Effect of Educational Progamabout Foot Care on Nurses'Knowledge, practiceand Outcomes for Patients with Diabetes.

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Abstract: *Diabetic foot problems are the leading cause of diabetes-related hospital admissions and are responsible for approximately 50% of all lower limb amputations.*
Aim of the study: *Determine the effect of educational program about foot care on nurses'knowledge, practice and outcomes for patients with diabetes.*
Material and methods:*pre-post test control trial design was conducted in this study.*
Subject: *Thirty nurses and forty diabetic patients in the medical department at Tanta University Hospital.*
Tools:*three tools were used for data collection: Tool I part 1 Nurses social-demographic and Knowledge assessment questionnaire regarding, diabetes, foot care.Part 2:patients Sociodemographic,Knowledgepart 3 patient practice assessment questionnaire.Tool II, Observational checklist for nurses 'practiceabout Neurovascular assessment for diabetic patient's.***Results:** There were significant differences and improvement between studied nurses, pre, immediately and one month post implementation the program. The total practical score of the studied group was good 93.33% and 90% in in immediately and afterone month respectively. It was found that there was an improvement of patients' practice of foot care in all question of diabetic foot and caring of it post the program.*
Conclusion:*Educational program about foot care showed improvementinnurses' knowledge and practice and screening testalso improve patients outcomes related to diabetic foot care.*
Recommendation: *Healthcare organizations must develop clinical expertise on the diabetic foot by implementing diabetes foot assessment, screening into routine assessments and education.*
Key words: *diabetic foot, foot care, neurovascular assessment,*

I. Introduction

Diabetes is considered as a global epidemic [1] .According to statistics in Egypt, by the year 2030, there will be 8.6 million adults with diabetes making it the country with the tenth largest population of diabetics in the world [2].Diabetic foot problems are the leading cause of diabetes-related hospital admissions and are responsible for approximately 50% of all lower limb amputations. Worldwide, including South Africa,roughly 10-15% of all patients with diabetes will develop foot ulcers at some stage of their lives. Several factors are involved in the development of foot ulcers, including peripheral neuropathy, peripheral vascular disease , limited joint mobility and repeated trauma from abnormal load distribution on the foot[3].

The prevalence of diabetes increase in developing countries, healthcare professionalHCPs should educate patients with diabetes to perform regular foot self-examination and self-care. In addition, they should regularly carry out foot examination and care. Patients with diabetes at greatest risk of foot ulcerations can easily be identified by regular examination of the feet by the patient and/or by his or her healthcare professional (HCP). Prophylactic foot examinations by HCPs have been shown to decrease patient complications. [4]The foot ulcers can lead to infection, gangrene, amputation and even death if the necessary care is not provided [5]. In addition, lower extremity amputation is associated with prolonged hospitalization and rehabilitation also is required to home care and social support. Overall, the rate of lower limb amputation in diabetic patients is 10-30 times higher than non-diabetics [6].

The main aim of diabetic education is to change behavior and promoteself-management of the condition, since poor foot care behaviors are known to increase the risk of ulcerations, amputations and mortality. Improving the foot care behaviors of people living with type 2 diabetes is reported to be one of the most effective strategies in minimizing diabetic foot complications [7-8].

Nurses have an effective role in prevention of foot ulcers and lower limb amputation by educational interventions, screening high-risk people and providing health care [9] . According to **Peterman et al (2010)[10] and Viswanathanet al(2005)**[11]it is necessary for all diabetic patients, especially patients at risk for foot ulcers, to be familiar with the basics of foot care. Also nurses' role in diabetic foot care includes foot examination, wound dressing, encouraged patients and families to appropriate care and follow-up . The primary goal of

screening is early detection of diabetic foot problems, identifying those at risk and planning the care to reduce the risk of ulcers [12-14].

In a diabetic foot clinic, nurses may access vascular status with an ankle brachial index (ABI),60 second Diabetic Foot Screen and toe pressure[15-17]. Moreover, pedography system and thermometer are used to assess foot sole pressure and foot temperature so the severity of foot problems and being at risk of diabetic ulcers will be identified.Several tests are used to detect peripheral neuropathy, including vibration perception, application of warmth and cold, and nerve conduction studies, which are assumed to be the reference standard [16]·An identification of those patients at risk of foot problems is the first step in preventing such complications.Monofilament testing is an inexpensive, easy touse for assessing the loss of protective sensation, and it is recommended by several practice guidelines to detect peripheral neuropathy in otherwise normal feet [17-19]

Management program that focus on prevention, education, regular foot examination, intervention, and optimal use of foot wear have significant reduction in the occurrence of lower extremities amputation, improve patients' qualities of life and reduce cost of healthcare of this chronic disease·[10,20]

Aim of the study:determine the effect of educational program about foot care on nurses' knowledge, practice and outcomes for patients with diabetes.

II.   Research hypothesis:

- Nurses attend educational program about foot care exhibit improved knowledge and practice mean score post program implementation.
- Patients with diabetes who receive their care from nurses attend educational program had apositive outcome.

Operational definition
Patient outcomes: measured by patients knowledge and self –care practice about foot care .

Subjects and methods
Research design:
The present study was utilized A quasi-experimental research it designed to determine the effect of educational program about foot care on nurses' knowledge, practice and outcomes for patients with diabetes.

Setting:
This study was conductedin Medical Department at Tanta University Hospital. Diabetic patients hadproblems, transferred from any hospital departments or from out patients'clinic can admitted in this department. It consists of 90beds.

Subjects:
A)-All available nurses (30) had bachelor and technician degree of nursing who are working in medical department and directly contact and caring with diabetic patients.
B)**-Patients**
A convenience sample of 40 Adults,   patients with diabetes had no history with previous food ulcer .

Data collection tools:
Three tools were used for data collection after reviewing the recent relevant literature·[19-26]
Tool I :Sociaodemographic and Knowledge assessment structure questionnaire: This tool was developed by researcher after reviewing of relevant literature [20-24] to assess nurse's knowledge related to diabetes mellitus and diabetic foot care It was comprised of two parts:
   Part 1: NursesSocio-Demographic data as : age, marital status level of education, years of experience , previous formal or informal education related to diabetic foot care .
   Part 2 : **Nurses knowledge questionnaire regarding foot care:** It was comprised of (30) open ended questions about : types of diabetes, complications of diabetes, diabetic foot' causes , signs & symptoms , high risk patients , nursing roles about foot care.
   Scoring system
   -Complete correct answer was given a score oftwo while correct and incomplete answer was given a score of one and zero score was given for wrong or no answer. The total score was 60
   - Score less than 60% of total score wasconsidered poor, from 60% to less than 75% was considered fair, and from 75% and more was considered good.

Tool II: Patients sociodemographic,knowledge and practice assessment questionnaire:
This tool was developed and used by the researcher after revising relevant literature to assess patient's knowledge and practice related to foot care. It was comprised from three parts as follows:

Part 1:Patient sociodemographicand clinical data: age, sex, occupation, marital status level of education , smoker,family income , previous health teaching program for foot care , , source of knowledge about foot care .

Part 2: Patients Knowledge about diabetic foot: It was comprised of (3) questions about knowledge related to diabetic foot as, definition, causes, and signs &symptoms.

Part 3:Patient practice related to foot care: It comprised of (24) questions about patient's practice related to foot caresuch as: daily feet assessment, washing and dryness, using hot or cold water, walking bare foot,check shoes , trimming nail, check feet every day for the following: cuts, cracks, bruises, blisters, sores, infections or unusual markings , the color of legs and feet; if there is swelling, warmth or redness, characteristic of suitable shoes.

Scoring system
-Correct answer was given a score of one and zero score was given for wrong answer.The Total score was 27.
- Score less than 60% of total score was considered poor, from 60% to less than 75% was considered fair, and from 75% and more was considered good.

Tool III: Diabetic patient'sneurovascular assessment used as an observational checklist for nurses.
This tool was adapted and used by the researcher after revising relevant literature : [25,26] to assess neurovascular assessment for diabetic patient'sfor early detection of high risk group , tests include: Monofilament test ,vibration test (tuning fork) , Loss of protective sensation (LOPS) assessment by using 60 second for diabetic foot screen,pulse in dorsalpedis.

1-10 G Monofilaments. Nylon monofilaments are constructed to buckle when a 10-g force is applied; loss of the ability to detect this pressure at one or more anatomic sites on the plantar surface of the foot has been associated with loss of large-fiber nerve function. It is recommended that teen sites (Big toe , third toe , fifth toe , first metatarsal , third metatarsal , fifth metatarsal , medial arch , lateral arch , heel , and dorsum be tested on each foot while the patient's eyes are closed .
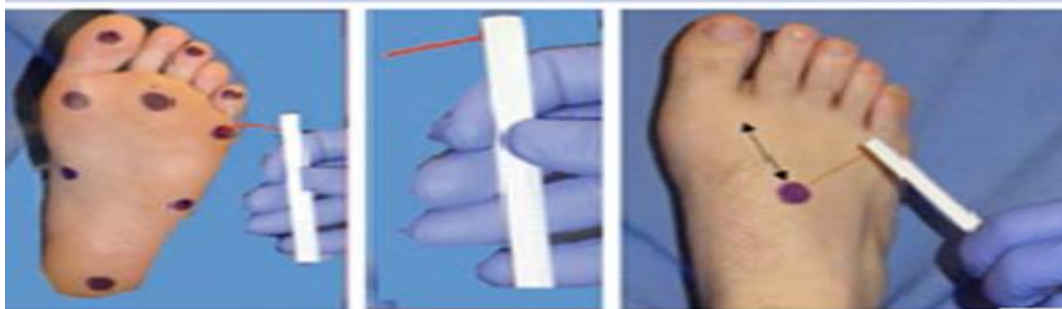
Foot Sensation Test [25]
2-Tuning Fork Test.
The tuning fork of 128-Hz wasused. It provides an easy and inexpensive test of vibratory sensation. Vibratory sensation was tested over the tip of the great toe bilaterally. An abnormal response was observed , when the patient loses vibratory sensation and the examiner still perceives it while holding the fork on the tip of the toe .

Tuning Fork Test[26]

Scoring system of nurses' performance related to neurovascular assessment.
- The nurse's performance ranked as follows:
Not done = 0, incompletelydone = 1 and completelyand correctly done= 2

3- Loss of protective sensation (LOPS)assessment by using 60 second for diabetic foot screen:
This tool was adapted and used by the researcher after revising relevant literature[17] to use 60 second diabetic foot screen .It was comprised from ,**look – 20 seconds**for skin (0-3 score), nails (0-2 score), deformity (0-4 score) , footwear (0-1 score)**. Touch 10 seconds**for right&left foot for temperature(0-1 score for each leg) andrange of motion0- 3 score) and **30 seconds assessmentfor sensation**for Monofilament site (0-4 score) test sensation ask patient 4 questions:. (1-Are your feet ever numb? 2-Do they ever tingle? 3- Do they ever burn?4- Do they ever feel like insects are crawling on them?**) ,** pedal pulses, erythema, dependent rubor**.**

Scoring system
Screening for foot ulcers and/or limb-threatening complications.
Score = 0 to 6 recommend screening yearly,
Score = 7 to 12 recommend screening every 6 months
Score = 13 to 19 recommend screening every 3 months .
Score20 to 25 recommend screening every month.

III. Method

1-An official permission to carry out the study was obtained from responsible authorities at Faculty of Nursing at Tanta University. Then, the permission was obtained from the hospital administrative authority.
2-The purpose of the study was explained to the nurses ,patientsand their consent to participate was obtained and those who were willing to participate were given a questionnaire to answer it. They were also assured of their anonymity and the confidentiality of their responses. Study was extended from June 2014 to the end of December 2014

-Field work -:
3- Tools validity were checked by 5 experts in the related field of medical surgical nursing and medical specialty. Tanta University.
4-Reliability (coefficient alpha)was tested for all tools and it was =(0.87) for tool 1 part 2, 0.78 for tool 2 part 2 and 3.
5-Pilot study was conducted on 10% of nurses. This number was excluded from the studied sample to identify the obstacles and problems that may be encountered in data collection, applicability and feasibility of the developed tools

Data collection
The program was conducted on four phases which include the following:-

1**. Program Assessment Phase:**
-All nurses were assessed for knowledge using tool I part 2 and practice using tool III part 1,2,3. Also patients were assessed for their knowledge and practice using tool II part 2 and 3 based on assessment phase and literatures review planning was done for nurses and patients

2. Planning phase:

In this phase planning was formulated for each patients based on assessment phase and literature review . Priorities patients expected outcomes was formulated , booklet also was formulated to be distributed to each patients in implementation phase

The general objective of the guideline model is to improve the nurses, knowledge and practiceofdiabetic foot care and improve diabetic patients' knowledge and practice of foot care.

3. Implementation Phase:

A clear and simple explanation was offered to nurses and patients about the study and expected outcomes for them and patient. Each nurse was assessed individually (10-20 minutes) using the previously mentioned tools. The application of designed nursing teaching program was performed by the researchers. The researcher prepared the training places, teaching aids and media (computer, picture , handouts, filament and tuning fork).The total number of 30 nurses divided into 6 group and each group composed of 5 nurses and was need 4 session, 2 sessions theory and other 2 sessions for practice.The program was introduced to each nurses separately over a period of one month and two weeks, 4 sessions /week the total numbers of sessions was 24 sessions. Each session is ranged from 30-60 minutes; the total time needed was 22 hours. In the first pre-test was done and objectives of the program were explained to the nurses. Also, a copy from program was given to each nurse. After finishing the program for each group of nurses assessed patient knowledge about diabetic foot and practice of foot carebefore and after providing the education program for them by using tool I partII(b,c) during the period of the study.

4. Evaluation phase:

The evaluation of the effectiveness the educational program was measured,each nurses was evaluated preprogram implementation and immediately post program implementation and one month later for their knowledge using tool I part 2 and for their practice using tool III part 1,2 and 3.Alsoeach patient was evaluated preprogram implementation and immediately post program implementation for their knowledge and practice using tool II part 2, 3.

Statistical analysis

The analysis was performed using statistical software SPSS version 16.For quantitative data, the mean and standard deviation were calculated. For qualitative data, a comparison between one group before and after intervention was done by using Chi-square test (χ^2). For comparison between means of one group before and after intervention, 1-way ANOVA test was used. A significance was adopted at $P<0.05$ for interpretation of results of tests of significance.[27]

IV.   Result

Table (1): Distribution of the studied nurses according to their sociodemographic data:

Items		Studied nurses (n = 30)	
		N	%
Age mean of age= (years)	35 ± 13 years		
Level of education	bachelor degree	15	50
	Technician degree	15	50
Years of experience post graduated	Less than 5 years	1	3.3
	5-10 years	23	76.7
	More than 10 years	6	20.0
	5-10 years	15	50.0
	More than 10 years	7	23.3
Past training program for diabetic foot	No	30	100

Table (1) shows Distribution of the studied group according totheirsociodemographic characteristics. Regarding the age the mean age of the studiednurses were 35 ± 13 years. About one half (50. %) of the studied group have 5- 10 years' experience. All nurses 30 (100%) of the studied nurses hadn't attend any training program in the past for diabetic foot .

Table (2):Percentage distribution of nurses according to their knowledge score throughout the study period :

Items	Pre (n=30)	Immediately postprogram (n=30)	One month post programimplementation	χ^2 P

		N	%	N	%	N	%	(n=30)
Nurses' knowledge level about diabetes mellitus	<20 Poor	9	30	0	0	0	0	90.00 0.000*
	20-29 Fair	21	70	3	10	5	16.66	
	>=30 Good	0	0	27	90	25	83.34	
Nurses' knowledge level about diabetic foot and care	<10 Poor	10	33.33	0	0	0	0	36.00 0.000*
	11-14 Fair	5	16.67	2	6.7	5	16.66	
	>=15 Good	15	50	28	93.3	25	83.34	

Table (2) Illustrated scores for nurses' knowledge about diabetes mellitus and diabetic footthroughout period of study: There were significant differences and improvement in knowledge score of nurses , pre, immediately and at follow up phase P (0.000*)

Table (3): Percentage distribution of the studied nurses according their practice at 3 different phases of program implementation :

Items		Pre (n=30)		Immediately post program (n=30)		One month post program implementation(n =30)		χ^2 P
		N	%	N	%	N	%	
1. Right and left foot 10 G Monofilaments	No done	30	100	0	0	0	0	93.103 0.000*
	Incomplete done	0	0	2	6.7	3	10	
	Complete done	0	0	28	93.3	27	90	
2. Tuning Fork Test	No done	30	100	0	0	0	0	94.737 0.000*
	Incomplete done	0	0	1	3.33	3	10	
	Complete done	0	0	29	96.7	27	90	
3. Dorsal pedals posterior tibialpulse	Nodone	30	100	0	0	0	0	96.429 0.000*
	Incomplete done	0	0	1	3.33	4	13.33	
	Complete done	0	0	29	96.7	26	86.67	

Table (3) Illustrated the percentage distribution of the studied nurses according to assessment of neurovascular of the feet .As regarding 10 G monofilaments , Tuning Fork Test , posterior tibial and dorsal and pedals pulse it was found that there was an improvement of nurse's knowledge and performance. There were significant differences between studied nurses, pre, Immediately and follow up one monthpost program implementation P (0.000*)

Table (4): Percentage distribution of studied nurses related to their practice at 3 phases of the study practice:

Items		Pre program (n=30)		Immediately post programimplemen tation (n=30)		one month post program implementation (n=30)		χ^2 P
		N	%	N	%	N	%	
Look – 20 seconds								
1. Skin	Not done	30	100	0	0	0	0	**93.103 0.000***
	Incomplete	0	0	1	3.33	2	6.67	
	Complete	0	0	29	96.7	28	93.33	
2. Nail	Not done	30	100	0	0	0	0	**93.103 0.000***
	Incomplete	0	0	0	0	2	6.67	
	Complete	0	0	30	100	28	93.33	
3. Deformity	Not done	30	100	0	0	0	0	**93.103 0.000***
	Incomplete	0	0	0	0	2	6.67	
	Complete	0	0	30	100	28	93.33	
4. Foot wear	Not done	30	100	0	0	0	0	**93.103 0.000***
	Incomplete	0	0	1	3.33	2	6.67	
	Complete	0	0	29	96.7	28	93.33	
Touch – 10 seconds								
5. Temperature-cold	Not done	30	100	0	0	0	0	**93.103 0.000***
	Incomplete	0	0	0	0	2	6.67	
	Complete	0	0	30	100	28	93.33	
6. Temperature-Hot	Not done	30	100	0	0	0	0	**93.103 0.000***
	Incomplete	0	0	0	0	2	6.67	
	Complete	0	0	30	0	28	93.33	

7. Range of motion	Not done	30	100	0	0	0	0	**93.103**
	Incomplete	0	0	0	0	2	6.67	**0.000***
	Complete	0	0	30	100	28	93.33	
Assess – 30 seconds								
8. Sensation – Monofilament Testing	Not done	30	100	0	0	0	0	**93.103**
	Incomplete	0	0	0	0	2	6.67	**0.000***
	Complete	0	0	30	100	28	93.33	
9. Sensation – Ask 4 Questions	Not done	30	100	0	0	0	0	**93.103**
	Incomplete	0	0	0	0	2	6.67	**0.000***
	Complete	0	0	30	100	28	93.33	
10. Pedal Pulses	Not done	30	100	0	0	0	0	**93.103**
	Incomplete	0	0	0	0	2	6.67	**0.000***
	Complete	0	0	30	100	28	93.33	
11. Dependent Rubor	Not done	30	100	0	0	0	0	**93.103**
	Incomplete	0	0	0	0	2	6.67	**0.000***
	Complete	0	0	30	100	28	93.33	
12. Erythema	Not done	30	100	0	0	0	0	**93.103**
	Incomplete	0	0	0	0	2	6.67	**0.000***
	Complete	0	0	30	100	28	93.33	

Table (4)continue :Percentage distribution of studied nurses related to their practice at 3 phases of the study practice:

Items		Pre program (n=30)		Immediately post program implementation (n=30)		one month post program implementation (n=30)		χ^2 P
		N	%	N	%	N	%	
Total practice score of foot screen tests	<12 Poor	30	100	0	0	0	0	**94.100**
	12-17 Fair	0	0	2	6.67	3	10	**0.000***
	>=18 Good	0	0	28	93.33	27	90	

Table (4): shows the distribution of studied nurses according to items of 60 second Diabetic Foot screening test throughout period of the study: It was found that there was an improvement of nurse's performance about 60 second Diabetic Foot screening of all items for**Look 20 seconds**,**Touch 10seconds**, and **Assess 30 seconds** . The total practical score was good 93.33% and 90% in immediately and after follow up by one month respectively. A significant differences were found between studied nurses, pre, Immediately and follow up P (0.000*)

Table (5):Distribution of the studied patients according to their socio-demographic data

Item		Pre program (n=40)		post program (n=40)		χ^2 P
Age (years)	Mean = 50 ± 10					
Sex	Male	24	60	26	65	**2.003**
	Female	16	40	14	35	**0.367**
Marital status	Married	35	87.5	18	45	**9.336**
	Single	5	12.5	8	20	**0.053**
	Widow	0	0	14	35	
Job	Manual	20	50	18	45	**0.404**
	Not manual	20	50	22	55	**0.817**
Level of education	Illiterate	16	30	16	40	
	Read and write	10	25	22	60	**21.257**
	Secondary	10	25	0	0	**0.002***
	University	8	20	0	0	
Income	Not enough	12	30	40	100	**36.522**
	Enough	28	70	0	0	**0.000***
Smoking	Yes	20	50	26	65	**2.828**
	No	12	30	10	25	**0.587**
	Stopped	8	20	4	10	
Training program before	Yes	0	0	38	95	
	No	40	100	-	-	

Table (5): Illustrated the distribution of the studied patients according to their socio-demographic data: Regarding the age distribution of the studied group, it was found that the mean of age of patient was 50 ± 10years. Regarding the sex, it was found that males' sex represented 60% of the studied patient. As regarding marital status it was found that the majority of 87.5% of the studied patients were married.While the level of education it was found 30% of the studied patients were illiterate. Regarding smoking half of patients 50% were smoker. As regarding training program in medical department it was found that the majority of the studied patients 100% hadn't any previous trainingprogram.

Table (6):Distributionof studied patients regarding to their knowledge for diabetic foot at different phases of program implementation .

Items		Pre program (n=40)		Post program (n=40)		χ^2 P
		N	%	N	%	
1. Definition of diabetic foot	Foot wounds	40	100	0	0	**60.00**
	foot exposure to damage	0	0	40	100	**0.000***
2. causes of DF	High bl. Sugar	40	100	0	0	**60.00**
	High bl. sugar, neuropathy & infections	0	0	40	100	**0.000***
3. Sign &Symptoms of DF	lack of sensation Foot	15	37.5	0	0	
	foot abnormal sensations	15	37.5	0	0	
	Presence of callus and cracks	5	12.5	0	0	**60.00**
	Foot color change	5	12.5	0	0	**0.000***
	All answers	0	0	40	100	

Table (6): Shows the distribution of the studied patients regarding to their knowledge for diabetic foot **.** It was found that there was an improvement of patients' knowledge for diabetic foot all items . There were significant differences between pre and post providing the program for the studied patients P (0.000).

Table (7): Distribution of studied patients regarding to their practice for foot care at different phases of program implementation .

Items		Pre program (n=40)		Post program (n=40)		χ^2 P
		N	%	N	%	
1. check your feet every day for color, cuts, sores, infections or unusual markings	Yes	0	0	20	100	**60.00**
	Sometimes	40	100	0	0	**0.000***
2. Wash foot daily?	No	4	10	20	100	**60.00**
	Yes	36	90	0	0	**0.000***
3. Dry foot after washing?	Yes	0	0	20	100	**60.00**
	Sometimes	40	100	0	0	**0.000***
4. Investigate water hotness before using it for washing?	Yes	0	0	20	100	
	No	32	80	0	0	**60.00**
	Sometimes	8	20	0	0	**0.000***
5. For coldness of foot in night?	Wear socks	14	35	18	90	**15.849**
	Cover or blanket	26	65	2	10	**0.000***
6. Walking bare shoes?	Yes	2	5	2	5	
	No	16	40	32	80	**10.358**
	Sometimes	22	55	6	15	**0.035***
7. Check shoes before wear ?	Yes	4	10	19	95	**55.824**
	Sometimes	36	90	1	5	**0.000***
8. Wear new shoes short time before starting wear?	Yes	0	0	36	90	
	No	40	100	2	5	**52.037**
	Sometimes	0	0	2	5	**0.000***
9. Use chemical material to remove dry skin?	No	0	0	20	100	**60.00**
	Sometimes	40	100	0	0	**0.000***
10. Put foot in water before cutting nail?	Yes	40	100	0	0	
	No	0	0	34	85	**60.00**
	Sometimes	0	0	6	15	**0.000***
11. Use lotion for foot skin?	Yes	0	0	34	85	
	No	30	75	0	0	**60.00**
	Sometimes	10	25	6	15	**0.000***
12. Put the lotion between toes?	Yes	14	35	0	0	
	No	20	50	40	100	**24.00**
	Sometimes	6	15	0	0	**0.000***
13. Wear tight socks?	Yes	0	0	0	0	
	No	40	100	40	100	**51.818**
	Yes	0	0	40	100	**0.000***

Table (7): (continue)Distribution of studied patients regarding to their practice for foot care at different phases of program implementation

Items		Pre program (n=40)		Post program (n=40)		χ^2 P
14. Change socks daily ?	Yes	0	0	39	95	**51.818**
	Sometimes	40	100	1	5	**0.000***
15. Character of shoes?	Closed	10	25	40	100	**60.00**
	Open with finger	20	50	0	0	**0.000***
	Open shoes	10	25	0	0	

16. Wear shoes without socks?	Yes	30	75	0	0	**40.00**
	No	10	25	40	100	**0.000***
17. Put foot in water before cut nails?	Yes	0	0	40	100	**60.00**
	No	40	100	0	0	**0.000***
18. Sitting in cross legs?	Yes	34	85	0	0	**47.488**
	No	6	15	19	95	**0.000***
21- change socks every day	No	20	50	0	0	**13.333**
	Yes	20	50	40	00	
22- use a mirror to see the bottom of your feet	No	40	100	0	0	**60.00**
	Yes	0	0	40	100	**0.000***
23- clean a cut or scratch with a mild soap and water and cover with a dry dressing for sensitive skin	No	15	75	0	0	**40.00**
	Yes	5	25	20	100	**0.000***
24- trim nails straight across	No	40	100	0	0	**60.00**
	Yes	0	0	40	100	**0.000***

Table (7): Shows the distribution of the studied patients regarding to their practice of foot care**.** It was found that there was an improvement of patients' practice of foot care in all items of diabetic foot caring post the program. Majority of patients in the preprogram stage made inappropriate practice for foot care. There were significant differences between pre and post providing the program for the studied patients P (0.000).

V.   Discussion

The prevention is better than cure. Diabetic foot as the most common cause of hospitalization in diabetic patients and is one of health system concerns .So that most of the time of diabetes healthcare providers is allocated to the prevention and early diagnosis of diabetic foot complications. In this regard, nurses is a members of the diabetes care team not only need to play their role in health care, public education, health system management, but also must attend special training program to use the latest instructions of diabetic foot care in order to provides the effective services to facilitate promote diabetic patients health.[1,6,10] So, this study aims to determine the effect of educational program about foot care on nurses, knowledge , practice and patients out comes.

In Egypt country, despite the increased number of diabetic patients, the training of specialist nurses has not beenconsidered effectively. **Tabatabaei et al (2012)**[21]reported that, It seems that developing short term training courses for nurses, in clinics and hospitals along with continues training about novel approaches in diabetic foot care could be temporarily increased the focus on diabetes and foot care.

The post-test of the educational program and follow up results demonstrated that all subjects (nurses and patients) had improved their diabetic foot care knowledge and practice. These data strengthen the previous findings of **Schmidt et al (2008)** [22]**Also ,Vatankhah et al (2009)** [23]**,**which found that education could effectively improve patients' foot care knowledge and behaviors. As regarding education of nurses staff **, Apelqvist et al (2000)**[24]and **Olson et al 2009**[28]showed that , optimal foot care according to guidelines includes professional protective foot care, education of nurses staff and regular inspection of the patient's feet, identification of the high risk patient, treatment of non-ulcerative lesions, and a multidisciplinary approach to established foot ulcers. These strategies have been reported to decrease the incidence of lower extremity amputation.

In relation to smoking half of the patient in the present study were smoking this may due to nearly two third of the patient included in the present study were male and didn't attend educational program before. This constant with **Al-Wahbi 2010** [29] Smoking is common between male than female. Smoking is unhealthy for everyone, but it's especially important for people with diabetes to quit. This is because the patient already have an increased chance of developing cardiovascular disease or circulatory problems. Smoking makes the chances of developing these diseases even greater.

In the present study the majority of the studied patient notperformed feet care practice before introduction the educational program fromnurses in the medical department of Tanta university as waking bare shoes, didn't dry their feet after washing, wearing open shoes and wearing shoes without sokesor observe it before wearing it but such practice improved post providing patientwith adequate information and knowledge.

According to **,Al Arouj (2014)**[30] report , risk factors for diabetic foot complications are particularly relevant to the Arab world. These include hot, dry weather, which means sandals are a common choice of footwear or people frequently chose to go barefoot, out of habit or necessity.This leaves the foot open to trauma," Islam is the dominant religion in most Arabic countries, and while people do wash their feet for prayer 5 times a day, leading to regular foot inspection, people often neglect to dry their feet properly, and this can lead to infection. **Also Basal (2005)**[31] stated that the effect of health education program will reflect on patients. It improves patients' knowledge towards appropriate foot care, and prevents the progress of foot ulcer and amputation.

Smoking and physical inactivity are well-known risk factors for peripheral arterial disease and diabetic foot . In consequence, a high percentage did not reach expert recommendations for glycemic control .Therefore, initiating a nurse-based foot care program is immediately required, including lifestyle modification, quit smoking , teaching patients to choose appropriate shoes with sufficient width, depth, and arch support, and cultivation of foot self-care practice; these are all important issues for patients[27-32].

Regarding neurological and lower limb sensation assessment, this study illustrates that all studied nurses had no previous experience with these tests as the monofilament examination or tuning fork assess dorsalpedus and tibia pulse and 60 second Diabetic Foot screening test. But there were improvements in their practice of these examinations immediately and after period of follow up of the educational program because these test are important for early detection of diabetic foot problem. This constant with **Boulton et al** (**2005)** [33]Early recognition and management of risk factors can prevent or delay adverse outcomes, showed that the loss of 10-g monofilament perception and reduced vibration perception predict foot ulcers. Clinicians are encouraged to review screening recommendations. **Chen et al (2011)** [34] stated that monofilament has been recommended as the diagnostic test of choice for the detection of diabetic patients with feet at risk of ulcers and amputation. The rationale for using the 10 g monofilament is that it is available, inexpensive and easy to use. However, the use of the tuning fork at two sites (the halluces) would take less time than the 10 g monofilament tested at eight sites and provide comparable accuracy. The graduated tuning fork has also been shown to be a useful, accurate and reproducible method of assessing peripheral sensation[35-36].

Moreover, **Johannesson** (**2009**) [37]and **Abdullah (2010)**[38]showed that health educating for staff and patients about diabetic foot complications will no doubt have a significant impact on reducing the rate of amputation; however, it will require commitment and patience to achieve the required results, especially in communities where education is still growing, as in developing countries. Achieving these results will encourage hospital administrators and policy makers.

In the current study many participants did not receive adequate foot-care education by health care providers. This may due to inadequate in-serves education for health care provider .This finding was consistent with **Chia et al (2013)[39]** It can be predicted that health care providers might neglect to examine patients' feet frequently. A possible reason is the limited continuing education for health care providers..Knowledge on the correct foot care can delay the onset of alterations that lead to ulcers and amputations, enable changes in incorrect behavior and promote cooperation of patients in relation to treatment and, subsequently, self-care[40-41]. Evidence suggests that patient education may reduce foot ulceration and amputation, especially in high-risk patients.[42]

VI.   Conclusion

Educational program about foot care showed improvementinnurses' knowledge and practice and screening testalso improve patient outcomes

VII.   Recommendations

1. National, provincial, and local diabetic foot care strategies should be developed and use evidence-based diabetic foot screening and prevention tools.
3. Nurses must develop clinical expertise on the diabetic foot by implementing diabetic foot assessmentscreening into routine assessments, and education.
4. Healthcare organizations must develop a dedicated funding plan that supports diabetic foot screening, re-screening of the high-risk foot as per guidelines.
5- Adopt a validated diabetes foot screening tool.
6- Healthcare organizations should incorporate foot care into self-management programs to establish and reinforce the importance of foot care to people with diabetes.
7-.Nurses should have ongoing evaluation, audits, to evaluate and implement quality improvement measures for the screening and management of the high risk diabetic foot.

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