

Effect of Foot Self Care Program among Diabetic Elderly Adults in Geriatrics Home.

Maha Moussa Mohamed Moussa and Naglaa Ibrahim Mohamed Gida

Department of Community Health Nursing, Faculty of Nursing, Port Said University

Abstract

Background: Diabetic foot has been considered as a major health problem in elderly adults, because of its high incidence in recent years. Self-care programs have a role in the early prevention of morbidity and mortality rate of the diabetic foot, promoting elderly knowledge and self-care practices are a crucial need in this regard.

The aim of this study is: to evaluate the effectiveness of foot self-care program among diabetic elderly adults in geriatrics home.

Material and methods: Research design, a quasi-experimental study design was implemented on all elderly living in geriatrics home their number were 60 elderly.

Setting: Study was conducted in geriatrics home at Port Said City,

Data collection tool: Two tools developed by the researchers.

First tool: A structured questionnaire developed to assess participants' knowledge and self-care practices.

Second Tool: An observational self-care practices checklist to observe self-care practices of diabetic elderly.

Results: The study findings revealed that lack of knowledge and unsatisfactory practices of diabetic elderly about self-care practice of foot before the program whereas after the program intervention, improvements were found in total scores of knowledge and practice through the follow up phase 80.17 ± 7.05 and 90.18 ± 1.78 respectively.

Conclusion: The present study concluded that diabetic elderly lacked appropriate knowledge in the preprogram phase also, elderly foot self-care practices were mostly unsatisfactory. After implementation of the program, considerable improvements were noticed in elderly' knowledge and foot self-care practices highly statically significant.

Recommendations: Based on findings in this study, regular continuing self-care programs should be designed to enhance elderly ability to care for their foot with an emphasis on the most important risk factors and appropriate management in a large population.

Key words: Health education, diabetic foot, self-care practice

I. Introduction

World Health Organization (WHO) assesses that more than 346 million individuals worldwide have diabetes mellitus (DM). This number is probably going to dramatically increase by 2030 with no intercession. Just about 80% of diabetes mortality happens in low and center wage nations WHO, ⁽¹⁾Mersal ⁽²⁾ and Albin et al. ⁽³⁾The World Health Organization, 2002 defines the diabetic foot as a contamination, ulceration as well as devastation of profound tissues related with neurological irregularities and different degrees of peripheral vascular disease in the lower limb. In the Dutch consensus the diabetic foot is defined as a differing quality of foot variations or abnormalities from the norm brought about by neuropathy, macroangiopathy constrained joint portability and different results of metabolic aggravations, for the most part happening in blend or combination, in patients with diabetes mellitus. Irwan, et al., ⁽⁴⁾ Salas-Salvad et al., ⁽⁵⁾ Ellabany & Abel-Nasser ⁽⁶⁾, Shahin et al. ⁽⁷⁾ Foot complications are most common in diabetic patients and are accompanying with a high amputation rate in addition to be life threatening. Accurate proper daily foot care is an essential, low cost and effective part of diabetic foot ulcer (DFU) prevention. Daily routines performance of foot care enables diabetic patients to detect foot abnormalities and injuries earlier, hence prevent or even decrease the risk of foot ulceration effectively Hokkam ⁽⁸⁾. However, numerous diabetic patients do not perform daily foot care appropriately or incorrectly, for example, failing to perform a daily foot self-inspection, walking barefoot or wearing improper footwear, improperly trimming their toenails, or using unsafe water for washing their feet. Thojampa & Mawn ⁽⁹⁾ and Albargawi et al ⁽¹⁰⁾ Preventive and management care of diabetic-related foot complications are also vital to reduce foot amputations, and an increasing problem among individuals with diabetes. American Diabetes Association ⁽¹¹⁾ Advocates of diabetic foot management suggest a nationwide educational campaign to encourage healthcare providers to conduct routine foot examinations for diabetic person and periodic follow-ups for individuals at risk of developing foot complications. Sumpio et al ⁽¹²⁾ Self-care is defined by Orem as the practice or activities for the keep of life, health and well-being by the individual for his/her own profit and benefit. Once carried out efficiently, they contribute to the maintenance of the functionality and integrity of

humans. **Al Sayah et al.** ⁽¹³⁾ and **Albargawi et al** ⁽¹⁰⁾ the active participation and involvement of the patient, by means of self-care activities, founds the main key for the control of diabetes mellitus (DM). Nursing actions are significant to teach patients about appropriate care with their feet, which starts with a careful daily check. Foot self-care includes cleaning, drying and lubricating foot. It prevents humidity of interdigital spaces. **Irwan, et al.,** ⁽⁴⁾, **Salas-Salvad et al.,** ⁽⁵⁾.

Nurses have an accountability to assist and support elderly people to recognize their health related experiences and to enhance their abilities to make informed choices. **Abdo and Mohamed** ⁽¹⁴⁾ also nursing responsibilities include promoting the accepting that health behavior changes involve lifestyle change. That is, the health behavior develops a part of everyday life and not just as time limited self-care program. **Saleh et al.** ⁽¹⁵⁾ and **Strajtenberger et al, 2011** ⁽¹⁶⁾

Significant of the study

In Egypt, diabetes is on the growth. The International Diabetes Federation (IDF) expects 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. **Abdo and Mohamed** ⁽¹⁴⁾ Also, the prevalence of diabetic foot ulcers has been found to be high. The reasons commonly stated for this prevalence includes inappropriate footwear and the lack of knowledge regarding diabetic foot problems. The latter is very pertinent to Egypt since more than 90% of the people having diabetes do not receive education on diabetic foot problems. **Saleh et al.** ⁽¹⁵⁾ The community health nurse, the family care givers and other involved health care professionals work collaboratively to facilitate a diabetic elderly person's learning, the chances of success will be maximized. The nurse must equipped diabetic elderly and their care givers by knowledge about prevention strategies, nutrition, medication, effect and side effect, exercise, disease progression, , monitoring techniques and medication adjustment. **Pan et al.,** ⁽¹⁷⁾ therefore the aim of this study is to evaluate the effect of foot self-care program among diabetic elderly adults in geriatrics home.

Aim of the study:

This study aimed to evaluate the effect of foot self-care program among diabetic elderly adults in geriatrics home.

Through

- 1- Assessing older adults' knowledge and practice regarding diabetes and foot care.
2. Developing a foot self-care program for older adults.
3. Determining the effect of the self-care program on older adults.

Hypothesis:

Knowledge and foot self-care practice of the older adults regarding diabetes will be improved after the implementation of the foot self-care program.

Methods:

Design:

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

Setting:

Study was conducted in the only geriatrics home at Port Said City

Sampling:

A purposive sample used in this study consisted of elderly adult with type 2 diabetes at low risk of foot ulceration.

The sample size

The subjects for this study included all elderly living in geriatric care home.

A total of 60 older adults were consecutively recruited from the aforementioned setting according to the following inclusion criteria: 60 years and above, type 2 diabetes, older who were able to communicate effectively were approached to participate in the current study.

Data collection:

Two tools were used for data collection after reviewing the recent relevant literature **Pan et al** ⁽¹⁷⁾, **Katie et al** ⁽¹⁸⁾, **Jill** ⁽¹⁹⁾, **Zahra, et al** ⁽²⁰⁾.

Tool I: Structured interview questionnaire:

This tool was developed by the researcher after reviewing of relevant literature. It was composed of three parts:

Part I: included items related to socio-demographic data regarding; name, age, sex, education, marital status, income, also family history and medical history.

Part II: comprised 12 questions related to elderly knowledge about diabetes mellitus open ended questions such as definition, causes predisposing factors, clinical manifestations, complications, prevention and control.

Scoring system

The study group's answers were compared with a model key answer, where (2) score is given to completely correct answer, (1) for an incompletely correct answer, and (0) for incorrect answer. These scores have converted into a percentage score. Mean and standard deviations had calculated. The study group's knowledge is evaluated well if the percent score was $\geq 75\%$, while considered average if the percent score is less than 75% and more than 50% and poor if the percent score is less than 50%.

Part III; questionnaire to assess their practical as reported by them; composed of 39 questions which includes:-

- Self care practice of diabetic elderly, their life style changes; which include personal hygiene (oral care, nails care, trimming nail). foot care, exercise, eating habits, smoking, sleeping habits, medication adherence, urine analyses.

Tool II: Observational checklist about foot self-care practices.

Elabbassy ⁽²¹⁾ comprised of (24) questions about patient's practice related to foot care such 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

It included the correct step of each foot care. Each step checked as done or not done. The step checked by done given a score of 1, and the not done item given zero. The sum of the scores of each step in the procedure was then converted into a percent score, and the older adults divided into two categories: The procedure with total score more than 70 % was considered to have satisfactory done, otherwise are considered unsatisfactory done.

Reliability:

The questionnaire was tested to be reliable with Cronbach's alpha coefficient of 0.78 for self-care practice items showed.

Validity of the tools

They were tested for content validity by jury of five experts in the field of community health nursing and medical surgical nursing and medical specialty Port Said University to ascertain relevance and completeness.

Pilot study:

A pilot study was conducted on 10 percent of the study sample patients for testing clarity, relevance, and feasibility of conducting and estimate the time required for interview. Based on the result of pilot study, the necessary modifications and clarifications of some questions were done to have more applicable tools for data collection. Those elderly were excluded from the study sample.

Field work:

Preparatory phase:

It included reviewing of literature & theoretical knowledge of the various aspects of this issue in order to develop the data collection tool. The aim of the study & component of the tool were explained to older adults at the beginning of data collection. They were assured that the information collected would be treated confidentially & that it would be used only for the purpose of the study.

1- *Assessment* of the older was done through visit at geriatrics home by using questionnaires (a tool I and tool II) pretest. The questionnaire was initially prepared in English then translated in to local language (Arabic) by researcher and other person then it was translated back to English by a different person to ensure consistency. The researcher first collect data regarding patient's demographic data, then ask about family and medical history after that the researcher assess foot self-care and self-efficacy by using observational

checklist about foot self-care practices. The duration of assessment for each one tool took about 15 to 20 minutes.

- 2- *Planning and development:* self-care program was planned and designed by researcher based on the result of the assessment phase. A booklet of information about diabetic foot and self-care practice was designed in Arabic.
- 3- *Implementation:* participants were divided into small groups and the education group comprised of 4 to 5 participants are taken in each visit. The implementation of the self-care program was done for each group separately.
- 4- Foot care bags were distributed to all participants in order to (training the older at geriatrics home on procedures), packs included (towel, nail clipper to trimming nail, moisturizing cream, pumice and small mirror).
- 5- *Evaluation:* this was done immediately after implementation of program. Then, another one was carried out after 6 months to evaluate retention of gaining knowledge and improvement of life style and self-care practices of foot care, compared to pre-test. Two elderly died before the follow up phase; therefore, the total number at the follow up was 58.
- 6- The researcher visited the geriatrics home in afternoon shift from 1:00 pm to 3:00 pm for two days / weekly (Sunday and Tuesday) in the period from beginning at December 2015 until the end of September 2016 (ten months). Afternoon shift was suitable for the researcher. The researcher at a suitable place in the geriatrics home interviewed each participant individually. The self-care program consists of 10 sessions (4 educational and 6 practical). The program implemented 5 weeks/ 2 sessions per week. The duration of each session was two hours.

Administrative Design:

Ethical approval obtained from the relevant research ethical committee in the faculty of nursing, Port Said University, to approve the research. An official permission obtained from the directors of geriatrics care home and explains the aim of study to obtain permission for the collection of data. An oral consent was taken from older adults for permission to participate in the research process.

Statistical Design:

The collected data were tabulated & statistically analyzed using statistical package for social sciences (SPSS). Version 10 to evaluate the patients under the study. The statistical analysis included percentage (%), mean, standard deviation (SD), range, and Chi-square (X^2). F. ANOVA test (F).

Limitations of the study:

Two of participants died before the follow up phase.

II. Results

The results of the current study are present in the following sequences:

Part (I): Socio-demographic characteristics of the diabetic elderly (tables, 1).

Part (II): Health Status of the diabetic elderly (Table, 2).

Part (III): knowledge about diabetes and life styles (Tables 3, 4).

PART (IV): Observational checklist about foot self-care practice (tables, 5).

Part (V): Comparison between total score of knowledge and practice (tables, 6).

Part (I): Socio-demographic characteristics of the studied elderly

Table (1): Distribution of the studied diabetic elderly according to their socio-demographic characteristics.

Items	Total (n = 60)	
	No.	%
Age		
<60	7	11.7
60 – 69	42	70.0
≥70	11	18.3
Mean±SD	65.25±4.9	
Sex	25	41.7
Male	35	58.3
Female		
Marital status		
Single	2	3.3
Widow	34	56.7
Divorced	24	40.0
Education		

Illiterate	42	70.0
Read and write	10	16.7
primary and preparatory	8	13.3
Monthly income:		
Sufficient & more	11	18.3
Just sufficient	18	30.0
Insufficient	31	51.7
Mean±SD	112.12± 83.44	

Table 1 shows the demographic characteristics of studied sample. The table reveals that, age range of the sample is 60 to more 70 years; the mean age of the study group was 65.25±4.9. As regards the sex the females were. (58.3%). This table also demonstrate that elderly were widow (56.7%) and illiterate were (70%). Finally, the monthly income was insufficient (51.7%) of the studied sample, with a mean 112.12± 83.44SD

Part (II): Health status of the diabetic elderly.

Table (2): Distribution of the studied elderly according to their family history and medical history.

Items	Total (n = 60)	
	No.	%
Family history:		
Yes	42	70.0
No	10	16.7
Don't know	5	8.3
Missed	3	5
Family history: (n = 42)		
Father/ mother	14	33.3
Brother or sister	10	23.8
Grand father or mother	9	21.4
Uncle	7	16.7
Other	2	4.8
Medical history		
Yes	55	91.7
No	5	8.3
Medical history (n = 55)		
Heart Disease	22	40
Hypertension	35	63.6
Respiratory Diseases	16	29.1
Osteoporosis	9	16.4
Arthritis	12	21.8
Visual impairment	39	70.9
Hearing impairment	38	69.1
Urinary problems	23	41.8
Dental problems	40	72.7
Others	2	3.6

Table 2 explains that (70.0%) of the study had family history of diabetes disease, while 33.3% of them state father and mother had suffered from diabetes diseases. As regard medical history 91.7% of the study had history of diseases, the most prevalent diseases among them were dental problems 72.7%, followed by visual impairment 70.9%, Hearing impairment which represented 69.1% and Hypertension 63.6%.

Part (III): knowledge about diabetes and lifestyles.

Table (3): Distribution of the studied elderly according to their general knowledge about diabetes throughout the program phases (pre, post and follow up)

	Total sample (n = 60)					
	Pre(n=60)		Post(n=60)		Follow-up(58)	
	No.	%	No.	%	No.	%
1. Definition						
Don't know	15	25.0	0	0.0	0	0.0
Incomplete. As	37	61.7	4	6.7	12	20.0
Complete	8	13.3	56	93.3	48	80.0
Mean ± SD.	44.2 ± 30.7		96.67 ± 12.58		90.0 ± 20.17	
p-value			<0.001*		<0.001*	
2. Causes / Predisposing factors						
Don't know	29	48.3	0	0.0	0	0.0
Incomplete	24	40.0	7	6.7	12	20.0
Complete	7	11.7	56	93.3	48	80.0
Mean ± SD.	31.67 ± 34.4		96.67 ± 12.58		90.0 ± 20.17	

p-value			<0.001*		<0.001*	
3. Clinical manifestations						
Don't know	0	0.0	0	0.0	0	0.0
Incomplete	7	11.7	36	60.0	42	70.0
Complete	53	88.3	24	40.0	18	30.0
Mean ± SD.	32.50±18.77		96.67± 12.6		90.0 ± 20.17	
p-value			<0.001*		<0.001*	
4. Control and prevention						
Don't know	29	48.3	0	0.0	0	0.0
Incomplete	31	51.7	6	10.0	21	35.0
Complete	0	0.0	54	90.0	39	65.0
Mean ± SD.	18.06± 22.61		85.28± 16.83		74.72± 19.28	
p-value			<0.001*		<0.001*	
5. Complications						
Don't know	30	50.0	0	0.0	0	0.0
Incomplete	30	50.0	26	43.3	12	20.0
Complete	0	0.0	48	80.0	34	56.7
Mean ± SD.	18.06± 22.6		85.28± 16.83		74.72±19.28	
p-value			<0.001*		<0.001*	

P: value for comparing between pre and post
 *: Statistically significant at $p \leq 0.05$

Table 3 Explains the distribution of the study sample, according to their general knowledge about diabetic foot throughout the program phases illustrated in table 2. Statistically significant improvement are noticed in all the information the mean±SD.definition was 96.67± 12.58 ,the mean± SD of causes/predisposing factors was 96.67± 12.58, ,the mean± SD of clinicalmanifestations was 96.67± 12.6 ,the mean± SD of complicationswas 85.28± 16.83 and the mean± SD of control and prevention was 85.28± 16.83). The comparison between general knowledge of diabetic foot of the pre and post phases highly statically significant $p < 0.001$.

According to research hypotheses in table 4,5,6

Table (4): Statistically difference between program phases (pre, post and follow up) according to their reported self-carelifestylepractices.

Lifestyle practices	Pre test (n=60)	Post test (n=60)	follow up (n=58)	F-test	P-value
		Mean±SD	Mean±SD		
Personal hygiene and teeth care	33.21±14.44	95.77 ± 1.78	92.23 ± 3.81	0.206	<0.001*
Exercises	27.06±21.81	95.46±2.41	93.64±3.31	0.082	<0.001*
Nutrition	23.92±14.29	94.97 ± 2.63	93.69 ± 3.09	0.557	<0.001*
Foot care	22.17 ± 9.42	93.37 ± 5.11	89.85 ± 3.73	0.506	<0.001*
Smoking	28.85±14.52	95.22 ± 2.53	90.33 ± 5.56	0.222	<0.001*
Stress management	49.04±14.64	92.27±1.94	87.20±3.40	0.966	<0.001*
sleep	19.55±10.49	94.73±2.90	92.84±3.19	0.534	<0.001*
Medications	30.97±19.53	94.11±5.38	89.48±4.32	0.534	<0.001*
Urine analysis	26.59 ± 8.51	96.03 ± 1.68	87.70 ± 10.10	0.356	<0.001*
Total practices.	13.3±34.2	96.67±18.1	92.6±18.1		
p-value			<0.001*		<0.001*

N.B *significance is considered at (p-value <0.05). Significance is a highly significant at p-value <0.01) ** F. ANOVA test

Table 4 shows reported diabetic elderly adults according to their reported self-care practices regarding (personal hygiene and frequency of teeth care, exercises, nutrition, foot care, smoking, sleep, stress management medication and urine analysis),before implementation of the program .It can be seen that, there are a statistically significant improvements were found after the implementation of the program in all areas of practices as (personal hygiene and frequency of teeth care, exercises, nutrition, foot care, smoking, sleep, stress management. Medicationand urine analysis) at the post-test phase.) Statistically significant improvements were found after the educational program PS was (< 0.001).

PART (IV): Observational checklist about foot self-care practice.

Table (5): distribution of the studied elderly according to observational checklist about foot self-care practice throughout the program phases(pre, post and follow up)

Procedure of foot care	Pre-test (n=60)		Post-test (n=60)		Post-test (n=58)		F.test	P-value
	Done		Done		Done			
	No	%	No	%	No	%		
1- Examine feet well daily looking for scratches, cuts, sores or redness	20	33.3	55	91.7	50	86.2	4.600	0.001*
2-Always check between your toes	19	31.7	53	88.3	49	84.5	7.068	0.000*
3-Wash feet daily and a good-dry between finger tow carefully	21	35	59	98.3	43	74.1	12.199	0.002*
4-Avoid use of very hot or cold water	22	36.7	54	90	48	80	5.799	0.000*
5-Avoid inundation of the feet in the water for a long time	16	26.7	52	86.7	49	84.5	21.66	0.000*
6-Nails cut carefully to avoid leaving a sharp edge and cut fingernails in a circular fashion	18	30	58	96.7	50	86.2	5.848	0.003*
7-Soften the nails using nail file for that	22	36.7	51	85	47	81.0	3.933	0.000*
8-Cutting my foot nails by myself	10	16.7	52	86.7	46	79.3	6.537	0.000*
9-Cutting my foot nails straight	28	46.7	56	93.3	51	87.9	38.12	0.000*
10-Maintain cutting foot nails weekly	19	31.7	55	91.7	50	86.2	46.728	0.000*
11-Keen to massage the feet and legs from time to time	16	26.7	54	90	46	79.3	21.929	0.000*
12-Use chemicals to remove excess skin	19	31.7	57	95	51	87.9	6.252	0.002*
13-Do not use bond to sticker on feet	17	28.3	54	90	49	84.5	10.534	0.000*
14- Use a cream to soften areas of hard skin, but not between the fingers	15	25	58	96.7	50	86.2	28.937	0.000*
15-Avoid walking barefoot in and out house	23	38.3	59	98.3	49	84.5	7.544	0.001*
16-Using comfortable shoes(made of soft material) or not tight or large	24	40	57	95	47	81.0	27.277	0.000*
17-Examine the shoes well to detect the presence of any foreign body inside it.	12	20	55	91.7	49	84.5	19.654	0.000*
18- Maintain wear clean and good stocks	22	36.7	52	86.7	48	80	17.598	0.000*
19- Avoided wear high heel shoes	10	16.7	52	86.7	45	77.6	106.199	0.000*
20- Avoided wear open sandals and shoes	23	38.3	58	96.7	47	81.0	117.492	0.002*
21- Sitting with leg across leg	22	36.7	50	83.3	48	80	12188	0.000*
22- Make sure the shoes dry from inside	20	33.3	57	95	44	75.9	15.376	0.000*
23-Have shoes with broad front & heel	23	38.3	59	98.3	50	86.2	4.689	0.001*
24- Use of woolen socks in winter and cotton in the summer	18	30	55	91.7	46	79.3	21.199	0.000*

N.B *significance is considered at (p-value <0.05). Significance is a highly significant at p-value <0.01) **F. ANOVA test

Table 5 shows the distribution of the diabetic elderly according to foot self-care practice throughout the program phases (pre, post and follow up). Statistically significant improvement were found after the educational program in all items related to comprehensive care for self-care practice of foot at the post test and follow up phases, p<0.00

Part (V): Comparison between total score of knowledge and practice.

Table (6): Comparison between total score of knowledge and practice of the studied elderly throughout the study phases (pre, post and follow up)

	Pre	Post	Follow up
Knowledge	25.19 ± 11.73	90.08 ± 4.98	80.17 ± 7.05
P		<0.001*	<0.001*
Practice	33.53 ± 7.13	95.74 ± 1.93	90.18 ± 1.78
P		<0.001*	<0.001*

N.B *significance is considered at (p-value <0.05). Significance is a highly significant at p-value <0.01) **

Table 6 illustrates the comparison between total score of elderly knowledge and practices at the post-test and follows up phases of the educational program. The table indicates similarly statically significant positive after application of the program p. <0.001

III. Discussion

Older diabetic adult clients' education on appropriate foot care has the potential to assume a key part in avoiding complications. **Mohamed et al.** ⁽²²⁾ Foot complications from DM are one of the chief causes of amputation and it's following emotional and physical problems. **Ellabany & Abel-Nasser**, ⁽⁶⁾ Thus teaching and training is a common strategy to prevent diabetic foot and reduce 85% of its amputations moreover has a great effect on enhancing the diabetic patients and their family members knowledge about diabetic foot care and abilities to carry out self-care as well as help bridge the gap between knowledge and daily activities. **Mohamed et al.** ⁽²²⁾ and **Haas et al.** ⁽²³⁾

Regarding demographic characteristics of diabetic elderly adults in the study sample aged between 60 years to more than 70 years with a mean age was 65.25 ± 4.9 years, where more than half of them were females. Regarding marital status, there more than half of them were widow. As regards to level of education, more than two third of them was illiterate. In relation to monthly income, where more than of them were insufficient with a mean monthly income was 112.12 ± 83.44 . These findings are in accordance with many previous studies **Fouad** ⁽²⁴⁾, **Abd El-Hamid** ⁽²⁵⁾, **Karakurt and Kaşıkçı** ⁽²⁶⁾, and **Shahin, et al.** ⁽⁷⁾, **Mohamed et al.** ⁽²²⁾, **Abdel-Rahman, and AboShousha**, ⁽²⁷⁾ all have agreed that more than half of Egyptian diabetic elderly clients were females and more than half of diabetic elderly clients were married while the majority were illiterate. Conversely, with the results of **Adam** ⁽²⁸⁾ et al, and **Chalyal et al** ⁽²⁹⁾ **Mersal et al** ⁽³⁰⁾ had mentioned that most of their studied clients with diabetic foot were male and had junior middle school education with above 60 years old. Other demographic characteristics of clients in the present study revealed that more than two thirds low socioeconomic and insufficient income. These findings are in congruence with **Mersalet al** ⁽³⁰⁾ who have specified that the treatment approaches were affected by their low socioeconomic factors and low-income status and low social class level are especially vulnerable risk to no improve in their health status. **Contrariwise** with the results of **Amente et al.** ⁽³¹⁾ who have mentioned that patients relatively in high-income class can get healthy foods that are suggested and recommended for diabetic patients.

The findings of the present study have demonstrated statistically significant improvement in all aspects of knowledge about diabetic foot of the elderly of the studied sample throughout the program phases (definition, causes, predisposing factors, manifestation, control and prevention and complications) compared to before the program implementation. This is documented by the increase in the percentage of older who have complete knowledge scores. This could be explained by the positive impact of the educational program on the elderly' knowledge. Also, it could be explained by the interest of the older of the studied sample with the teaching methods and audio visual material used in the education. Additionally the improvement of the elderly' knowledge might be as a result of their active participation in educational sessions through discussion and the frequent review of knowledge by the researcher and encouraged them to be interested to have an active role in their diabetic foot management. Parallel to findings by **Anselmo et al** ⁽³²⁾, **Mersal & Mersal** ⁽³³⁾, **El-Ahmady** ⁽³⁴⁾ have reported increases and positive effect on all items of the knowledge including; (definition , causes , risk behaviors and preventive and therapeutic medical treatment) which improved significantly after training programs. Conversely **William et al.** ⁽³⁵⁾, **Ayele et al.** ⁽³⁶⁾ and **Hailu et al.** ⁽³⁷⁾ these authors have reported that the poor of client' knowledge may be due to deficiency in the role played by mass media in reaching information and material about diabetic foot care and risk factors.

Commonly, most of the elderly in the present study had unsatisfactory self-care practices related to personal hygiene, regularity of teeth care, exercises, diet, foot care, smoking, sleep, stress urine analysis and medication before the program. After the program implementation, significant improvements were noticed in older adults' life style practice. The statistically significant improvement shown in the study is in line with many previous studies **Malathy et al.** ⁽³⁸⁾ and **Thungathurthi et al.** ⁽³⁹⁾, **Shahin et al.** ⁽⁷⁾ and **Mohamed** ⁽⁴⁰⁾ had also found the greater part of customers' way of life practices were either poor or reasonable. Through projects accentuating physical exercise, dietary regimen, push administration, smoking and prescription there were enhancements in way of life practices.

As to self-care exercises, the present data have uncovered that more than two third was not honing exercise before execution the program. Implementation of the program was associated with statistically significant improvement in elderly practice of physical exercise. These discoveries are in accordance with **Malathy et al.** ⁽³⁸⁾ and **Karakurt Kasıkçı** ⁽²⁶⁾ these creators have asserted that if diabetic patients kept on performing standard activities in their homes , three to four times each week , this enhanced exercise self-care exercises of diabetic patients separately.

As regards diet, the findings of the present study have showed that the most of the older adult were not monitoring or controlling their diet before the program implementation. These findings could be deduced by the fact that the older lack of knowledge about importance of diet. Afterward the implementation of the program most of the study sample were found to have controlled their diet .These results are in agreement with **Mersal** ⁽²⁾ and **Mohamed** ⁽⁴⁰⁾ have emphasized that diabetes control has also shown improvement when dietary instructions, including specific situational examples and applications in instructive plans, can result in better

glycemic control, which reduce disease burden and mortality. About smoking the present study revealed statistically improvements in elderly practices. At the follow up phase, the majority of them have quit smoking and controlled environment from the passive smoking. These findings are in the line with **Thojampa & Mawn**⁽⁹⁾ who have indicated that more than one third of studied patients prevented passive smoking in their environment. Another important method of self-care practice to control diabetic that has been included in the current study program was stress management. The findings of this study have shown a statistically significant improvement of elderly stress. This might undoubtedly have a positive impact on improving their level of diabetic foot at the end of the study. In the same vein **Ayele et al**⁽³⁶⁾ has reported that stress management techniques such as relaxation and meditation can all help to get rid of stress under control and this may help control of diabetes. Concerning medication self-care activities and actions, the present study elucidated that all of the study subjects had adequate self-care activities post and follow up phase intervention. It might attribute to their awareness about seriousness of the disease and control. Statistically significant improvement was exposed in diabetic elderly towards medication, treatment and control after implementation of the program. This findings in agreement with **Abdo & Mohamed**⁽¹⁴⁾, and **Mersa et al**⁽³³⁾ who have reported that obedience and compliance are of great importance in management of diabetic foot as well as clearly patient education should be improved to a drive more effective diabetic control. This was contradicted with **Kim et al**⁽⁴¹⁾ who found inadequate medication self-care activities pre-intervention and web-based education for diabetic patients improved medication self care activities post-intervention.

The observation being held in the present study indicated that the steps of the procedures of urine glucose tests were not accurately followed before the program implementation. These results could be related to lack of the elderly knowledge and experience in performing, reading and interpreting the results of their tests. In addition, they did not attend any educational session about urine glucose test performance as well as insulin injection. Also it might be related to the fact that the urine glucose tests and inject insulin were practiced by the pharmacist, nurses and caregivers before the program. The finding of this study was congruent with **Zahra et al**⁽²⁰⁾ who found that the majority of patients were not skillful in blood and urine test. The results of the current study exposed that near one third of the elderly of the study group one-take daily bath before the program, and brush their teeth once a day and after meal before the program. These findings may be explained in the light of the fact that the older diabetic foot take daily bath as a daily habit, may be due to oral hygiene is important for diabetic elderly to prevent infection. In addition, the elderly are in the age where their body image and response of their peer to their body image are the main focus during this period therefore they focus on their self and appearance. These finding are in agreement with **William et al**⁽³⁵⁾ and **Addisu et al**⁽⁴²⁾ who have indicated that importance and rank of wash hand regular, mouth care, dental care and brush of teeth and skin care must be emphasized to adolescents, to prevent infections; recurrent infection may indicate poor diabetic control. As regards self-care practice of diabetic foot. These results are consistent with the research hypothesis, study revealed statically significant improvements in elderly practices at post intervention all of them as (examine feet well daily, wash feet daily and a good-dry between finger, avoid use of very hot or cold water, nails cut carefully to avoid leaving a sharp edge and cut fingernails in a circular fashion, keen to massage the feet and legs from time to time avoided wear high heel shoes, use of moistening cream, wearing shoes without socks, wearing sandals or walking barefoot, use of woolen socks in winter and cotton in the summer). These findings are in accordance with many previous studies (**Mersal & Mersal**⁽³³⁾, **Salehet et al**⁽⁵⁾, **Mersal**⁽²⁾, **Addisu et al**⁽⁴²⁾ and **Mohamed et al**, **Salehet et al**⁽⁴³⁾, **Aghili et al**⁽⁴⁴⁾, **Mozaffarian**⁽⁴⁵⁾, **AbdMichaelides et al**⁽⁴⁶⁾ and **Michaelides**⁽⁴⁷⁾) stated that the effect of health education program will reflect on patients. It improves patients' practice towards prevents the progress of foot ulcer and appropriate foot hygiene (possibility for diabetics to arrive and see their feet, daily washing, of foot, dry between fingers, cream) were improved significantly both post and use of moistening after four months of the intervention program. Finally, the present study points to a lack of knowledge and unsatisfactory practices of diabetic elderly about self-care practice of foot before the program. However, after the program intervention, improvements were found in total scores of knowledge and practice. The improvements were maintained through the follow-up phase in total knowledge and total practices (353.77%) and (626.8%) respectively. Furthermore, there were statistically significant among knowledge and practice scores. These results are congruent with **Malathy et al**⁽³⁸⁾, **Ayele et al**⁽³⁶⁾, **Shahinet al**⁽⁷⁾, **Abd EL-Rahman & Abo Shousha**⁽²⁷⁾ and **Amente et al**⁽³¹⁾ who have also added that educational programs have positive effect in improving elderly knowledge and self-care practice of diabetic foot.

IV. Conclusion

The current study highlights the fact that self-care program is important. It can be concluded that diabetic elderly lacked appropriate knowledge in the preprogram phase and their self-care practices were mostly unsatisfactory as regards personal hygiene teeth care, foot care, exercises, smoking, diet, sleeping, medication and urine analysis. After implementation of the program, significant improvements were noticed in

elderly' knowledge and self-care practices. Therefore, the self-care program was successful in attaining its aim and hypothesis of positively changing the knowledge and self-care practices of diabetic foot elderly.

V. Recommendation

Based upon the results of the study, the following recommendations are suggested:

- Regular continuing self-care programs should be designed to enhance elderly skills ability to care for their foot with emphasis on the most important risk factors and appropriate management.
- Proper diabetic foot care can be implemented by using variety of facilities such as audiovisual aids, towel, nail clipper to trimming nail, moisturizing cream, pumice and small mirror should be more available in certain places in geriatrics home to enable and encourage diabetic elderly to perform foot care and self-care practice properly at any time.
- Posters to remind clients about foot care and to improve clients' knowledge and self-care practices about diabetic foot care. The posters should be hung upon the wall in the geriatrics home.
- Future studies should follow the long-term effect of diabetic foot prevention program to reflect sustained change in the reduction of risk attitudes.

Acknowledgments

I express my gratitude and thanks towards all who have directly or indirectly helped me to complete this study and their support in each major step of the study. In particular, I would like to thank all the diabetic patients in geriatrics home

References

- [1] World health organization: Diabetes – Factsheet. (2012). <http://www.who.int/media/centrefactsheets/fs312/en/index.html>.
- [2] Mersal F A. Improving self-care practice for adults with type 2 diabetes mellitus. *Innovative Journal of Medical and Health Science*, 2013; 3(3): 93 – 101.
- [3] Albin RI, Mai S H C, Ahmed Z, Cheng J, Chong K and Mayer P. Outcomes Following Advanced Wound Care for Diabetic Foot Ulcers: A Canadian Study. *Canadian journal of diabetes*. 2017; 41(1):26-32. <http://dx.doi.org/10.1016/j.jcjd.2016.06.007>
- [4] Irwan AM, Kato M, Kitaoka K, Kido T, Taniguchi Y and Shogenji M: Self-care practices and health-seeking behavior among older persons in a developing country: Theories-based research. *International Journal of Nursing Sciences*, 2016; 3(1): 11– <http://dx.doi.org/10.1016/j.ijnss.2016.02.010>.
- [5] Salas-Salvadór J, Guasch-Ferré M, Lee CH, Estruch R, Clash CB, and Ros E. Protective effects of the Mediterranean diet on type 2 diabetes and metabolic syndrome. *J Nutr* 2016; 9 March; doi: 10.3945/jn.115.218487
- [6] Ellabany; Abel-Nasser M.A. : Non-communicable diseases and their Risk Factors in Egypt, Ministry of Health & population, Egypt, supported by World Health Organization (WHO), Eastern Mediterranean Regional Office (EMRO) In collaboration with USAID, Cairo, 2005.
- [7] Shahin ES, Qalawa SA, Mohamed MA and Abo El-Ata AB. Quality of life & satisfaction of diabetic foot patients: Comparative study. *Journal of American Science*, 2013; 9(1):474-483
- [8] Hokkam, E.N. Assessment of risk factors in diabetic foot ulceration and their impact on the outcome of the disease. *Primary Care Diabetes*. 2009; 3:219-24.
- [9] Thojampa S, Mawn B. The moderating effect of social cognitive factors on self-management activities and HbA1c in Thai adults with type-2 diabetes. *International Journal of Nursing Sciences*. 2017; 4(1):34-37. *Int. Wound J.* 2007; 4:298- 302.
- [10] Albargawi M, Sneathen J, Gannassan AL, Kelber S. Perception of persons with type 2 diabetes mellitus in Saudi Arabia. *International Journal of Nursing Sciences*. 2016; 3(1): 39-44. <http://dx.doi.org/10.1016/j.ijnss.2016.02.007>
- [11] Statistics about diabetes. American Diabetes Association website. www.diabetes.org/diabetesbasics/statistics. Updated June 11, 2014. Accessed July 23, 2014.
- [12] Sumpio BE, Armstrong DG, Lavery A, Andros G. The role of interdisciplinary team approach in the management of the diabetic foot: a joint statement from the Society for Vascular Surgery and the American Podiatric Medical Association *Vas Surg*. 2010; 51(6):1504-6.
- [13] Al Sayah F, Soprovich A, Qiu W, Edwards A L., Johnson JA. Diabetic foot disease, self-care and clinical monitoring in adults with type 2 diabetes: the Alberta's caring for diabetes (ABCD) cohort study. *Can J Diabetes*, 39 (Suppl. 3). 2015: pp. S120–S126. <http://dx.doi.org/10.1016/j.jcjd.2015.05.006>.
- [14] Abdo, N. & Mohamed, E.: Effectiveness of Health Education Program for Type 2 Diabetes Mellitus Patients Attending Zigzag University Diabetes Clinic, Egypt. *J. Egypt Public Health Assoc.* 2010; 85 (3)...113-130.
- [15] Saleh NM, Shebl AM, Hatata EZ, and Refiei MR. Impact of Educational Program about Foot Care on Knowledge and Self Care Practice for Diabetic Older Adult Patients. *Journal of American Science* 2012; 8(12):1444-1452
- [16] Strajtenberger M, Trbović V and Sekerija M: standardized educational program in persons with type 2 diabetes on oral hypoglycemic therapy: effects on glycemic control and body mass index. 2011; P. 30.
- [17] Pan X, Bai JJ, Sun J, Ming Y, Chen L, Wang Z. The characteristics of walking strategy in elderly patients with type 2 diabetes. *International Journal of Nursing Sciences*. 2016; 3(2):185-189. <http://dx.doi.org/10.1016/j.ijnss.2016.12.00>
- [18] Katie W, Heather B, Welch G, Annette G.: Measuring Diabetes Self-Care: A psychometric analysis of the Self-Care Inventory-revised with adults *Diabetes Care* 2005; 28:1346-52.
- [19] Jill H 2010 ;Foot Care for Patients With Diabetes, Wolters Kluwer Health, Lippincott Williams & Wilkins Vol. 26, No. 3, pp. 250–263
- [20] Zahra Y, Reza P, Mohammad RA, al e. Assessment of Self-Care Practice and Its Associated Factors among Diabetic Patients in Urban Area of Urmia, Northwest of Iran. *Journal of Research in Health Sciences* 2011; 11(1):33-8.
- [21] Elabbassy AA. The use of high-definition video technology on diabetes management. *Journal of Nursing Education and Practice*, 2015; 5(7): 109-122

- [22] Mohamed HA, Elsaher HE, Aref MS and Fouad N. The Effect of Diabetic Foot Care Training Program on Elderly Adults' Outcome. *IOSR Journal of Nursing and Health Science*, 2015; 4(4): 14-20
- [23] Haas L, Maryniuk M, Beck J, Cox CE, Duker P, Edwards L, et al. National standards for diabetes self-management education and support. *Diabetes Care*. 2014; 37(Suppl 1):S144-53
- [24] Fouad RA. Common Foot Health Problems and Measures to Prevent It among Diabetic Geriatric Patients *Journal of the Medical Research Institute (MRI)*. 2009; 30.2: (118-27).
- [25] Abdel-Hamid S. Self-care practice among home Based diabetic elderly in Dakahlia Governorate. Unpublished master thesis, faculty of nursing, Alexandria University, 2005
- [26] Karakurt, P., & Kaşıkçı, M. The effect of education given to patients with type 2 diabetes mellitus on self-care. *Int. J. of Nursing Practice*. 2012; 18: 170-179
- [27] Abd El-Rahman SA and Abo Shousha AEL. Effect of an Educational Program on Caregivers, Knowledge about Diabetic Foot Care at Elderly Home in Damanhur – Egypt. *J Am Sci*. 2015; 11(1):99-107
- [28] Adam, M. A.; Hamza, A.A.; Ibrahim, A.E. Diabetic Septic Foot in Omdurman Teaching Hospital, Sudan *JMS*. 2009; 4 (2) p.1
- [29] Chalya I, p; Mabula, j; Dass, R; Kabangila, R; Jaka, H; Mchembe, M; Kataraihya, J; Mbelenge, N; and Gilyoma, J. (2011) : Surgical management of Diabetic foot ulcers: A Tanzanian university teaching hospital experience, Tanzania, p.3
- [30] Mersal FA; .Mahday NE and Mersa NA. Efficiency of Web-Based Education versus Counseling on Diabetic Patients' Outcomes. *Life Sci J*. 2012; 9(3):912-926
- [31] Amente, Belachew T, Endalew Hailu E and Berhanu. Self-care practices and its predictors among adults with diabetes mellitus at Nekemte Referral Hospital Diabetic Follow up Clinic, East Wollega, Ethiopia. *World Journal of Medicine and Medical Science*, 2014; 2(3):1-16
- [32] Anselmo MI, Nery M, & Parisi MC. The effectiveness of educational practice in diabetic foot: a view from Brazil. *Diabetology & Metabolic Syndrome*. 2010, 2(1), 45.
- [33] Mersal F and Mersal N. Nursing Guidelines for Improving Foot Care Practices for Adult Patients with Type 2 Diabetes Based on National Institute for Clinical Excellence guidelines. *Journal of American Science*. 2011; 7(10):396-403.
- [34] El-Ahmady MM, Marie SA, & El-Degwi HK. *Role of family physician in foot care in diabetic patient*. Unpublished Master degree thesis, Cairo University 2013.
- [35] William K, Zachary M, Eva W, et al. Knowledge, attitude and practices related to diabetes among community members in four provinces in Kenya: a cross-sectional study. *Afr J Prm Health Care Fam Med*. 2010; 4(1):655
- [36] Ayele K, Tesfa B, Abebe L, et al. Self-Care Behavior among Patients with Diabetes in Harari, Eastern Ethiopia: The Health Belief Model Perspective. 2012; 7(4):355-15
- [37] Hailu E, Mariam W, Belachew T, Birhanu Z. Self-care practice and glycemic control amongst adults with diabetes at the Jimma University Specialized Hospital in south-west Ethiopia: A cross-sectional study. *Afr J Prm Health Care Fam Med*. 2012; 4(1):311
- [38] Malathy R, Narmadha M, Ramesh S, et al. Effect of a diabetes counseling programme on knowledge, attitude and practice among diabetic patients in Erode district of South India. *J Young Pharm*. 2011; 3(1), 65
- [39] Thungathurthi S, Kumar V. Self-Care Knowledge on Diabetes among Diabetic Patients in Warangal Region, *International Journal of Life Science and Pharma Research*. 2012; Vol 2/Issue 2
- [40] Mohamed SA. Effect of lifestyle intervention on health behaviors, weight and blood glucose level among patients with diabetes mellitus. *Journal of Nursing Education and Practice*, 2014; 4(12):75-87
- [41] Kim, H.S., Kim, N.C. & Ahn, S.H. Impact of a nurse short message service intervention for patients with diabetes. *J Nurs Care Qual*. 2006; 21(3):266-271.
- [42] Addisu Y, Eshete A, Hailu E. Assessment of Diabetic Patient Perception on Diabetic Disease and Self-Care Practice in Dilla University Referral Hospital, South Ethiopia. *J Metabolic Synd*, 2014; 3(166) 2-8. doi:10.4172/2167-0943.1000166
- [43] Saleh F, Mumu SJ, Ara F, Hafez M and Ali L. Non-adherence to self-care practices & medication and health related quality of life among patients with type 2 diabetes: a cross-sectional study. *BMC Public Health*. 2014; 14:1-16
- [44] Aghili R, Polonsky W H., Valojerdi A E, Malek M, Keshtkar A A, Esteghamati A, and Heyman M, Khamseh M E. Type 2 Diabetes: Model of Factors Associated with Glycemic control. *Can J Diabetes*. 2016; 40 (5): 424-430.
- [45] Mozaffarian D. Dietary and policy priorities for cardiovascular disease, diabetes, and obesity a comprehensive review. *Circulation* 2016; 133:187-225
- [46] Michaelides A, Raby C, Wood M, Farr Toro-Ramos T: Weight loss efficacy of a novel mobile Diabetes Prevention Program delivery platform with human coaching. *BMJ Open Diabetes Res Care* 2016; 4(1):S1-S8. <http://dx.doi.org/10.1136/bmjdr-2016-000264>
- [47] Michaelides BL: Use of Medicare's diabetes self-management training benefit. *Health Educ Behav*. 2015; 42:530-538