

Knowledge and Practices of Type II Diabetic Patients' Regarding Diabetic Foot Self- Care And Their Foot Disorders.

Doaa Abd el Salam Amin Yacout, ⁽¹⁾

⁽¹⁾Lecturer of Community Health Nursing Department, Faculty of nursing, Damanhour University

Abstract

Background: Egypt figured one of the highest incidences of diabetic cases as up to 11 % of its population who has been diagnosed with the disease. This number of cases predicted to be doubled by 2025. Consequently, the rise in prevalence of DM is likely to bring associated increase in foot problems. **Aim of the study:** assess the diabetic patients' related knowledge and reported practices regarding foot self- care and to detect most common foot problems. **Subjects & Methods: Research Design:** An exploratory descriptive research design was followed in the study. **Setting :This study was conducted in the two outpatient diabetic clinics in Damanhour city .Subjects:** Using the equal allocation method a convenient sample of 360 patients.. **Tools of data collection:** two tools were used to collect data from diabetic patients. **Results:** Mean BMI was 28.30 ± 4.1 (within normal range). Less than half of them had poor knowledge with mean score of 3.94 ± 1.82 and half of them had poor practices with mean score of 11.54 ± 2.77 related to diabetic self-care. Fissures, callus and blister was observed by half of the subjects. Significance differences was observed between total knowledge and practice scores and most of demographic characteristics and also between total foot self-care related knowledge and practices regarding to their reported peripheral neuropathy complain and observed foot disorders. Mass media was the main source of diabetic patients' information. **Conclusion:** Diabetic patients had variation in their knowledge and practices in relation to some topics regarding foot self -care which highlight that the knowledge gained on diabetes and basic foot self-care over the course of their disease do not promote the implementation and maintenance of adequate behaviors and this is reflected on the presence of foot problems. **Recommendations:** Patients with diabetes should receive ongoing foot care - specific education constantly reinforced, to ensure basic diabetes information and daily living skills are taught enough to impart proficiency of this knowledge and skills.

Keywords: diabetes, foot self –care, practice, knowledge, diabetic foot disorder

Introduction

Diabetes is one of the most common non-communicable diseases globally. It is undoubtedly a challenging health problem in the 21st century. In 2013, WHO and International Diabetes Federation (IDF) estimated that the worldwide prevalence of diabetes for all age groups to be 382 million people and by 2035; this is expected to reach 592 million with prevalence 8.3%. Additionally, it is projected that the prevalence of diabetes mellitus (DM), in developing countries, will be 69% increase in numbers of adults with diabetes ⁽¹⁻³⁾.

Egypt has figured one of the highest incidences of diabetic cases as up to 11 % of its population who

has been diagnosed with the disease. This number of diabetic cases is expected to double by 2025 and Egypt will have at least 8.6 million adults with diabetes by 2030. This is due to an increase of the aging population, growth of population size, urbanization and high prevalence of obesity and sedentary lifestyle ^(4,6).

Consequently, the rise in prevalence of DM is likely to bring concomitant increase in its

complications among diabetic patients. One of the most important complications of diabetes is foot problems. Diabetic foot is one of the major medical, social, economic problem and a leading cause of morbidity, disability and mortality, especially in the developing countries. The lifetime risk of a person with diabetes to develop a foot ulcer could be as high as 25%, and it is believed that every 30 seconds a lower limb is lost somewhere in the world as a consequence of diabetes. The prevalence of diabetic foot ulcer (DFU) ranges between 1.0% and 4.1% in the United States (US), 4.6% in Kenya, and 20.4% in Netherlands^(3,7).

Diabetic foot problems are represented in foot ulceration and infection which typically results from peripheral neuropathy complicated by deformity (Charcot foot, hammer toe, hallux valgus), callus, corn, trauma, vascular insufficiency, infection and failure to implement effective treatment. Fifteen percent of all diabetics develop foot ulcers. More than 85% of lower extremity amputations in patients with diabetes occur in people who have had an antecedent foot ulcer.⁽⁸⁻¹⁰⁾

The major causes of diabetic foot are peripheral neuropathy (PN) that eventually causes loss of protective sensation, foot deformity, dry skin, and crackling or fissure. Moreover, some of the patients' daily activities, such as walking bare foot or improper trimming nails are potential causes of foot ulcer that easily results in foot ulceration^(11, 12).

In Egypt, The prevalence of DFU has been found to be 6.9% among outpatient people with diabetes. The most commonly reasons stated for this prevalence include: inappropriate footwear, presence of objects inside the shoes, history of previous foot

ulceration and amputation, foot deformities, poor glycemic control as well as low socioeconomic factors and cigarette smoking and lack of knowledge regarding diabetic foot problems. Also is very pertinent to lack of knowledge regarding diabetic foot problems that 93.8% of diabetic patients doesn't receive any education about it^(4, 13).

Significant of the study:

It is estimated that the risk of diabetes-related foot complications can be reduced by 49% through proper preventive measures, patient education, access to medical care, foot care education about self-care. Similarly, certain segments of the population may be more likely to not receiving appropriate medical foot care and not performing diabetes foot self-care, including the elderly, ethnic minorities, and persons in rural communities^(14, 15).

It is important to recognize that diabetic patients' appropriate knowledge and practices about foot care are critical for the prevention of lower limb diabetic complications. Consequently, it is important to reveal the actual situation regarding diabetic patients' knowledge and self-care in order to gear their care toward minimizing foot complications.

.Aims of the study:

- To assess the diabetic patients' knowledge and practices regarding foot self-care in Damanshour city.
- To detect diabetic foot disorders among studied type II diabetic patients

Research questions:

- 1- What is the level of foot self-care knowledge and practices of type II diabetic patients in Damanshour city?

- 2- What is the most common diabetic foot disorders facing type II diabetic patients attending outpatient clinics in Damanhour city?

Subjects and Methods

Research Design: An exploratory descriptive research design was adopted to carry out the study.

Study Setting:

- The study was conducted in 2 diabetic outpatient clinics which rendered diabetic health services in Damanhour (teaching hospital and ministry of health outpatient clinics), that are supposed to be the only two governmental diabetic outpatient clinics, that providing diabetic health care services in Damanhour city .

Subjects:

- By using the Epi info program 7 sample estimation programs using the following parameter: population size : 4200 (patients attending last 3months), expected frequency 50% , margin of error 5%, confidence coefficient 95% and minimum sample size 353. The total sample size was 360 of type II diabetic patients.
- Using the equal allocation method a convenient sample of 180 patients (90 female and 90 male) were recruited from each of the previously mentioned diabetic clinics.
- Inclusion criteria: All type II diabetic patients who accepted to participate were included in the study.

Tools of data collection:

In order to fulfill the objective of the study two tools were used for data collection as following:

Tool I: Diabetic patient's basic & clinical data structured interview schedule. It was used to collect necessary data about diabetic patients foot self –care knowledge and practices.

It includes **four parts:**

Part I: patients' personal and demographic data. It consists of data related to age, sex, level of education, marital status, and occupational status.

Part II: Medical Health Profile

It consists of data related to the onset of the disease, associated chronic disorders, type of treatment regimen, compliance of medication, history of smoking, history of any complain of peripheral neuropathy, previous past foot examination in the last 6 months and body mass index (BMI) (weight & height were measured by the researcher then BMI was calculated according to WHO 2006)⁽¹⁶⁾.

Part III: Knowledge related to diabetic foot self-care and foot disorders:

It contained knowledge about effects of diabetes on patient's feet, causes of diabetic foot, signs and symptoms of diabetic foot (peripheral neuropathy) that indicate seeking podiatrist visit, factors increase complications of diabetic foot(smoking , sedentary lifestyle, and compliance to treatments) and ways of prevention of diabetic disorders (foot self –care, wearing of wide shoes , cutting nail straight ,daily foot inspection). It consists of 9 statements recorded either yes or no / don't know each item with the correct answer was given 1 (one) with a maximum score of 9 and wrong answer or don't know was given 0 (zero) with a minimum of 0 (zero).

- The knowledge scores was classified into three categories: poor knowledge score < 50% (0 < 5points), fair knowledge 50 -<75% (5 -<7 points) and good knowledge score ≥75% (7-9 points).

Part IV: Diabetic foot self- care practice:

It included the reported patients practices related to diabetic foot self-care. It contains 12 statements asked how often several activities was done over the last month. It was recorded either always, sometimes or never. Three points category scale were

used as: always was given two (2), sometime one (1) and never zero (0). Foot self- care practice as frequency of examining feet and checking the inside footwear (shoes), wound care , foot cleaning, walking bare foot ,nail care, using cotton socks, type of foot wear, and exercise .

The total practice score was classified into three categories: poor practices score < 50% (0 < 12 points), fair practices 50 -<75% (12 - <17 points) and good practices score ≥75% (18-24 points).

Tool II: Diabetic foot assessment observational checklist:

- It consists of 3 parts: **First** part: the presence or absence of foot disorders: (foot deformities as (hammer toes, Charcot foot, and callus), blister / edema, and dermatological changes (redness, ulcer, fissure and wound).
- **Second part:** The shape of nail cut edge (straight/square, or curved/rounded) and skin between toes status either wet, or presence of dry white scale .Each response was recorded as present or absent.
- **Third** part: Types of foot wear was observed either open (flip flop,

pointed toe, open –toe shoes) or (closed tight, wide) were inspected.

Content validity:

- Tools were self-generated, developed and adapted by researcher after a thorough review of the recent relevant literature related to diabetic foot disorders and foot self- care (Miller et al (2014), Moyer et al (2004)^(17,18) and were sent to 5 experts in the field to check for validity. Any necessary modifications were made.
- Cronbach Alpha coefficient was used to ascertain the reliability of the tool (0.84)

Fieldwork:

- Data was collected within a period of 4 months from February to June 2015. Each interview and observation took an average from 20–30 minutes.
- The researcher was seeking the assigned physician each time to help in differential and confirming the foot disorder diagnosis in order to check certainty of the cases.

Pilot study:

- A pilot study was carried out on 30 patients to ascertain the clarity, relevance and applicability of study. Necessary modifications were done. Those patients were excluded from the study sample.

Administrative and Ethical considerations:

- Approval from the responsible authorities was obtained to conduct the study.
- Verbal Informed consent were obtained from each diabetic patient after brief explanation and anonymity and confidentiality of the data were assured.

Statistical Analysis:

- The collected data were coded and analyzed using the Statistical Package for Social Sciences (SPSS) software version 20.0 Released 2011.
- Tests used: calculation of the mean, standard deviation, and chi-square test was used to study the significance of the difference between proportions. $P \leq 0.05$ was considered to indicate statistical significance.

Results

Table (1) shows the general characteristics of the studied sample (type II diabetic patients). More than half (53.3%) of the sample were above 50 years and their mean age was 49, 23 ± 11.02 . About one third (35.9%) and 15.2% were illiterate and just could read and write, respectively, while slightly less than one third

(32.6%) were university graduates. The table also presents that the majority (80.7%) of them were married and about half (51.4%) were not working.

Table (2) presents the distribution of the studied sample according to their health profile related to diabetes. Less than half (45%) of them had diabetes for less than 5 years. Approximately half (50.9%) of them were on oral diabetic medication and more than one third (39.7%) were on insulin. While only 9.4% of them were on both types of medications. The majority (82.5%) of them reported that they were completely complying with their medications as mentioned by their physician. Nearly two fifths (41.4% and 31.7%) of them were either obese or overweight, respectively, with mean body mass index of 28.30 ± 4.1 . Less than one third (29.6%) of them were smokers. Only 30.6% of them had reported that they had foot examination by podiatrist

(physician) on regular basis. Less than one third (31.9% and 30.8%) of them complained from tingling and numbness sensation, respectively. While, 19.4% and 18.6% of them reported that they had burning sensation and cramps respectively. More than half (58.1%) and majority 80.3% had moist skin and rounded nails edge respectively. Finally, nearly three quarters (75.3%) of them were wearing open toes or flip flop shoes or sandals.

Figure (1) illustrates the studied subjects reported associated chronic disease. More than half (58.1%) of them had hypertension. While, minority of them had heart disease and complain of eye problems (6.1% and 3.1% respectively).

Table (3) presents the distribution of studied subjects' foot self-care knowledge. The majority (89.7% and 99.4%) of them mentioned that their

foot should be washed in warm water and compliance to medication can affect foot health respectively. Also 62.5% and 54.4%, mentioned correctly that they should inspect their foot for an object every time they wear shoes, they should look after their feet because they liable to injury respectively. More than one third 37% of them correctly mentioned the negative effect of smoking on foot health. Less than two third (60.3%) didn't realize the signs of peripheral neuropathy and other dermatological signs as indication to seek immediately physician help.

Concerning studied sample foot self-care practices **table 4** portrays that, more than three quarters (76.9%, 74% and 74.7%) of them sometimes remove corn or callus by them self, walk for 15-30 minutes 3-4 time / week and trim their toe nails in

straightway respectively. While, 62.5% of them seeks physician help in case of foot redness or bleeding. Furthermore, the table shows that less than half (48.6% and 44.4%) of them stated that they either never inspect their foot on regular base, or they walk barefoot respectively. Finally the table shows that about two third (62.5%) of them reported that they never use a cream to soften their feet to prevent dryness.

Figure (2) illustrates the observed foot disorders among study sample. It was obvious from the figure that more than half (56.4%) of them

had fissure. While, more than quarter (27.8% and 26.9%) had callus and blisters respectively. While minority of them had Charcot foot, foot ulcer, redness ,hammer toes and wounds (9.4%, 8.6%, 6.9%, 6.1%, 4.2%, and 4.2% respectively).

Table (5) reveals the relation between studied patients' total diabetic foot self-care knowledge score and their general demographic

characteristics. A significant difference was observed between studied patients' knowledge scores and their age, gender, marital status, BMI, onset of disease, education level, smoking and working status.

Concerning the relation between studied patients' total foot self -care practices score and their general demographic data **table (6)** portrays significant differences found between studied patients total practices score and age, gender ,marital status, BMI, onset of disease, education level and working status. While there is no significant relation was observed with patients smoking status and their practices score ($p= 0.197$)

Table (7) concerning the relation between patients' foot self-care related

knowledge and practices percent score regarding patients' reported history of peripheral neuropathy and observed foot disorders, it was revealed from the table that those who hasn't any peripheral neuropathy complains had either fair to good diabetic foot self-care knowledge and practices. Also those who hadn't any observed foot disorders had either fair or good foot self-care knowledge and practices . Furthermore, significant differences was observed between total foot self-care related knowledge and practices regarding to their reported peripheral neuropathy complain and observed foot disorders ($p= 0.001$).

Regarding to diabetic patients source of foot self-care information **figure (3)**; illustrated that the majority (83.3%) of them reported that mass media (TV, radio ,books, magazine) was one of their main sources, followed by two third (66. 1%) of them had their knowledge from physician . Only 11.4% of them had it from nurses.

Discussion:

Diabetes mellitus was described as the "global epidemic" of the 21st century". Accordingly, diabetic foot problems dramatically increase and foot ulcers are more likely to be of neuropathic origin, and therefore extremely preventable Zubair et al .⁽¹⁹⁾

Effective diabetic foot problems prevention includes regular foot examinations, risk identification, effective health education and appropriate shoe-gear recommendations Herman et al ^(20, 21).

The importance of foot care knowledge in preventing foot ulcers in diabetic patients is a widely accepted as a fact and it is evident from research demonstrating that patients who never received diabetes education showed a striking fourfold increased

risk of a major diabetic complication^(22, 23). Finding drawn from the present study indicate that, nearly less than half of the studied sample had poor total knowledge score with mean score of 3.94 ± 1.82 related diabetic foot self-care. This was in agreement with Moodley et al.,⁽²⁴⁾ who mentioned that around half of his diabetic patient had poor knowledge on basic foot self-care. Moreover, there was contradiction between diabetic patient knowledge and their practices regarding certain topics as regularity of foot hygiene, relation of smoking with occurrence of diabetic neuropathy and complying of treatment which is considered risk for acquiring more foot disorder without knowing the cause. This may be attributed that there was no consistent education about the goals of therapy, the purpose of prescribed drug, the importance of adhering to every single education tips(smoking bad effect) as well as the consequences of non-adherence.

Furthermore, more than one third of them noted correctly that they should inspect their toe and dry well in between and heels on a daily basis. In spite of their correct knowledge and practices it was observed that more than half of them had wet skin area between toes which liable them to infection and ulcer and delay in healing etc. Even though, more than quarters mentioned correctly that it was important to trim toes nails in straight and they reported that they do it but by observation the majority of their toes edges were trimmed in rounded edges. More than three quarters complained of either cramps, numbness and tingling burning sensation (sensory neuropathy) unfortunately, less than two third of them incorrectly didn't know that they

should contact physician immediately in case of foot disorder and their foot complains. This result was in the line with Chiwanga et al.,⁽²²⁾ and Rocha et al.,⁽²⁵⁾ that they found that nearly less than half of their study subjects complain from peripheral sensory neuropathy.

The inconsistency between studied patients' knowledge, practice and the actual situation may be due to inadequate foot self-care knowledge practices and lack of understanding of the serious consequence effect on foot that can be prevented with simple measures. And, may due to that patients may feel that education is not worth the transportation cost to/from the clinic on a separate day or even in the same day especially because these classes are open to all patients with diabetes, regardless newly diagnosed or old patients so they feel that the information it is not specified for what they already needs or not related to their complain. Also those with foot problems, especially painful PN, may not be able to visit the clinic frequently. These patients may choose to make just one trip, often the one in which they will be getting their prescribed medications.

Regarding the total practice score of the studied sample it was observed that adequate diabetic foot self-care is not undertaken by nearly half of them (poor practices) with mean score of 11.54 ± 2.77 . This result was congruent with Seid et al.,⁽²⁶⁾ More than half of the subjects reported that they sometimes walk barefoot and mentioned that they never wear open shoes while in contradiction, more than three quarters of them were wearing open foot wear (flip flop/ open toes footwear, plastic). Also, nearly more than half reported that they sometimes inspect the inside inner of their foot wear. These findings was in the agreement with Desalu et al.,⁽²⁷⁾,

Rocha et al.,⁽²⁵⁾ and Bijoy et al.,⁽²⁸⁾ who mentioned that their studied sample wear open foot wear outside home ,and walk in bare foot sometimes. This may be due that most Arab countries especially in rural area the weather is hot that's make wearing closed foot wear and cotton socks is rejected by many patients and instead they prefer to wear sandals although, sandals doesn't give the required protection needed for prevention of any injuries or even just friction with skin may lead to ulcer formation later as closed foot wear prevent all of these.

There are independent risk factors for foot problems as demographic variables, health findings and history, health care and education Zubair et al. The result of the study revealed that good total knowledge and practices score was among those who less than 40 years, male, had secondary education ,and working. Also, there was highly significant differences between those variable. (age, sex, marital status and education) and the total scores. These finding was in the line with, Chiwanga et al.,⁽²²⁾, Desalu et al.,⁽²⁷⁾ and Berhe et al.,⁽²⁹⁾ they

find higher knowledge and practice score was with higher education, being working ,younger age and being male. This may be attributed to that male may more expose to environmental factor more than women especially in rural area , also educated younger patients tend to be more able to read and search about information and can benefit of printed material if exist and used to search more and try to comply to physician advice to prevent early deterioration.

The present study indicate that less than one third and less than half of the studied sample were either overweight or obese respectively with

mean BMI of 28.30 ± 4.1 , this was slightly differ than Kalil et al.,⁽³⁰⁾ that found that mean BMI was 32.84 ± 6.31 and El-Sayed et al.,⁽³¹⁾ who found that more than more than half either overweight or obese. This may be due to the active life style of those who live in rural or sub urban areas. Also, more than half and all of those who had good knowledge and practices score respectively were within normal body weight for height. These results were in agreement with Rocha et al.,⁽²⁵⁾.

Regarding observed foot disorder, the majority has at least one foot disorder. Moreover, more than half of sample had fissure, nearly more than quarter had either callus or blisters and minimal percent of them had other disorder as Charcot feet, ulcers hammer toes. These findings were in agreement with Dikeukwu et al.,⁽³²⁾ that who mentioned more than two third of his subjects had at least one foot problem and less than ten percent of them had foot ulcers. While it was contradict with Khalil et al.,⁽³⁰⁾ that found that nearly quarter of his subjects had fissure and callus. This may be due to rural community setting that they always wear open foot wear and not used to wear close shoes , walk bare foot and

also may be due to lack in especially in applying lotion to prevent dryness due to poverty or lack in information of importance of softening the foot.

Less than one third of the studied sample mentioned that their foot was examined in regular basis .This result was comparable with Chiwanga et al.,⁽²²⁾ who noted more than one quarters reported having their feet examined by a doctor at least once since their initial diagnosis. This may be due to shortage of staff, overcrowding in the clinics and also because there is no podiatrist available all the time in the Egyptian

diabetic clinic. Also may lead to that diabetic patients may feel let down by healthcare professionals for the lack of adequate foot care advice and inspection during their years following their diagnosis. Eventually this can impair trust and affect the way that patients interact with healthcare professionals.

It was noticed that the majority of studied patients mentioned that mass media was their main source of their knowledge followed by physicians and then nurses. This result was contradict with Maskari et al.,⁽³³⁾ who mentioned that most of their patients mentioned physician as the primary source of DM knowledge, and Chiwanga et al.,⁽²²⁾ who mentioned that majority of studied sample receive their knowledge from nurses and minority of them receive it from mass media. This may be due to either physician or nurses are overwhelmed by written work which make them unavailable to perform required individual tailored health teaching also may be to shortage in both physician and nurses in outpatient clinics.

Finally and the most important finding those who hadn't any diabetic peripheral neuropathy complains or observed foot disorder had fair to good

knowledge and practices score. This finding was consistent with a studies done in India by George et al.,⁽³⁴⁾ and in Egypt AL-Asmary et al.,⁽³⁵⁾ who mentioned that increasing amount of evidence that the patient education is the most effective way to lessen the complications of diabetes and its management.

Conclusion

Based upon the findings of the current study the studied patients had poor diabetic foot self-care knowledge and practices. Significant differences was observed between total foot self-care related knowledge and practices regarding to their reported peripheral neuropathy complain and observed foot disorders

These findings highlight that the knowledge patient's gains on diabetes and basic foot self-care over the course of their disease do not promote the implementation and maintenance of adequate self-care behaviors.

Recommendations:

In the light of the findings the following recommendations are suggested:

- 1- A specialized diabetic educator should be available in each diabetics outpatient clinic to provide tailored and individualized teaching based on the needs of diabetic patients and constantly reinforced diabetic ongoing foot-specific education should be given on regular basis.
- 2- The health team needs to develop multidisciplinary strategies to encourage diabetic patients to follow adequate foot care behaviors and to be involved in decision-making, monitoring and evaluation all of which are likely to increase their compliance
- 3- Nurses role in early detection and prevention of foot problem must be emphasis in novice graduate to raise their awareness regarding their important roles.

Table (1): Distribution of study sample according to their general demographic characteristics.

Items	N=360	
	No.	%
Gender		
Male	180	50
Female	180	50
Age (years)		
▪ <40	86	23.9
▪ 40- 50	82	22.8
▪ >-50	192	53.3
Mean ± SD	49.23±11.02	
Educational level		
▪ Illiterate	130	35.9
▪ Read & write	55	15.2
▪ Basic school education	48	12.8
▪ Secondary school	118	32.6
▪ University	9	2.5
Marital status		
▪ Married	292	80.7
▪ Single	9	2.5
▪ Widow	59	16.3
Working status		
▪ Working	175	48.6
▪ Nonworking	185	51.4

Table (2): Distribution of studied patients according to their Medical Health Profile.

Medical health profile	N=360	
	No.	%
Disease duration (in years)		
< 5	162	45
5 – 10	116	32.2
10 +	82	22.8
Diabetic medications		
Oral hypoglycemia drugs	183	50.9
Insulin	143	39.7
Both	34	9.4
Compliance of diabetic medications:		
Compliance	297	82.5
Non compliance	63	17.5
Inspected by podiatrist(physician) in regular basis		
▪ Examined	110	30.6
▪ Not examined	250	69.4
BMI(kg/m²)		
Underweight(<18.50)	NA	NA
Normal range(18.50 - 24.99)	97	26.9
Overweight (≥25.00)	114	31.7
Obese (≥30.00)	149	41.4
Mean ± SD	28.30±4.1	
Smoking		
Non smoker	253	69.9
Smoker	107	29.6

Table (2): Distribution of studied patients according to their Medical Health Profile (cont.).

Medical health profile	N=360	
	No.	%
History of diabetic neuropathy *		
No complain	80	22.2
Cramps	67	18.6
Numbness	111	30.8
Tingling	115	31.9
Burning sensation	70	19.4
Observed foot disorders :		
Skin between finger status:		
Moist	209	58.1
Dry	151	41.9
Nails shape :		
Straight	71	19.7
Rounded	289	80.3
Type of foot wear :		
Closed tight	72	20.0
Closed wide	17	4.7
Open toe/ flip flop	271	75.3

*More than one answer is allowed

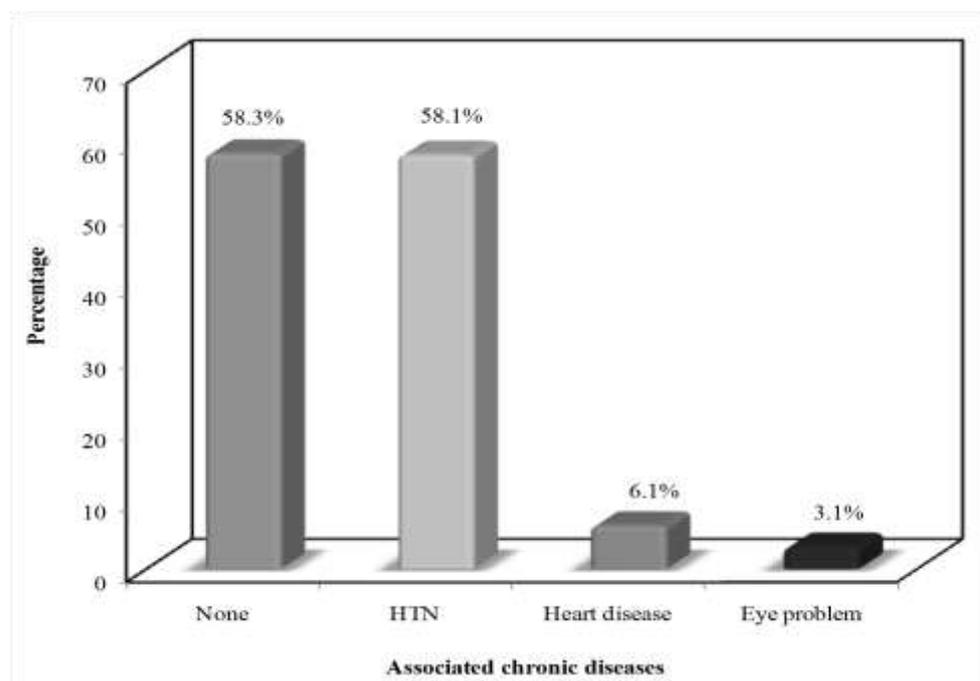
Table (3) Distribution of diabetic patients' responses regarding foot self -care related knowledge .

Knowledge items	Correct	*Incorrect
	%	%
DM patients should wash his feet every day in warm water with mild soap	89.7%	10.3%
DM patients should inspect feet and toes, the top, sides, soles, heels, and the area in between the toes in a daily basis.	34.7%	65.3%
DM patients should Trim nails of feet in straight way with care after washing feet and when nails are soft..	27.8%	72.2%
DM patients should contact his doctor immediately if discover any dermatological (sores, redness, cuts, blisters), or peripheral neuropathy signs .	39.7%	60.3%
DM patients should not smoke because it can causes poor circulation which affect his feet.	37%	63%
DM patients should look after their feet because wounds and infection may not heal quickly.	48.1%	51.9%
DM patients should look after their feet because they may not feel a minor injury to their feet.	54.4%	45.6%
DM patients should take medication regularly because they liable to get DM foot complication	99.4%	0.6%
DM patient should inspect the inside of footwear for objects every time he wear it .	62.5%	37.5%

*(Incorrect and don't know)

Table (4) Distributions of diabetic patients' reported responses related to foot self-care practices

Reported practice related foot care	Always %	Sometimes	Never
Do you Inspect feet regularly	5.0%	46.4%	48.6%
Do you dry between your toes regularly	13.3%	44.2%	42.5%
Do you wash feet with soap and warm water	44.7%	55.3%	0%
Do you trim toe nails straight across	25.3%	74.7%	0%
Did you ever inspect inside of footwear	6.1%	53.9%	40.0%
Do you regularly walk barefoot	0%	55.6%	44.4%
Do you wear open shoes / slipper outside home	1.7%	46.9%	51.4%
Do you wear cotton socks	38.3%	61.7%	0%
Do you usually remove callus or corn / hard skin by your self	2.3%	76.9%	20.8%
Do you seek physician help if you found redness/ bleeding , oozing between yours toes	18.1%	62.5%	19.4%
Do you walk for 15-30mintes 3-4 times /week	11.4%	75.3%	13.3%
Do you use lotion or oil to prevent foot dryness	3.3%	34.2%	62.5%

**Figure (1):** Distribution of the studied sample according to their diabetic associated chronic diseases.

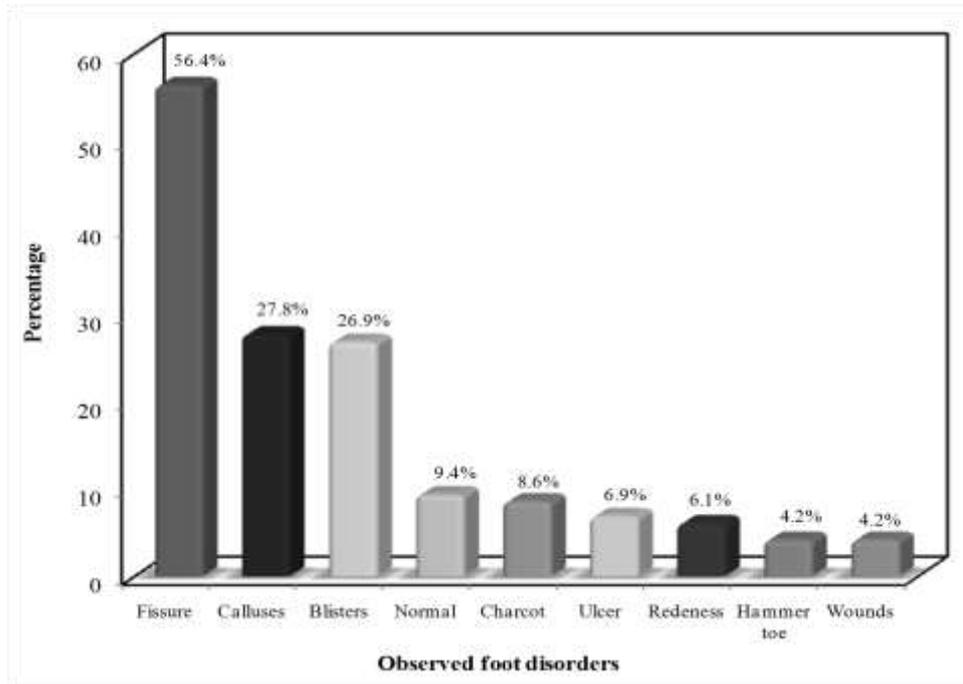


Figure (2): Distribution of patients according to observed foot disorders

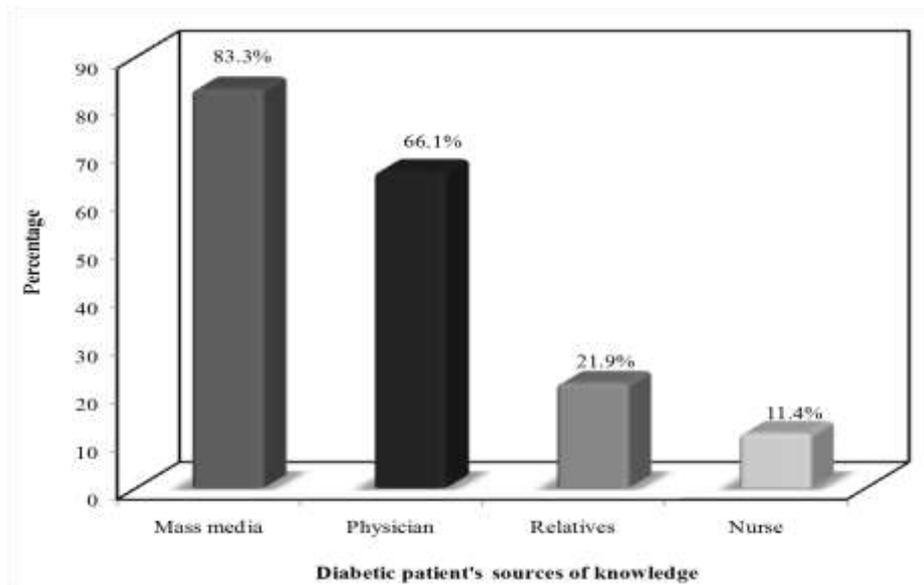


Figure (3) Distribution of the studied sample regarding their sources of knowledge about diabetic foot self-care and foot disorder

Table (5): Relation between studied patients' total knowledge score and their socio-demographic data.

Knowledge	Poor <50% (n = 170)		Fair 50 - <75% (n = 94)		Good ≥75 (n = 96)		χ ²	MC p
	No	%	No	%	No	%		
Age:								
<40	5	2.9	18	19.1	63	65.6	138.112*	<0.001*
40 – 50y	43	25.3	23	24.5	16	16.7		
>50	122	71.8	53	56.4	17	17.7		
Gender								
Male	59	34.7	64	68.1	57	59.4	31.579*	<0.001*
Female	111	65.3	30	31.9	39	40.6		
Marital status								
Single	0	0.0	0	0.0	9	9.4	74.406*	<0.001*
Married	117	68.8	89	94.7	86	89.6		
Widow	53	31.2	5	5.3	1	1.0		
Education								
Illiterate	107	62.9	18	19.1	5	5.2	157.817*	<0.001*
Read write	36	21.2	8	8.5	11	11.5		
Primary and preparatory	15	8.8	15	16.0	18	18.8		
Secondary	12	7.1	51	54.3	55	57.3		
University	0	0.0	2	2.1	7	7.3		
Onset of the disease								
<5 yrs	96	56.5	25	26.6	41	42.7	59.925*	<0.001*
5-10 yrs	52	30.6	22	23.4	42	43.8		
More than 10 yrs	22	12.9	47	50.0	13	13.5		
BMI								
Normal >18.5 - <25	28	16.5	18	19.1	51	53.1	125.789*	<0.001*
Overweight 25 - <30	36	21.2	64	68.1	28	29.2		
Obese >30	106	62.4	12	12.8	17	17.7		
Smoking								
Non smoker	137	80.6	54	57.4	62	64.6	17.551*	<0.001*
Smoker	33	19.4	40	42.6	34	35.4		
Working condition								
Not working	111	65.3	33	35.1	41	42.7	26.030*	<0.001*
Working	59	34.7	61	64.9	55	57.3		
Total score of knowledge (0 - 9)					Mean score 3.94± 1.82			

χ²: Chi square test

MC: Monte Carlo for Chi square test

*: Statistically significant at p ≤ 0.05

Table (6):Relation between studied patients' total practices score and their socio-demographic data.

Practice	Poor <50% (n = 181)		Fair 50 - <75% (n = 175)		Good ≥75 (n = 4)		χ ²	MC p
	No	%	No	%	No	%		
Age								
<40	8	4.4	74	42.2	4	100.0	88.381*	<0.001*
40 – 50y	49	27.1	33	18.9	0	0.0		
>50	124	68.5	68	38.9	0	0.0		
Gender								
Male	77	42.5	100	57.1	3	75.0	8.522*	0.010*
Female	104	57.5	75	42.9	1	25.0		
Marital status								
Single	0	0.0	8	4.6	1	25.0	39.867*	<0.001*
Married	133	73.5	156	89.1	3	75.0		
Widow	48	26.5	11	6.3	0	0.0		
Education								
Illiterate	92	50.8	38	21.7	0	0.0	66.503*	<0.001*
Read write	36	19.9	19	10.9	0	0.0		
Primary and preparatory	21	11.6	26	14.9	1	25.0		
Secondary	32	17.7	83	47.4	3	75.0		
University	0	0.0	9	5.1	0	0.0		
Onset of the disease								
<5 yrs	99	54.7	61	34.9	2	50.0	23.320*	<0.001*
5-10 yrs	38	21.0	76	43.4	2	50.0		
More than 10 yrs	44	24.3	38	21.7	0	0.0		
BMI								
Normal >18.5 - <25	36	19.9	57	32.6	4	100.0	31.812*	<0.001*
Overweight 25 - <30	54	29.8	74	42.3	0	0.0		
Obese >30	91	50.3	44	25.1	0	0.0		
Smoking								
Non smoker	134	74.0	117	66.9	2	50.0	3.218	0.197
Smoker	47	26.0	58	33.1	2	50.0		
Working condition								
Not working	107	59.1	77	44.0	1	25.0	9.192*	0.006*
Working	74	40.9	98	56.0	3	75.0		
Total score of practice (0 - 24)								
Mean score : 11.54± 2.77								

χ²: Chi square test

MC: Monte Carlo for Chi square test

*: Statistically significant at p ≤ 0.05

Table (7): Relation between studied patients' percent score of knowledge and practices with their foot complain and observed disorder.

	Practice	Knowledge
Peripheral neuropathy sign and symptoms complain		
Presence	52.14± 13.28	58.44± 23.68
Absence	46.93± 10.76	46.61± 21.78
t (p)	3.610 (<0.001)	4.200 (<0.001)
Observed foot disorders		
No	57.60± 8.24	69.49± 22.44
Yes	47.10± 11.40	47.12± 21.73
t (p)	6.786 (<0.001)	5.964 (<0.001)

t: Student t-test *: Statistically significant at p ≤ 0.05

References:

- World health organization (Who) facts and figure about diabetes Geneva: WHO; 2015. Available at: <http://www.who.int/diabetes>. Accessed :December 2014
- International Diabetes Federation. Diabetes Atlas. 6th ed. Diabetes facts and figures. 2014. Available from: www.idf.org/world-diabetes-day/facts-figures. Accessed: December 2014
- International Diabetes Federation. Diabetes facts and figures. IDF Diabetes Atlas 3rd ed. 2012. Available at :www.idf.org/3rd-edition.pdf Accessed : December 2014
- Diabetes Score card In Egypt. International Diabetes Federation. Available at www.idf.org/membership/mena/egypt. Accessed :December: 2014
- El Baz T, Hamed F, Mahmoud F et al., Screening for the detection of early decline of renal functions among a group of Egyptian diabetics and hypertensive patients. AAMJ, 2013;10, (4).
- Arafa N & El Din Amin G. The Epidemiology of Diabetes Mellitus in Egypt: Results of a National Survey. The Egyptian Journal of Community Medicine 2010;28 (3).
- Sicree R, Shaw J, Zimmet P. Diabetes and impaired glucose tolerance. International Diabetes Federation, Belgium. Diabetes Atlas fourth edition Diabetes and IGT 2006. Available at: www.idf.org. Accessed: December 2014
- Haas L, Maryniuk M, Beck J, et al., National Standards for Diabetes Self-Management Education and Support. Diabetes Care. 2012; 35(11): 2393–2401.
- Chomi E.I. and Nuñeza O.M .Clinical Profile and Prognosis of Diabetes Mellitus Type 2 Patients with Diabetic Foot Ulcers in Chomi Medical and Surgical Clinic, General Santos City, Philippines. International Research Journal of Biological Sciences. 2015;4 (1), 41-6.
- Zubair M, Malik A and Ahmad J. Incidence, risk factors for amputation among patients with diabetic foot ulcer in a North Indian tertiary care hospital. 2012; 22, (1):24–30.
- Chand G, Mishra A, Kumar S, Agarwal A. Diabetic foot Clinical Queries: Nephrology 2012; 144–150. Available at [journal homepage: www.elsevier.com](http://www.elsevier.com). Accessed :July 2015
- Sumpio B. Contemporary Evaluation and Management of the Diabetic Foot. Hindawi Publishing Corporation Scientica 2012. Available at: www.hindawi.com. Accessed :July 2015
- Nahas M, Gawish H and Tarshoby M. The prevalence of risk factors for foot ulceration in Egyptian diabetic patients. Practical Diabetes International. 2008; 25,(9).362–66.

- 14- Bell R, Arcury A, & Snively B et al., Diabetes Foot Self-care Practices in a Rural, Triethnic Population. *Diabetes Educ.* 2005; 31(1): 75–83.
- 15- El-Rahman S & Abo Shousha A. Effect of an Educational Program on Caregivers, Knowledge about Diabetic Foot Care at Elderly Home in Damanhur –Egypt. *Journal of American Science* 2015;11(1).
- 16- The WHO Global Database on Body Mass Index (BMI). Copyright 2006 World Health Organization - Last update: 01/11/2015. Available at: <http://apps.who.int/bmi>. Accessed December 2014
- 17- Miller J, Carter E, & Shih J, BS et al., Applied evidence, How to do a 3-minute diabetic foot exam. *Journal of Family Practice* . 2014; 63(11):646-49,653-56.
- 18- Moyer A, Delmas L & Little M. et al. Diabetes Foot: Risk Assessment Education Program Participant's Package. Based on the Registered Nurses Association of Ontario Best Practice Guideline: Reducing Foot Complications for People with Diabetes 2004. Available at: www.rnao.ca. Accessed December 2014
- 19- Zubair M, Malik A, Ahmad J. Diabetic foot ulcer: A review: *American Journal of Internal Medicine* 2015; 3(2): 28-49. Available at www.sciencepublishinggroup.com Accessed :December 2014
- 20- Herman W, Kinmonth L, Wareham N & Williams R. *The Evidence Base for Diabetes Care 2nd ed.* Wiley –Blackwell Ltd.; 2010.
- 21- Model of care for the diabetic foot . National Diabetes program clinical strategy and program directorate 2011. Accessed on June 2015. www.hse.ie.
- 22- Chiwanga F. and Njelekela M. Diabetic foot: prevalence, knowledge, and foot self-care practices among diabetic patients in Dar el Salaam, Tanzania – a cross-sectional study. *Journal of Foot and Ankle Research* 2015;8:20 Available at www.creativecommons.org. Accessed :March 2015
- 23- Olayinka O. Shiyabola B, Randall B, & Lammers C. Impact of an Inter professional Diabetes Education Model on Patient Health Outcomes: A Longitudinal Study. *Journal of Research in Inter professional Practice and Education* . 2014; 4 : (2).
- 24- Moodley L & Rambiritch V. An assessment of the level of knowledge about diabetes mellitus among diabetic patients in a primary healthcare setting. *South African Family Practice* 2014; 49:10-16 .Available at www.tandfonline.com Accessed :July 2015
- 25- Rocha R, Zanetti M, & Santos M. Behavior and knowledge: basis for prevention of diabetic foot. *Acta Paul Enferm* 2009; 22(1):17-23.
- 26- Seid A , Tsige Y. Knowledge, Practice, and Barriers of Foot Care among Diabetic Patients Attending Felege Hiwot Referral Hospital, Bahir Dar, Northwest Ethiopia. *Advances in Nursing* 2015;1-10. available at: www.hindawi.com Accessed :December 2014
- 27- Desalu O, Salawu F, Jimoh A & Adekoya A, et al., Diabetic Foot Care: Self - Reported Knowledge and Practice Among patients Attending Three Tertiary Hospital in Nigeria. *Ghana Medical Journal* 2011; 45:(2).
- 28- Bijoy C, Feba B, Vikas R , & Dhandapani C, et al. Knowledge Assessment and Patient Counseling on Diabetic Foot Care. *Indian Journal of Pharmacy Practice*. 2012;5 (2).
- 29- Berhe K , Kahsay A , Gebru H. Adherence to Diabetes Self-Management Practices among Type II Diabetic Patients in Ethiopia; A Cross Sectional Study. *Greener Journal of Medical Sciences*. 2013; 3 (6): 211-21.
- 30- Khalil S & Megallaa M. Prevalence of diabetic foot disorders and related risk factors among Egyptian subjects with diabetes. *Primary Care Diabetes*. 2014 ;9: 297–303
- 31- El-Sayed Z & Hassanein S. Diabetic Foot Screening for Ulcer Detection: Suggested Customized Nursing Guideline at a University Hospital-

- Egypt. Egyptian Nursing Journal 2015. Available at : erepository.cu.edu.eg. Accessed :December 2014
- 32- Dikeukwu R, Famed M & Omole O. Awareness and practices of foot self-care in patients with diabetes at Dr Yusuf Dadoo district hospital, Johannesburg. JEMDSA 2015; 18(2):112-18. available at : www.tandfonline.com Accessed :February 2015
- 33- Maskari M, El-Sadig M, Al-Kaabi J, Afandi B, Nagelkerke N, Yeatts K. Knowledge, attitude and practices of diabetic patients in the United Arab Emirates. PLoS ONE 2013;8(1):1-8.
- 34- George H, Rakesh P, Prasad J. Foot Care Knowledge and Practices and the Prevalence of Peripheral Neuropathy Among People with Diabetes Attending a Secondary Care Rural Hospital in Southern India. J Family Med Prim Care 2013; 2(1): 27–32.
- 35- Al Asmary A, Mostafa O, Khald Y. Diabetic Patients' Knowledge and Practice Regarding Prevention of Diabetic Foot. Med. J. Cairo Univ 2013 ;81 (2):197-205 Available at : www.medicaljournalofcairouniversity.com Accessed : July 2015