

Nursing Guidelines For Improving Foot Care Practicies For Adult Patients With Type 2 Diabetes Based on National Institute for Clinical Excellence guidelines, 2004.

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Abstract : Foot problems are a common complication in people with diabetes. Fortunately, most of these complications can be prevented with careful foot care. If complications occur, daily attention will ensure before they become serious. These complications have been shown to be already present in about 10% of diabetic patients at the time of diagnosis. Teaching patients proper foot care is a nursing intervention that can prevent costly, painful, and debilitating complications. Half of all major leg amputations in the UK are performed on people with diabetes who have uncontrolled ulceration, infection, and gangrene. Morbidity and mortality associated with the diabetic foot are unacceptably high, there is a perceived need for evidence-based guidelines to improve outcomes in management of the diabetic foot, which is a major public health problem. In response to this, the National Institute for Clinical Excellence (NICE) has published Clinical Guidelines in Prevention and Management of Foot Problems (2004) for Type 2 Diabetes. This study aims to improve foot care practice for adults with type 2 diabetes mellitus .A quasi-experimental intervention was conducted in Eldemerdash outpatient clinic for diabetes, Ain Shams University Hospital, Cairo, Egypt, on a sample of 180 type 2 diabetic patients randomly divided into two equal study and control groups. Data were collected using interview questionnaire, foot care practice scores; foot care guideline was developed based on NICE Guidelines and implemented on the study group. Data were collected at pre-post, and 3 months follow up phases. The finding of this study revealed that the mean age of the study and control group was 39.3 ± 5.6 and 40.3 ± 4.9 years respectively. About (19.8%) of patients in the study and control (20.5%) groups had previous exposure to foot injury, health information needs were very high in both groups. At post and follow up tests, patients in the study group had satisfactory knowledge, 95.3% and 87.2% respectively ($p<0.001$), compared to 24.4% and 23.2% respectively in the control group, in the study group adequate practice were 96.5% and 79.1% at the post and follow up phases among patients in the study group, compared to 16.8% and 13.2% respectively in the control group ($p<0.001$), It was concluded that foot care knowledge and practice for diabetic adults were improved after guidelines.

[Fathia Ahmed Mersal, Nahed Ahmed Mersal. **Nursing Guidelines For Improving Foot Care Practicies For Adult Patients With Type 2 Diabetes.** Journal of American Science 2011;7(10): 396-403]. (ISSN: 1545-1003). <http://www.americanscience.org>.

Keywords: type 2 diabetes mellitus, foot care practices, NICE guidelines.

Introduction

Diabetes mellitus is a complex metabolic disorder that results in acute or long-term complications that may diminish both the quality and length of patients lives (American Diabetes Association, 2007). In Egypt, diabetes is on the rise, The International Diabetes Federation (IDF) predicts that nearly 7.6 million Egyptians will have the disease by 2025, making it one of the top 10 countries in the world in relation to diabetes incidence (Gunaid and Assabr, 2008).

In Egypt, diabetic foot problems might be exacerbated by sociocultural factors such as lack of knowledge regarding diabetic foot complications ,inappropriate footwear and the absence of specialized podiatric services ,so educating patients about proper foot care and periodic self-foot examinations has been found to be an effective method that can prevent foot ulceration (IDF, 2006).

Diabetes can lead to foot complications that may escape notice until they become serious. Patients should therefore form the habit of examining their feet every day. This examination only takes a minute. It is important to examine all parts of the feet, especially the area between the toes; look for any broken skin, ulcers, bunions, blisters, or increased callus formation, and notify the doctor if the patient finds any of these changes (Badrudin, Basit, Hydrie, and Hakeem, 2002).

Serious feet complications may develop include deep skin, bone infections and gangrene that a very serious complication widespread gangrene may require foot amputation. Approximately 5 percent of men and women with diabetes eventually require amputation of a toe or foot. This tragic consequence can be prevented in most patients by managing blood sugar levels and daily foot care (Morbach, Heidenheim, Paul, and Hartmann, 2003)

Various treatments are used for diabetic foot ulcers, but evidence for their effectiveness is generally poor. 15% of people with diabetes develop foot ulcers associated with nerve damage, lack of blood supply or both. Serious infection originating in a diabetic ulcer is the most common reason for amputation apart from trauma. Multidisciplinary interventions to increase patients' knowledge about foot care, podiatry, and therapeutic shoes, can improve the condition of the feet and help to reduce ulcer and amputation rates (Louise, 2009).

Teaching patients proper foot care is a nursing intervention that can prevent costly, painful, and debilitating complications. Preventive foot care begins with careful daily assessment of the feet. The feet must be inspected on a daily basis for any redness, blisters, fissures, calluses, ulcerations, changes in skin temperature, and the development of foot deformities as hammer toes, bunions (Fritschi, 2001).

There is a perceived need for evidence-based guidelines to improve outcomes in management of the diabetic foot, which is a major public health problem. In response to this, the National Institute for Clinical Excellence (NICE) has published Clinical Guidelines for Type 2 Diabetes: Prevention and Management of Foot Problems (NICE, 2004).

Significance of the study

Nursing has a strong tradition of focusing on various ways of knowing to provide excellent care. Evidence based practice is a way to frame and address questions about how to provide the best patient care. Within the nursing profession, it is expected that new information in the form of research findings will be incorporated constantly and knowledgeably into the nursing practice to provide the best patient care.

From 50% to 75% of lower extremity amputations are performed on people with diabetes. More than 50% of these amputations are thought to be preventable, provided patients are taught foot care measures and practice them on a daily basis Preventive Foot Care in People with Diabetes (ADA, 2003).

Aim of the study

The aim of this study was to improve foot care practice for adults with type 2 diabetes mellitus attending Eldemerdash hospital through:

- Assessment of health needs and demands of diabetic adults regarding foot care practice.
- Development and implementation of foot care guidelines based on National Institute of Clinical Excellence guidelines (2004) .
- Evaluation of the effects of the guidelines on foot care practice of diabetic adult.

Research hypotheses

- It was hypothesized that the knowledge and practice of diabetic patients who

will receive the foot care guidelines (study group) will be improved compared with those who will not receive the guidelines(control group).

Subjects and methods

Research design

A quasi-experimental intervention study design was used in conducting the study.

Setting

The study was conducted in adult's outpatient clinics for Diabetes in Eldemerdash, Ain Shams University Hospital Cairo, Egypt.

Subjects

A purposive sample of consecutive 180 patients with type II diabetes was recruited from the study setting. The inclusion criteria set for sample selection were as follows:

- Both sexes.
- Age between 30 and 50 years.
- Can read and write.
- Duration of diagnosed type 2 diabetes less than one year, No previous experience or attendance of any organized programs for caring for DM management self-care.

The subjects were randomly divided into two equal and identical groups. Study group was intended for application of the intervention, and the other half was considered as a control group.

The sample size was estimated with SPSS, Version 13. The estimated required sample size was 90 patients in each group, to achieve power of study 80%, power = 0-8000 and alpha=0.0500.

Data collection tools

Data were collected using interview questionnaire, Self care practice scores; self care guidelines was developed based on National Institute of Clinical Excellence guidelines (2004) , and implemented on the study group. Data were collected at pre-post, and 3 months follow up phases.

▪ **Interview questionnaire form**

This tool was designed by the researchers, and included the following parts:

- Socio-demographic data as patient age, sex, educational level, and occupation.
- History of diabetic foot, patient's knowledge about diabetic foot.

▪ **Foot care skills observation checklist.**

▪ **Type 2 diabetes foot care guidelines**

Guidelines protocol was designed by the researchers based on National Institute of Clinical Excellence (2004). The protocol included sessions covering theoretical and practical training; interactive teaching methodology was used.

The study tools utilized to collect data in the present study were constructed by the researchers and content validity was done through ten experts' opinions.

Procedure

The current study was carried out on three phases, preparatory phase, implementation phase and evaluation phase.

Phase I: Preparatory phase:

Human rights and ethical permission were obtained to conduct the study. Head of Out patient's clinics gave permission to perform the study. Patients were fully informed of the study. The voluntary nature of participation was stressed as well as confidentiality. Consent was obtained from each patient.

Phase 2: Implementation phase:

Pilot study: a pilot study was carried out on 10 patients with diabetes in the before mentioned health setting to test the practicability, clarity and consistency of the tools. The pilot also helped the researchers to estimate the time needed to fill in the data collection forms. The subjects of the pilot study were not included among the study sample.

Each questionnaire sheet was filled through individual interviewing with each client. An average of four clients were interviewed per day for both study and control groups. Each client took an average 30-45 minutes for questionnaire filling.

Field work

The actual field of work started from March 2007 till August 2008. The researchers were available for two hours per day in the study setting, two days/week study setting. The researcher introduced herself to the patient with diabetes, and gave a brief idea about the purpose of the study and its component. After the pre-test, the researcher applied the developed guidelines protocol for the study group patients only. Clients were trained through guidelines protocol sessions on diabetes foot care practices, and knowledge about foot care,

Limitations of the study

Some obstacles faced the researcher during carrying out the study. The most obvious was the dropouts, as four patients from the study group and seven from the control group refused to continue after participation in the assessment phase.

Phase 3: Evaluation phase:

The evaluation of the study was measured by improving knowledge and practice of patients with diabetes who will receive the foot care guidelines rather than those who will not receive the guidelines.

Data analysis

Data entry, validation and analysis were done with the statistical package for social science version 13.0,

the statistical tests used is a chi-square test. A value of $p < 0.05$ was considered to be statistically significant.

Result

Table 1, illustrates the socio-demographic characteristics of patients in the study and control groups. Their age was quite close, with means \pm SD 39.3 \pm 5.6 and 40.3 \pm 4.9 years, respectively. The study group had slightly more males (53.5%), compared to the control group (45.8%). The highest percentages had basic/intermediate education, 62.8% and 69.9%, respectively. The majority of the study (80.2%) and control (84.3%) group patients were married.

Table 2 shows that there are no statistically significant differences between them in relation to other diseases, as detected from patient's medical record. The most common concomitant disease in both groups was hypertension, affecting about two-fifth of the patients in each group. The table also indicates that, regarding positive family history of DM, the affected persons in the family were mostly parents in the study and control groups, 69.4% and 61.2%, respectively. The table also shows that about two-fifth of the patients in both groups were taking medications for other diseases and about one-fifth of patients in the study (19.8%) and control (20.5%) group had previous exposure to foot injury; however, these differences were not of statistical significance. As regards past medical history of patients in the study and control groups,

Table 3, elaborates that at the pre-test, patients in the study and control group had no statistically difference of knowledge related to foot care in all tested area. After the intervention, at the post-test, patients in the study group had statistically significantly higher percentages of satisfactory knowledge in almost all tested areas. At the follow-up phase, the study group knowledge was better than that of the control group in all tested areas, with statistically significant differences in all of these areas.

Table 4 describes the knowledge about diet in DM among patients in the study and control groups throughout the intervention phases. Before the intervention, knowledge was almost similar in the two groups. However, patients in the control group had statistically significantly higher percentages of satisfactory knowledge related to food to be decreased ($p < 0.001$). At the post-test, patients in the study group had statistically significantly higher percentages of satisfactory knowledge related to namely food to be decreased ($p < 0.001$), and snacks ($p < 0.001$). This better knowledge in the study group continued in the follow-up phase, with statistically significant differences in these same areas, $p < 0.001$. The table also demonstrates that the knowledge about food items to be avoided was

always high in both groups at the three phases of the study, reaching 100.0% at all phases in the study group.

Table 5 describes the knowledge about exercise in DM among patients in the study and control groups, throughout the intervention phases. This table indicates that patients in the control group had higher percentages of satisfactory knowledge related to all tested areas. At the post-test, patients in the study group had statistically significantly higher percentages of satisfactory knowledge in all tested areas, $p < 0.001$, except for the conditions of exercising. Similar findings are noticed at the follow-up phase, where the study group knowledge about exercise in DM continued to be statistically significantly better differences in almost all areas, compared to that in the control group.

Table 6, describes the adequacy of foot care practices (score 75%+) related to DM as observed

among patients in the study and control groups, throughout the intervention phases. It indicates that at the pre test, no statistically significant differences were present between the study and control groups. At the post and follow up phase the majority of patients in the study group had statistically significantly higher percentages of adequate practices related to foot practice ($p < 0.001$) compared to patients in the control group. Also it indicate that at pre test total adequate practice was (17.4%) among study group compared to (15.6%) among control group with no statistically significant difference. At the post test changed to (89.5%) and (6%) among study and control group respectively. At the follow up test changed to (79.1%) and (13.2%) among study and control group respectively.

Table 1, Socio-demographic characteristics of diabetic patients in the study and control groups

Items	Group				X ²	p-value
	Study (n=86)		Control (n=83)			
	No.	%	No.	%		
Age (years):						
<40	48	55.8	48	57.8		
40+	38	44.2	35	42.2		
Mean±SD	39.3±5.6		40.3±4.9		1.25	0.21
Gender:						
Male	46	53.5	38	45.8		
Female	40	46.5	45	54.2	1.00	0.32
Education:						
Read/write	0	0.0	3	3.6		
Basic/intermediate	54	62.8	58	69.9	4.94	0.08
High	32	37.2	22	26.5		
Marital status:						
Single	15	17.4	9	10.8		
Married	69	80.2	70	84.3	--	--
Divorced/widow	2	2.3	4	4.8		

(--) test result not valid

Table 2: History of diabetic foot among patients in the study and control groups

Items	Group				X ²	p-value
	Study (n=86)		Control (n=83)			
	No.	%	No.	%		
Have a history of:@						
Hypertension	36	41.9	36	43.4	0.04	0.84
Ischemic heart disease	2	2.3	6	7.2	Fisher	0.16
Fatty liver	5	5.8	4	4.8	Fisher	1.00
Gout/urinary stones	1	1.2	6	7.2	Fisher	0.06
Family history of DM:						
Parents	59	69.4	41	61.2		
Grand parents	3	3.5	1	1.5		
Siblings	23	27.1	9	13.4	--	--
Previously exposed to foot injury	17	19.8	17	20.5	0.01	0.91
Action taken:@						
Nothing	3	17.6	2	11.8		
Dressing	13	76.5	8	47.1		
Consult doctor	0	0.0	7	41.2	--	--
Antibiotic	1	5.9	1	5.9		
Cleaning	1	5.9	1	5.9		
Antitetanic serum	0	0.0	1	5.9		

(--) test result not valid

(@) Not mutually exclusive

Table 3: Knowledge about foot and nail care in DM among patients in the study and control groups throughout the study phase.

Knowledge about foot/nail	Pre % (satisfactory)			Post % (satisfactory)			FU % (satisfactory)		
	Study (n=86)	Control (n=83)	X2 test sign	Study (n=86)	Control (n=83)	X2 test sign	Study (n=86)	Control (n=83)	X2 test Sign
Foot care	14	10.8	0.32	93	12	111.3 HS	79.1	14.5	70.8 HS
Nail care	25.6	18.1	1.5	93	20.5	90.73 HS	93	18.1	96.6 HS
Prevention of injuries	16.3	16.1	1.2	89	16.9	89.8 HS	81.4	16.9	70.5 HS
Signs of infection	18.6	25.3	1	90.7	38.6	45 HS	80.2	33.7	37.6 HS
Signs of diabetic foot	15.1	21.7	1.2	96.5	24.1	93.2 HS	87.2	20.5	75.9 HS
Dangers of diabetic foot	52.3	60.2	1.7	100	54.2	50.6 HS	100	48.2	59.8 HS
Total knowledge	19.8	22.1	0.24	95.3	24.4	86.8 HS	87.2	23.2	68.5 HS

N.B. HS= highly significant ($P<0.001$)

Table 4. Knowledge about diet in DM among patients in the study and control groups throughout the study phases

Knowledge about diet	Pre (% satisfactory)			Post (% satisfactory)			FU (% satisfactory)		
	Study (n=86)	Control (n=83)	p-value	Study (n=86)	Control (n=83)	p-value	Study (n=86)	Control (n=83)	p-value
Food to be Avoided	100.0	98.8	0.49	100.0	100.0	1.00	100.0	98.8	0.49
Food to be decreased	17.4	47.0	<0.001*	98.8	37.3	<0.001*	98.8	43.4	<0.001*
Snacks	0.0	4.8	0.06	70.9	4.8	<0.001*	64.0	3.6	<0.001*

(*) Statistically significant at $p<0.05$

Table 5, Knowledge about exercise in DM among patients in the study and control groups throughout the study phases

Knowledge about exercise	Pre (% satisfactory)			Post (% satisfactory)			FU (% satisfactory)		
	Study (n=86)	Control (n=83)	p-value	Study (n=86)	Control (n=83)	p-value	Study (n=86)	Control (n=83)	p-value
Importance	0.0	8.4	0.006*	70.9	8.4	<0.001*	59.3	4.8	<0.001*
Conditions	0.0	3.6	0.12	7.0	1.2	0.12	5.8	0.0	0.06
When to stop	7.0	27.7	<0.001*	100.0	49.4	<0.001*	91.9	63.9	<0.001*
Action if Hypoglycemic	0.0	6.0	0.03*	37.2	6.0	<0.001*	64.0	4.8	<0.001*

(*) Statistically significant ($p<0.05$)

Table 6, foot care adequate practices score (75 %) related to DM as observed among patients in the study and control groups throughout intervention phases.

Practice of foot/nail	Pre % (adequate)			Post % (adequate)			FU % (adequate)		
	Study (n=86)	Control (n=83)	X2 test sign	Study (n=86)	Control (n=83)	X2 test sign	Study (n=86)	Control (n=83)	X2 test Sign
Avoid walking barefoot	20.9	18.1	0.2	96.5	22.9	95.7 HS	81.4	14.5	75.8 HS
Wash feet daily	93	90.4	0.42	100	90.4	8.8 S	96.5	90.4	2.6
Check feet daily	4.7	7.2	0.4	91.9	14.5	101.8 HS	87.2	12	95.1 HS
Check shoes daily	4.7	7.2	0.4	95.3	8.4	90.4 HS	81.4	8.4	91 HS
Avoid injuries	20.9	25.3	0.41	96.5	24.1	93 HS	81.4	24.1	55.7 HS
Clip toenails	4.7	2.4	0.53	89.5	6	118 HS	79.1	3.6	99 HS
Total practice	17.4	15.6	0.08	96.5	16.8	109.9 HS	79.1	13.2	73.5 HS

N.B. HS= highly significant ($P<0.001$)

Discussion

Type 2 diabetes mellitus is a chronic disease with severe late complications and high mortality. The

increasing prevalence of T2DM is mainly due to reduced physical activity and consumption of unhealthy food and larger portion sizes in genetic

susceptible individuals. Lifestyle intervention can prevent development complications of T2DM in subjects with impaired glucose tolerance. Permanent changes in lifestyle are needed (Vadstrup, Frølich, Perrild, Borg and Røder, 2009).

People who have diabetes often develop minor foot problems that may progress to major problems and even amputation. Many foot problems can be prevented or resolved at an early stage. The most important responsibilities of the nurse in diabetic foot care are assessment of the knowledge, self care ability and needs of the client, other responsibilities are education, and direct care measures (Jeffcoate, Lima, and Nobrega, 2007).

This study aims to improve foot care practice for adults with type 2 diabetes mellitus attending Eldemerdash hospital. This study had two groups of diabetic patients; a study group for implementation of the guideline protocol, and a control group for comparison. The two groups were quite similar in most important characteristics. Thus, the age of both groups was close, and their means were around forty years. This is the usual age of patients with type-2 DM as pointed out by Fabian, Majkowska, Moleda and Stefanski (2006) who have claimed that the majority of type-2 diabetics are in the age group around 45 years old.

The gender distribution of patients in the two groups was also similar. As regards education, the majority of patients in the two groups were educated. This selection of educated patients was important in order to get the maximal benefit from the guideline protocol. Conversely, illiteracy would create a barrier hindering the proper compliance to the therapeutic regimen. On the same line Pace, Ochoa, Caliri and Fernandes (2006) have demonstrated that low education levels can certainly limit information access, especially when acknowledging that adult patients are responsible for their own daily care. In this sense, diabetes patient education stands out as a fundamental care aspect to control the disease and, thus, prevent or delay the appearance of acute and chronic complications.

The results of the present study have revealed statistically insignificant difference between the study and control groups as regards their family history of DM. It was higher among patients in the study group, compared to those in the control group. A family history of DM might be associated with a higher awareness about the disease among patients. The finding is in congruence with Wattana, Srisuphan, Pothiban, and Upchurch (2007) who has mentioned that genetic factors play a role, and added that insulin resistance is genetically determined in many

individuals. Moreover, epidemiological studies indicate that having a diabetic first-degree relative causes a fourfold increase in one's risk of developing diabetes. Also, the concordance rate of type-2 diabetes in monozygotic twins exceeds that of dizygotic twins, suggesting that genes are more influencing than environment (Gulve, 2008).

Patients in the study and control groups were also similar as regards their medical history of concomitant diseases detected from their medical records. The most common concomitant disease in both groups was hypertension, affecting about two-fifth of the patients in each group. This is in agreement with Health and Development Information team (2008) who has reported a higher risk of hypertension among diabetic patients. Therefore, the author has recommended that these patients should have some management for high-normal blood pressure, and if the target blood pressure is not reached within 3-6 months of lifestyle intervention, pharmacological treatment should be initiated.

The study showed that, before the intervention, patients in the study and control group had no statistically difference of knowledge related to foot care in all tested areas. After the intervention, at the post-test, patients in the study group had statistically significantly higher percentages of satisfactory knowledge in almost all tested areas. At the follow-up phase, the study group knowledge was better than that of the control group in all tested areas, with statistically significant differences in all of these areas.

The importance of providing diabetic patients with proper updated knowledge about foot and nail care and nonjudgmental assessment of a person's current knowledge and care practices should be obtained first been emphasized by Vadstrup, Frølich, Perrild, Borg and Røder (2009).

The American Diabetes Association (2003) has also added that Patients with diabetes and high-risk foot conditions should be educated regarding their risk factors and appropriate management, also patients at risk should understand the implications of the loss of protective sensation, the importance of foot monitoring on a daily basis, the proper care of the foot, including nail and skin care, and the selection of appropriate footwear. Then, the patient understands of these issues and their physical ability to conduct proper foot surveillance and care should be assessed.

Concerning diabetic patients' knowledge about diet in DM, the present study results have shown that it was almost similar in the two groups before the self-learning guidelines program. After implementation of the program, and at three-month follow-up tests, patients in the study group had statistically significantly better knowledge in most areas of related knowledge.

Other studies have also indicated that teaching dietary management skills by providing patients with information in meal planning and food guidelines have been effective in helping patients improve their glycemic control (Norris , Lau , Smith , Schmid , and Engelgau ,2002) In the same respect Warsi , Wang , Lavalley , Avom and Solomon (2004) has emphasized that diabetes control has also shown improvement when dietary instructions, including specific situational examples and applications in educational plans, can result in better glycemic control, which may improve the quality of life and reduce disease burden.

The present study findings are in line with Polonsky et al.(2003) who has also added that diabetes education programs help patients increase their knowledge about dietary management, with resulting improved glycemic control and quality of life. Furthermore, and in agreement with these present study findings, studies have shown that patients who participate in education programs demonstrate increased knowledge of diabetes management and greater compliance to the difficult treatment protocol (Wolf et al., 2004).

The present study has demonstrated statistically significant improvements in their knowledge about exercise in DM. Thus, before implementation of the self-care guidelines program, patients in the control group had statistically significantly better knowledge in almost all related areas of exercise. At the immediate post-test, patients in the study group had statistically significantly better knowledge in most tested areas. This improvement continued throughout the follow-up phase.

In agreement with these present study findings Genkinger , Guallar , Peyrot and Brancati (2003) have reported that structured exercise programs had a statistically and clinically significant beneficial effect on glycemic control, and this effect was not mediated primarily by weight loss. Moreover, Meeto and Temple (2003) has claimed that exercise intensity and exercise with volume change increase cardio-respiratory fitness, whereas resistance exercise improves insulin sensitivity to about the same extent as aerobic exercise.

Also, in congruence with the foregoing present study findings Ellis et al. (2004) have stressed that regular physical activity plays an important role in the prevention and treatment of NIDDM. Therefore, these authors have recommended that physical training programs suitable for diabetic patients, as well as for individuals at risk for NIDDM should be incorporated into medical care system to a greater extent. Moreover, as mentioned by American Diabetes Association (2004) exercise training can prevent muscle atrophy and stimulate muscle development, and as well improve the control of insulin over blood glucose. It

has also shown that regular exercise can lead to lower levels of plasma triglycerides and to increases in high-density lipoproteins (HDL). High-density lipoprotein cholesterol levels, has beneficial effects on hypertension as well as on body composition and fat distribution (Murata et al.,2003) .

However, in order to be effective, the exercise program should be individually tailored, and based on evaluation of the patient's adaptation to effort, in terms of frequency, intensity and duration the exercises (Funnell et al. ,2009). Moreover, before beginning a program of physical activity, people with diabetes should be assessed for conditions that might be associated with increased likelihood of cerebrovascular problems, or might predispose to injury such as uncontrolled hypertension. This has been taken into account in the present study guidelines protocol, and patients were provided complete knowledge about pre-exercise conditions, type and intensity of activity, as well as necessary precautions before, during, and after exercise.

On the same line MacKinnon (1999) has emphasized it is hoped that people awareness of diabetes and its complications will be raised through educational programs, and that the necessary attention will be paid to the need for improved foot care for people with diabetes throughout the world. Moreover, findings have indicated that educating patient about foot care may not only encourage routine foot care, but also that those dependent on either formal or informal support to perform foot care do so less frequently, and become less dependent in this practice Albright, Michael and Burge (2001) The study findings have shown very low levels of adequate practice, no statistically significant differences between the study and control groups in the foot and nail care practice before program implementation. Immediately after the program, patients in the study group had better practices related to foot and nail care practice practices. This difference was maintained at the follow-up phase. Moreover, the changes in the scores of practice throughout the intervention phases have shown statistically significant improvements in the two groups. However, the increase in the practice scores was higher in the study group, compared to the control group.

Also in agreement with these present study findings Persell et al. (2004) have claimed that exposure to current best practice foot care recommendations and the incorporation of those practices into patients' daily lives may help them prevent future wounds and possible amputation. Additionally, learning proper foot care and dealing with foot problems early can prevent 50 percent of amputations among people living with diabetes. Foot ulcer patients were also found to be more often men

living alone, and obese patient with diabetes. Therefore, high-risk foot conditions should be identified early, and educated regarding their risk factors and appropriate management.

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9/29/2011