an unpleasant impact on patients' life more than other complications [11, 12]. Delays in referral of serious foot problems are of particular concern [5]. Ndosi et al., reported that 15.1% of patients died within the year of presentation, the ulcer had healed in 45.5%, but recurred in (9.6%). Participants with a single ulcer on their index foot had a higher incidence of healing than those with multiple ulcers (hazard ratio 1.90, 95% CI 1.18 to 3.06) [13].

Understanding the level of knowledge and practice in patients with diabetes is important in planning for the better control of diabetes and its complications. A study by Ahmad and Ahmad on 124 patients with diabetes in North India reported that 60.5 and 79.0% got lower scores in knowledge and practice toward diabetes, respectively [14]. Jackson IL et al., reported that 79.5% of patients with diabetes in Nigeria had more than 70% of overall knowledge about self-care [15]. The results of a study in Malaysia showed that the most patients (58%) had poor knowledge and 61.8% of them had poor practice of foot care [16].

Among diabetes complications, the foot ulcers are considered as the most preventable ones. Risk factors of DFU_S are correlated with poor practices and knowledge. Good knowledge and practice toward diabetic foot care reduces the risk of diabetic foot complications and ultimately amputation [7]. According to American Diabetes Association, annual assessments of knowledge, skills and behaviors are necessary for patients with diabetes [15].. The current study was conducted to assess patients' knowledge and practice toward diabetic foot care. No similar study is conducted in Rasht City (the capital of Guilan Province, Northern Iran) thus far; therefore, the present study aimed at evaluating the level of practice and knowledge toward foot care in patients with type 2 diabetes mellitus. Health system can prevent DFU and amputation by applying a strategy to raise knowledge in patients.

Methods

Study design and subjects

The current analytical, cross sectional study was conducted at a clinic in Razi Hospital, affiliated to Guilan University of Medical Sciences, which is the only endocrine disease referral center across the province. Data were gathered from May to July 2017 and the subjects were selected by consecutive sampling. To Diagnostic and classify the patients, the American Diabetic Association, the diagnostic criteria were utilized [17]. Patients with diabetes receive care, education, treatment, and other services at this center. The center also delivers healthcare services to outpatients and inpatients, as well as routine training. The research project was approved by the Deputy of Research, Guilan University of Medical Sciences. Participation in the study was voluntarily and

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the subjects were informed about their right to withdraw from the study at any stage. The participant's privacy was respected, and data were kept confidential and utilized for study purposes only. Participants were asked to read and sign an informed consent form. Inclusion criteria were: receiving the diagnosis of type 2 diabetes mellitus, age 18 years or above, taking anti-diabetic medications for at least 1 month prior to the study, having clinical records at the center, and willing to participate in the study. The exclusion criteria were: critically ill patients with diabetes, pregnant or newly diagnosed (less than 1 month) patients, receiving any other treatment or therapy, and having major psychiatric problems. A structured datasheet was used to collect demographic and clinical information of the patients using paper-based and digital records archives. Some information was also collected by a medical student through face-to-face interviews. A paper-based questionnaire was distributed among both outpatients and inpatients. Wagner DFU classification system was used to classify the patients based on ulcers. In this hospital, we assessed peripheral neuropathy, retinopathy and peripheral vascular disease (PVD), respectively by using monofilament testing, optometrist or ophthalmologist reports and the clinical diagnosis documented by the surgeon or, if available, images taken through arterial Doppler or angiography. Macro vascular disease was defined as any macro vascular complications other than PVD including prior myocardial infarction, angioplasty, coronary artery bypass grafting, ischemic heart disease, or stroke [18].

In the current study, having one or two more complications was considered a positive condition. The sample size was determined 375 considering 95% confidence interval with d = 0.05 and $P = 0.58$. A total of 375 out of 395 distributed questionnaires were completed and returned; the response rate was 94.4%.

Measures

A three-section questionnaire was used in the current study. First section included demographic characteristics such as age, gender, and duration of diabetes mellitus, place of residence, occupation, and level of education, marital status, and body mass index. Second part consisted of 15 questions about knowledge scored based on nominal (yes/no/I don't know) scale, and third part with 15 questions focusing on practice was scored based on "yes/no" scale. The questionnaire was used to measure the level of knowledge and practice of subjects toward diabetic foot care. Patients' demographic data were collected to analyze factors associated with knowledge and practice toward diabetic foot care. Each correct answer was given 1 point; however, wrong answers or choosing "I don't know" option was given 0 point. The total score for each part ranged 0 to 15. Good or poor level of knowledge was determined based on the 75% of the maximum score of the questionnaire; therefore, the scores higher than 11.25 were considered good and those lower than 11.25 were considered poor. Examples of the questions included "Do you care about your diabetes?"; "Do you wash your feet every day?"; "Do you check the water temperature before using it?" and "Do you dry your feet after washing?"

The questionnaire was translated into the Persian language. Following the translations conducted by an Iranian professor of English literature, a native bilingual English speaker translated it back into English. Content validity was determined by gathering the views of 15 medical and nursing professionals after reviewing the questionnaire. Content validity ratio (CVR) and content validity index (CVI) of the questionnaire were assessed. Mean scores of CVI and CVR were higher than 0.80. Cronbach's α coefficients were computed to evaluate reliability of knowledge and practice, which were 0.80 and 0.85, respectively.

Statistical analysis

After collecting data, descriptive statistics (frequency, mean, and standard deviation) were employed to summarize patients' socio-demographic data and Chi-square test to investigate association between predictors (factors) and knowledge and practice level. In order to assess the differences between groups, the Wilcoxon, Mann-Whitney, and Kruskal-Willis tests were used for continuous variables. Factors related to knowledge and practice was estimated by multiple regressions. In this research, wrong answers and "I don't know" merged as poor awareness. In order to assess the relationship between individual variables with knowledge and practice, we had to integrate these two items in order to have a better analysis. Variables with a P-value of < 0.1 were included in the multi-variate models. P-value < 0.05 was considered as the level of significance. All analyses were performed using SPSS version 18.

Results

The mean (± SD) age of the 375 participants was 55.4 (± 12.9) years, and 56.4% were female. Majority of patients had diabetes for less than 10 years (54.1%), were female (56.5%), urban residents (62.1%), illiterate or had elementary education (73.1%), did not have normal BMI (69.8%), and (10.6%) patients had 2 and more complications (Table 1). In terms of knowledge, only 57 participants (15.2%) had good knowledge, most of them (84.8%) had poor knowledge, and the mean score of patients' knowledge was 8.63 ± 2.65. The highest percentage of correct answers was found with the knowledge about "The need for meeting or consulting a physician, if there were signs of wounding" (88.8%), followed by "Not walking without shoes" (83.5%) and "Washing and

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Table 1 Demographic Data of Participants

Characteristics	Gender		Total (*N* = 375)
	Female (*n* = 212)	Male (*n* = 163)	
Age, yrs. (mean ± SD)	54.62 ± 12.48	56.40 ± 13.31	55.4 ± 12.9
Education			
Illiterate	80 (37.7)	17 (10.4)	97 (25.9)
Read and write	5 (2.3)	15 (9.2)	20 (5.3)
Primary	85 (40)	72 (44.7)	157 (41.9)
Diploma	29 (13.6)	33 (20.2)	62 (16.5)
University	16 (7.5)	23 (14.1)	39 (10.4)
Marital status			
Single	200 (94.3)	143 (87.7)	30 (8)
Married	10 (4.7)	20 (8)	343 (91.4)
Divorced	1 (0.5)	0 (0)	1 (0.2)
Widowed	1 (0.5)	0 (0)	1 (0.2)
Occupation			
Civil servant	9 (4.2)	16 (9.8)	25 (6.7)
Self-employed/business	5 (2.3)	37 (22.6)	42 (11.2)
House wife	166 (78.3)	0 (0)	166 (44.3)
Student	7 (3.3)	6 (3.6)	13 (3.5)
Farmer	17 (8)	33 (20.2)	50 (13.3)
Retired	8 (3.7)	71 (43.5)	79 (21.1)
Place of residence			
Urban	135 (63.7)	98 (60.1)	233 (62.1)
Rural	77 (36.3)	65 (39.9)	142 (37.9)
Duration of diabetes (yrs.)			
< 10	116 (54.7)	87 (53.4)	203 (54.1)
> =10	96 (45.3)	76 (46.6)	172 (45.8)
Diabetic foot ulcer			
Yes	36 (17)	51 (31.3)	87 (23.2)
No	176 (83)	112 (68.7)	288 (76.8)
History of amputation			
Yes	23 (10.8)	37 (22.7)	60 (16)
No	189 (89.2)	126 (77.3)	315 (84)
History of hospitalization			
Yes	31 (14.6)	45 (27.6)	76 (20.2)
No	181 (85.4)	118 (72.4)	299 (79.7)
Body mass index (kg/m^2)			
Underweight	3 (1.4)	4 (2.5)	7 (1.9)
Healthy weight	51 (22.1)	62 (38)	113 (30.1)
Overweight	92 (43.5)	80 (49.1)	172 (45.9)
Obesity	66 (31.1)	17 (10.4)	83 (22.1)
Complications(> = 2)			
Yes	10 (4.71)	30 (18.4)	40 (10.6)
No	202 (95.2)	133 (81.5)	335 (89.3)
Family history of diabetes			
Yes	20 (14.8)	40 (24.5)	60 (16)
No	192 (90.5)	123 (75.4)	315 (84)
Current smoker			
Yes	15 (7.07)	89 (54.6)	104 (27.7)
No	197 (92.9)	74 (45.3)	271 (72.2)

changing socks" (9.81%). The lowest knowledge was about "The use of talcum powder or other powders between the toes" (3.5%), followed by "Not using lotion between the toes" (22.24%), and "The proper method of trimming the toenails" (23.2%).

In terms of practice, only 33 patients (8.8%) had a good practice; most of them (91.2%) had a poor practice (Table 2), and the mean score of patients' practice was 7.6 (± 2.5). The participants reported their best practice toward "Importance of diabetes control" (80.5%), followed by "Meeting or consulting a physician, in case of signs of DFU" (79.2%). The poorest practice was toward "The use of talcum powder between the toes" (2.7%), followed by "Proper method of trimming the toenails" (25.9%), and "Keeping the foot skin soft" (30.9%).

There was a direct and significant correlation between knowledge and practice ($P < 0.0001$, $r < 0.8$) (Fig. 1). There was a significant relationship between knowledge score and gender, duration of diabetes, occupation, level of education, place of residence, having DFU, hospital stay history, and amputation history.

The study results showed that patients with more than 10 years history of diabetes, history of DFU, history of hospital stay or experience of lower limb amputation due to DFU, female gender, and the ones with complications had higher knowledge ($P < 0.05$).

There was a significant correlation between practice score and gender, duration of diabetes, occupation, level of education, and place of residence ($P < 0.05$) (Table 3).

Also, based on multiple regression, the strongest variables related to practice were knowledge score ($P < 0.0001$), place of residence ($P < 0.03$), marital status ($P = 0.008$), and DFU ($P = 0.02$), indicating that these four variables were the predictors of foot care practices in the current study (Table 4).

Discussion

In the current study, majority of patients with diabetes had lower levels of education. Studies report that level of knowledge depends on the level of education [14, 19]. Understanding this variable is highly important in designing strategies to prevent diabetes.

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Table 2 Distribution of Patients According to Knowledge and Practice

Variable	Good Score			Poor Score		
	Female	Male	Total	Female	Male	Total
Knowledge	39 (18.4)	18 (11)	57 (15.2)	173 (81.8)	145 (89)	318 (84.8)
Practice	24 (11.4)	9 (5.5)	33 (8.8)	188 (88.7)	154 (94.5)	342 (91.2)

In the current study, most patients had lower scores of knowledge and practice toward foot care, and the mean practice score was lower than the mean knowledge score, which was similar to the findings of Muhammad-Lutfi's and Kim's studies [16, 20]. A study conducted on patients with diabetes in Western Nepal reported poor KAP (knowledge, attitude and practices) score; they indicated that the plausible factors could be lack of knowledge, lack of information, and literacy level of the studied population [21]. Another study on young Saudi females with diabetes also reported poor KAP scores [19]. Some studies reported that patients with diabetes had good level of knowledge about diabetes [7, 16, 22, 23]. The differences in knowledge about foot care among patients with diabetes across the studies could be due to different trainings on diabetes care provided by the health care professionals in different settings [23] and also the literacy level of the studied subjects.

Several studies reported poor foot care practices among patients with diabetes. Kheir et al., reported poor practices toward regular inspection of feet among patients in Qatar [24]. Hamidah et al., from Malaysia observed that 28.4% of patients newly diagnosed with diabetes practiced good habits towards foot care [25]. Desalu et al., from Nigeria observed that only 10.2% of patients with diabetes had good foot care practices [26]. It was difficult to compare the results of the current study with those of other studies since the nature of the study populations and the applied measurements were different.

In the current study, there was a direct and significant correlation between knowledge and practice scores; therefore, with an increase in the knowledge score, the practice score also increased. Other studies also showed that patients who receive trainings on foot care checked their feet regularly [20]. Patients who are advised to take care of their feet and the ones whose feet are regularly checked by physicians have better practices toward foot care [27].

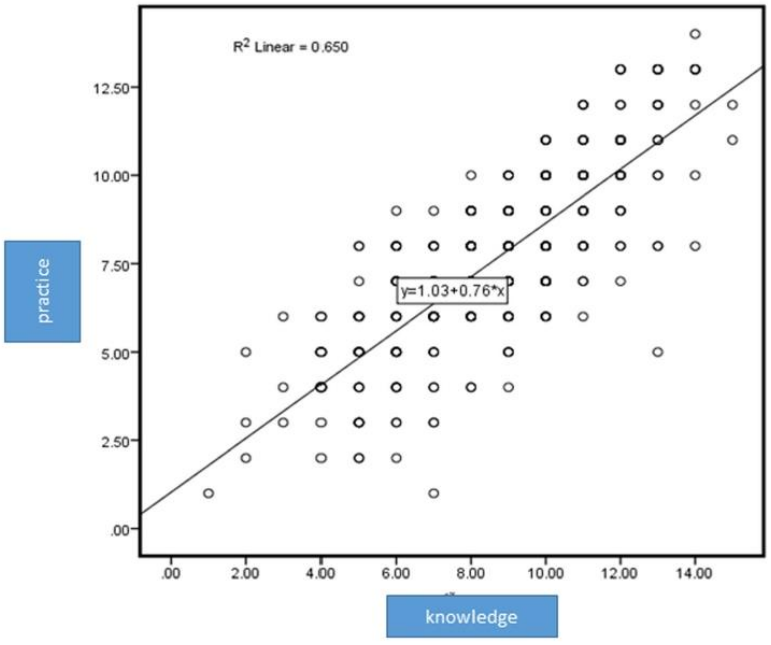

Fig. 1 Correlation Between Khowledge and Practice

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Table 3 The Relationship of Individual, Social, and Disease-dependent Variables With Knowledge and Practice

Variable	Knowledge	Practice
Age, yrs.	*P* = 0.72	*P* = 0.71
Gender	*P* = 0.0001	P = 0.0001
Duration of diabetes (yrs.)	*P* = 0.005	*P* = 0.016
Place of residence	*P* = 0.003	P = 0.0001
Occupation	P = 0.0001	P = 0.0001
Level of education	P = 0.0001	P = 0.0001
Marital status	*P* = 0.65	*P* = 0.14
Body mass index, kg/m^2	*P* = 0.88	*P* = 0.33
Diabetic foot ulcer	*P* = 0.04	P = 0.5
History of hospital stay	*P* = 0.007	P = 0.14
History of amputation	P = 0.02	P = 0.5
Family history of diabetes	P = 0.5	P = 0.65
Complications	P = 0.02	P = 0.14
Current smoker	P = 0.14	P = 0.5

In the current study, the lowest knowledge scores were regarding the application of talcum powder or other powders and not using lotions between the toes, and the proper way of trimming the toenails; while the lowest practice scores were related to the application of talcum powder between the toes, the proper way of trimming the toenails; keeping the foot skin soft, and avoid dryness.

It should also be noted that due to wet climate in the North of Iran, use of lotion between the toes is not common. Nevertheless, it also needs training. Patients with diabetes need to keep between their toes dry using talcum powder and avoid the application of lotion since it is important as a hygienic measure for feet in preventing fungal infection [28]. Patients should also use skin moisturizers daily to keep the skin of their feet soft and should trim their toenails straight across (not rounded) to prevent damage to their toes [29].

In the current study, gender, duration of disease, occupation, place of residence, level of education, having DFU, and a history of hospitalization, amputation, and complication had significant relationships with knowledge. Also, gender, duration of disease, place of residence, occupation, and level of education had significant relationships with practice. It was found that knowledge level was higher in females, patients with a diabetes history of more than 10 years, and the ones underwent amputation due to DFU compared to the others; in addition, females, patients with a diabetes history of more than 10 years, and urban residents had better performance. The current study results showed that males were usually reluctant to disclose their health problems and seek professional care. Also, males presented greater deficit in self-care compared to females [30].

In the study by Muhammad-Lotfi, age, gender, level of education, and duration of diabetes had no significant relationship with knowledge and practice. This finding was in agreement with that of the current study [16], but another study indicated a significant relationship between the level of education and knowledge [31].

People with higher education are expected to be more likely to read and receive information about their illness and foot care and understand the information provided by medical staff in health care settings.

But in the current study, there was no significant relationship between the level of education and knowledge or practice, which could be due to the poor and inadequate resources of information about diabetes at the community level, since both educated and uneducated groups had inadequate information. It may also be due to the fact that in spite of possessing knowledge, due to the lack of time, heavy work load, and lack of adequate insurance coverage, patients could not take good care of their feet in practice, which requires more studies to root out the causes.

Nevertheless, the attitude of patients toward self-care in addition to sufficient knowledge was not studied in the current study. As observed in the present study, patients with a history of DFU or hospital stay, and even amputation and complication had higher knowledge level. It could be due to the fact that while completing the questionnaire, the current knowledge level of the

Table 4 Multiple Regression of Predictor Factors of Practice Score

Variable	Unstandardized Coefficients(B)	Standard Error	Standardized Coefficients(β)	T	SIG	95%CI interval	
						Lower Limit	Upper Limit
Knowledge	0.75	0.03	0.79	10.74	0.0001	0.69	0.80
Place of residence (rural to urban)	- 0.59	0.15	- 0.11	2.16	0.0001	−0.90	−0.29
Marital status (single to married)	−0.20	0.27	−0.08	4.30	0.008	−1.29	−0.19
Diabetic foot ulcer	0.43	0.18	0.06	2.8	0.02	0.06	0.80

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subjects was questioned, which indicated that training medical centers can raise the level of knowledge in patients with DFU. In many Iranian state hospitals, diabetic training programs are not well organized, and the existing programs are weak. It is believed that knowledge about diabetes in the general population as well as patients with diabetes in Iran is not enough and there is a dire need for a good program for diabetes [32].

The collected data indicated that patients with diabetes had poor practice and knowledge about foot care. This is basically due to lack of proper communication between patients and medical team and inadequate education. Based on nurses' opinion, recommendations and guidelines play an effective role in prevention, treatment, and reduction of complication among patients with DFU. Therefore, adaptation, implementation, and evaluation of the educational programs were recommended [33].

Thus, patients should be trained for foot ulcer prevention based on clinical practice guidelines for diabetes mellitus both in the community and hospitals. The results of the current study encouraged a positive outlook: A diabetes educator should give necessary advices to patients during every visit, in order to improve their perception about disease, diet, and lifestyle changes and help them control their glycemic level and overcome the complications of diabetes.

According to the principle of "prevention is better than cure" and considering the predictive factors in the current study including poor knowledge, urban residency, being single, and lack of DFU, more attention should be paid to patients possessing risk factors .

Knowledge and practice toward foot care were poor in most patients with diabetes. There was a significant relationship between some demographic characteristics of patients and knowledge and practice toward foot care. The level of knowledge, place of residence, marital status, and history of hospital stay due to DFU were the predictors of practice in patients with diabetes.

The strength of the current study was that it was the first, study to discuss this important issue in Guilan Province. The study also had some limitations; first, since the work had a cross sectional design, the direction of relationships and causal relationships cannot be determined. Second, the result of the study should be interpreted with caution, since they were obtained from a single center; a clinic-based study. Hospital-based studies cannot provide a true picture of knowledge and practice in the community. The current study sample did not represent the whole Iranian population consisting of several ethnicities. In this research, responses of the wrong answers and "I don't know" have been grouped together, in order to achieve better analysis. Perhaps with increasing sample size, we could solve this problem in future studies.

Conclusions

Adequate knowledge and good practices are important to effectively control diabetes mellitus. Patients require continuous support of family members and community in order to modify their lifestyle and behaviors and make sustainable changes in order to better control their diabetes disease. Also, education about diabetes mellitus and its risk factors should be provided through mass media in order to effectively control it in the community.

Abbreviations

CVI: Content validity index; CVR: Content validity ratio; DFU: Diabetic foot ulcers; EMR: Eastern Mediterranean Region; WHO: World health organization

Acknowledgements

The authors wish to thank all the individuals who helped throughout the study, especially Razi Clinical Research Development Center.

Authors' contribution

PA, KM, and GA: the study design; PA,KM and MB: data collection; PA, KM, GA, HH, and BH: data analysis; PA, GA, KM, BH, HH, MB and JZ: data interpretation and drafting of the manuscript. All authors read and approved the final version of the manuscript.

Funding

The study was funded by the Deputy for Research; Guilan University of Medical Sciences. The funder had no role in the study design, data analysis and interpretation, and writing of the manuscript.

Availability of data and materials

The datasets used and /or analyzed during the current study are available from the corresponding author on reasonable request.

Ethics approval and consent to participate

Written informed consent was obtained from participations and verbal consent from illiterate participants following a detailed explanation of the study objectives. The study was conducted in accordance with the ethical principles and its protocol was approved by the Ethics Committee of Guilan University of Medical Sciences (ethical code: IR.GUMS.REC.1396.8).

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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Received: 7 January 2019 Accepted: 25 February 2020
Published online: 20 March 2020

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Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

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Doi:http://dx.doi.org/10.5704/MOJ.1411.005

Knowledge and Practice of Diabetic Foot Care in an In-Patient Setting at a Tertiary Medical Center

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ABSTRACT

Good knowledge and practice regarding diabetic foot care will reduce the risk of diabetic foot complications and ultimately amputation. This study is conducted to assess patients' knowledge and compliance of diabetic foot care.

A cross sectional study performed on patients who were admitted to HSNZ from the 1st September 2013 to 30th April 2014 for diabetic foot infections. They were interviewed with a questionnaire of 15 'yes' or 'no' questions on foot care knowledge and practice. Score of 1 was given for each 'yes' answer. The level of knowledge and practice, whether good or poor, was determined based on the median score of each category. The result was tested using a chi-square test in SPSS version 17.

A total of 157 patients were included in this study with a mean age of 56.33 years (31-77). There were 72 male (45.9%) and 85 female (54.1%) patients with the majority of them being Malays (154 patients, 98.1%). Majority of the patients (58%) had poor foot care knowledge while 97 patients (61.8%) had poor diabetic foot care practice as compared to the median score. Based on the chi square test of relatedness, there was no significant association between knowledge and practice with any of the variables.

In conclusion, the majority of patients admitted for diabetic foot infections had poor knowledge and practice of diabetic foot care. Education regarding foot care strategies should be emphasized and empowered within the diabetic population.

Key Words:
Knowledge and practice, diabetic foot care, in-patient, tertiary care centre

INTRODUCTION

Diabetes mellitus was found to have affected more than two million Malaysians between the ages of 20 to 79 in 2011 and the number is projected to increase by 50 percent by the year 2030 [1]. As the incidence increases, one would expect the number of diabetic complications including diabetic foot complications to rise in the years to come. This potentially devastating sequela causes significant mortality and morbidity and poses a substantial amount of financial burden on our healthcare. A study showed that 12 percent of diabetic related hospital admissions were due to diabetic foot complications [6]. In 2013 at a tertiary center in East Coast Malaysia, out of all these admitted diabetic patients, 11 percent ended up with a major limb amputation [8]. Foot complications increase the risk for amputation in diabetics by 12.3 folds as compared to the normal population [3]. The cost of managing an acute diabetic foot infection in a single admission is approximately RM 32,000 per year or RM190 per patient per year [9]. Diabetic foot complications also have a negative effect on patient's health related quality of life based on the SF36 questionnaire [10].

The common component causes of diabetic foot ulcer formation are trauma, neuropathy and deformity [4]. Education and awareness of diabetic foot ulcer pathway and the existing foot care measures that are intended to control them are paramount in foot ulcer prevention strategies. Nonetheless, having knowledge of the foot care alone will not be beneficial unless practiced with good compliance. Efforts have been made to increase public awareness of diabetic foot in the forms of health campaigns, public service advertisements and education by primary healthcare workers. However there are no studies in the literature that assess the current level of awareness of diabetic foot care in our diabetic patients.

The main objective of this study is to determine the level of knowledge and practice of foot care in diabetics who require admission for diabetic foot complications. We would also want to determine the factors associated with the different levels of knowledge and practice of foot care.

MATERIALS AND METHODS

This is a prospective cross sectional study performed between September 2013 until May 2014 on an in-patient population at Hospital Sultanah Nur Zahirah a tertiary medical center in Kuala Terengganu, Malaysia. A non-

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randomized convenient sampling method was performed and an informed consent was obtained from the participants. The inclusion criteria was diabetic patients who required admission due to diabetic foot complications such as infected diabetic foot ulcers, cellulitis of the foot, foot abscesses, septic arthritis of the ankle joint, wet gangrene and necrotizing fasciitis of the foot. We excluded patients who were admitted for infection of the lower limb from the level of the calf cephalically such as intra-muscular abscess of the calf, septic arthritis of the knee, thigh abscess and infected transtibial or transfemoral amputation stump. Patients with poor conscious level and clinically delirious or demented were also excluded.

Patients' demographic data were collected for the purpose of analyzing the factors that were associated with knowledge and practice of diabetic foot care. Information such as age, gender, race and the duration since diagnosed with diabetes mellitus were collected together with educational level and household income per month in Malaysian Ringgit (RM); a local currency. Data regarding duration since diagnosed with diabetes, educational level and household income per month were then divided into two different groups, each. Duration since diagnosed with diabetes was grouped into more and less than 10 years. Educational level was divided into those who studied beyond the Malaysian Certificate of Education (SPM) at tertiary level and those who did not. As with household income the two groups were divided based on monthly income of more or less than RM2000, 00.

We used a diabetic foot care questionnaire designed by Hasnain *et al*,[2] which is a set of 15 'yes', or 'no' questions on knowledge and practice (Table II). The questionnaire was translated into local language of Bahasa Malaysia and was tested and validated. Medical personnel interviewed all patients during the completion of the questionnaire. It covered good foot care practice in the areas of feet washing techniques, skin and nail care and foot wear care. Each 'yes' answer carried one (1) point and zero point for a 'no'. The points were then added up for each of the knowledge and practice categories. The level of knowledge and practice, whether good or poor, was determined based on the median score of each category. Those who scored more than the median were considered as good and scores lower than the median were considered as poor. The association between duration since diagnosed with diabetes and other socio demographic factors with the level of knowledge and practice of foot care were tested using a chi-square test in SPSS version 17. All data generated and collected were tabulated using a normal frequency table.

RESULTS

A total of 157 patients were included in this study with a mean age of 56.33 years (range 31-77) with 94 patients (59.9%) e 55 years or older (Table I). There were 72 male (45.9%) and 85 female (54.1%) patients with the majority of them were Malays (154 patients, 98.1%). Only three patients were Chinese (1.9%) from the whole study sample. The mean duration since diagnosed with diabetes was 11.26 years (1-38). Most patients had diabetes for less or equal to 10 years (53.5%). A large majority of the patients earned less than RM2000,00 monthly (120 patients, 76.4%) and only 14 (8.9%) patients had received education beyond the SPM at tertiary level.

The responses for each foot care measure were generally good except for some in areas of feet washing technique and skin care of the feet (Table II). Application of talcum powder in the interdigital space has the lowest positive response with 23.6 percent for knowledge and 15.9 percent for practice. The other foot care measures that received poor responses were: the use of warm water for washing or bathing (47.8% for knowledge, 34.4% for practice); checking the temperature of water before using (31.2% for knowledge, 22.3% for practice) and not to apply lotion in the interdigital space (42.0% for knowledge and 42% for practice). Patients relatively gave satisfactory response to daily change of socks with 52.9 percent for knowledge, however its practice was only 40.8 percent, which was considered poor.

The majority of patients who were admitted for diabetic foot complications had poor foot care knowledge, with 58 percent of them scoring less than the median score of 10. In terms of practice, the number of patients with poor practice was also greater with 97 patients (61.8%) scored less than median score of nine. Based on the chi square test of relatedness (Table III) age, gender, household income per month, educational level and duration since diagnosed with diabetes had no significant association with knowledge and practice with none of the variables had p value of less than 0.05.

Table I: Sociodemographics of diabetic populations admitted for diabetic foot complication

Variable	n (%)
Age	
<55 years	63 (40.1%)
>55 years	94 (59.9%)
Gender	
Male	72 (45.9%)
Female	85 (54.1%)
Income per month*	
<RM2000	120 (82.2%)
>RM2000	26 (17.8%)
Educational level*	
Secondary or less	125 (89.9%)
Tertiary	14 (10.1%)
Duration of diabetes*	
<10 years	84 (53.5%)
>10 years	66 (46.5%)

* contains missing value, thus n≠157

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Table II: Diabetic foot care questionnaire assessing knowledge and practice. The values are showing positive responses

Foot care measures	Knowledge (n=157)	Practice (n=157)
1. Importance of taking anti-diabetic treatment to prevent complication	147(93.6%)	130 (82.8%)
2. Daily washing of the feet	134 (85.4%)	127 (80.9%)
3. Using warm water for washing/bathing	75 (47.8%)	54 (34.4%)
4. Checking the temperature of the water before using	49 (31.2%)	35 (22.3%)
5. Drying the feet after washing	126 (80.3%)	117 (74.5%)
6. Talcum powder usage for keeping interdigital spaces dry	37 (23.6%)	25 (15.9%)
7. Keeping the skin of the feet soft to prevent dryness	98 (62.4%)	87 (55.4%)
8. Lotion not to be applied in the interdigital space	66 (42.0%)	66 (42.0%)
9. Daily change of socks	83 (52.9%)	64 (40.8%)
10. Trimming toe nails straight with care	84 (53.5%)	80 (51.0%)
11. Inspection of feet daily by respondents	110 (70.1%)	89 (56.7%)
12. Wearing comfortable coat shoes	111 (70.7%)	94 (59.9%)
13. Checking the inside of the shoes before wearing	105 (66.9%)	88 (56.1%)
14. Not walking barefoot	130 (82.8%)	121 (77.1%)
15. Warning signs for which consultation is required	125 (79.6%)	114 (72.6%)

Table III: Analysis of factors associated with the levels of knowledge and practice

Variables	Knowledge of foot care			Practice of foot care		
	Poor	Good	p-value*	Poor	Good	p-value*
Gender						
Male	48 (66.7%)	24 (33.3%)	0.931	42 (58.3%)	30 (41.7%)	0.246
Female	49 (57.6%)	36 (42.4%)		49 (57.6%)	36 (42.4%)	
Age						
<55 years	37 (58.7%)	26 (41.3%)	0.873	42 (67.7%)	21 (33.3%)	0.303
>55 years	54 (57.4%)	40 (42.6%)		55 (58.5%)	39 (41.5%)	
Income**						
<RM2000	69 (57.5%)	51 (42.5%)	0.485	72 (60.0%)	48 (40.0%)	0.884
>RM2000	13 (50.0%)	13 (50.0%)		16 (61.5%)	10 (38.5%)	
Educational level**						
Secondary	72 (57.6%)	53 (42.4%)	0.292	76 (60.8%)	49 (39.2%)	0.791
Tertiary	6 (42.9%)	8 (57.1%)		8 (57.1%)	6 (42.9%)	
Duration of diabetes**						
<10 years	33 (39.3%)	51 (60.7%)	0.259	53 (63.1%)	31 (36.9%)	0.617
>10 years	34 (51.5%)	32 (48.5%)		39 (59.1%)	27 (40.9%)	

* chi square test of relatedness
** contains missing value, thus n≠157

DISCUSSION

Based on the specific measures of foot care, the ones that received poorest responses were: using warm water for washing and bathing; checking the temperature of water before using; not applying lotion in the interdigital space; and application of talcum powder in the interdigital space. The first two were deemed crucial in diabetic foot care and the latter two might not be as important. Patient should not be using water that is too hot or too cold in washing and bathing as diabetic patients with neuropathy might not be able to feel any insult to their feet and this could lead to catastrophic consequences. Checking the temperature of water before using was also an important step that should be taught to patients so that scald injury could be avoided especially in the feet of diabetics. Keeping the interdigital space dry by applying talcum and avoiding application of lotion was also important to prevent fungal infections as part of foot care hygiene[13].

This study showed that the majority of patients who were admitted for diabetic foot infections had poor knowledge and poor practice of foot care. In terms of the foot care scoring based on the questionnaire, practice was shown to be lower than knowledge. Median score for knowledge and practice were 10 and 9 respectively. This is a reflection of poor compliance; patients already had a certain level of knowledge of foot care but the practice of that particular knowledge was not always carried out. This finding was comparable with other related studies, which also reported the same pattern of scoring for knowledge and practice of foot care; the score of practice was always poorer than the score of knowledge[2,5,14].

An important finding of this study was the non-association of the level of education with the level of knowledge of foot care in diabetic patients. Although the majority of patients who had poor knowledge and practice obtained education

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only up to secondary level, there was no significant difference when compared to those who received education at tertiary level. Several studies that looked into knowledge and practice of diabetic foot care found that there was a significant association between the level of education with the level of diabetic foot care knowledge [2,5,14,15]. This difference could be explained by the lack of adequate promotion of diabetic awareness in our population. Both educated and less educated patients received inadequate information regarding diabetic foot care.

One might also argue that the population of Terengganu, which is predominantly Malays, has the tendency to believe more in alternative and traditional treatment than modern medicine. According to Ang *et al*, many of these patients would not accept the loss of a limb even if it were medically required and life saving[12]. Due to their religious beliefs, most of them would want to be buried as a whole person, hence would usually refuse amputation. This type of patients would then opt for alternative medicine with the hope of saving their limb.

Pollock *et al* reported that women have a significantly higher diabetic foot care knowledge score compared to men in a study conducted in Europe [7]. In some third world countries especially in certain parts of Africa and South Asia, due to socio-cultural beliefs, women were not allowed to attain higher educational status compared to their male counterpart. This had resulted in the discrepancy in the level of knowledge between males and females [5]. however, there is no association between gender and the level of knowledge and practice of diabetic foot care in the present study. In Malaysia, males and females are given the same opportunity for education.

Our study has shown that there was no significant association between patients' demographics with the level of knowledge and practice of diabetic foot care. Based on our current practice, there are no established guidelines or programs in educating patients during admission or prior to discharge. Although they had multiple admissions for diabetic foot complications, the level of knowledge and practice remained poor. The role of physicians in passing the knowledge to patients is very important in improving the awareness and good practices of foot care. Poor communication between healthcare workers and patients and little amount of time allocated to educate patients due to a busy clinic schedule are usually the reasons for inadequate patient education [5,12,13]. In addition to that, physicians should always be up to date with the latest information regarding foot care and consistently reinforce the importance of compliance in patients. This should be a routine practice for all diabetic patients in both in and out patient setting. Education of good diabetic foot care practice will increase patient's confidence in managing their illness [11].

The results of this study should be a reminder for clinicians; nurses and other health care personnel on the importance of improving foot care knowledge and promoting compliance among diabetics. The limitation of this study was that our sample consisted of predominantly Malay patients with a very small number of Chinese patient and no other ethnic groups. This sample does not represent the actual population of Malaysia that consists of several ethnicities. Another limitation was our inability to include all patients that were admitted to our center as the study sample included only diabetic patients who were admitted to the wards of Orthopaedics Department.

CONCLUSION

Knowledge and practice of foot care in the majority of diabetic patients who were admitted for diabetic foot infections were poor. There is no significant association between patients' demography with the different levels of knowledge and practice of foot care. Educational programs focusing on awareness of diabetic foot care must directly involve the community, and thereupon in order to reduce the incidence of diabetic foot complications. This should be done in primary care up to tertiary care centers as a multidisciplinary effort.

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