

Health Education Program on Diabetic Foot Care for Elderly in Some Rural Areas of Assiut City

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Abstract: Diabetic patient education on appropriate self-care play a key role in preventing foot complications. The aim of this study was to estimate the effectiveness of an educational program on diabetic foot care for elderly. Quasi experimental research design was utilized. The study was conducted at four rural villages in Assiut city. The total number of participants was 100 diabetic elderly patients which chosen by a multi- stage sampling technique. Two tools were developed by the researchers; tool I: A structured interview questionnaire include two parts, 1st Part included demographic data. The 2nd part included questions for assessing foot self-care knowledge, tool II: an observational checklist to assess the elderly' practice regarding foot care. The results revealed that 85.0% of the studied elderly are diabetic since 5-10 years and (91.0%) of them hadn't diabetes foot. Good score of elderly` knowledge about foot care in pre, post and follow up were (0.0%, 21.0% and 16.0% respectively). Also (4.0%, 93.0% and 63.0% respectively) had satisfactory score of practice in pre, post and follow up, with a statistically significant difference in pre and post tests and in pre and follow up tests. The study concluded that there is a serious lack of diabetic foot care knowledge and practice among the studied elderly. Health education intervention succeeded in improving them which suggest the essential foot care education should be acquainted to a larger group in different health care centers over a longer period of time. Advanced research is recommended to determine at whether the increases in foot care practices should be implemented and re-enforced.

Keywords: Health education program, Diabetic foot care, Elderly, Rural area.

1. INTRODUCTION

Diabetes is a persistent problem result from insufficiency of insulin secreted by the pancreas or if the body cannot use the glucose formed by the pancreas. Increasing number of diabetic patients among the elderly resulting from population growth and estimation of The International Diabetes Federation concerning the universal spread of diabetes in the elderly is to be more than 134.6 million and the number is expected to increase to 252.8 million by 2035% (WHO, 2015).

Diabetes prevalence in Egypt has increased rapidly within a relatively short period from approximately 4.4 million in 2007 to 7.5 million in 2013. It is expected this number will increased to 13.1 million by 2035 (The International Diabetes Federation Diabetes Atlas 2013).

Hegazi, et al, (2015) reported that diabetes is a rapid increasing health problem in Egypt with a significant impact on morbidity, mortality, and health care resources. Now, the prevalence of type 2 diabetes in Egypt is about 15.6% of all adults aged 20 to 79.

Saleh et al, (2012) stated that diabetic foot problems are one of the most common chronic complications of diabetes that has a tremendous economic and social impact on individuals, families and on health system as a whole in developing and developed countries.

Foot problems most often happen when there is nerve damage also called neuropathy. This can cause tingling, pain (burning or stinging), or weakness in the foot. It can also cause loss of feeling in the foot, so the patient can injure it and not know it. Poor blood flow or changes in the shape of patient feet or toes may also cause problems (**American diabetes Association, 2018**).

The contributing factors for foot ulcer include peripheral sensory neuropathy (PSN), structural disfigurement (eg, hammertoes, bunions, or any distortion that creates accretion of plantar pressure), and trauma (eg, shoe gear irritation, injury, cutting toenails). Motor and autonomic neuropathy may be present along with PSN, and these lead to the development of deformities and skin disease, respectively (**Boulton, et al, 2008**).

Diabetic foot complications, which affect more often the older adults, could be prevented through the application of comprehensive programs. These programs concentrated on foot care, including feet daily inspection, professional treatment, hygiene, and proper well-fitting foot wear which have been revealed incredibly diminish amputation rates. (**Seid & Tsige, 2015 and Otene, et al, 2015**).

The application of diabetic foot attention comprising daily foot examination and use of appropriate footwear is considered serious in its early detection and prevention of complications. People with lack of knowledge and practice concerning diabetic foot care are recognized to have excessive occurrence of diabetic foot ulcers (**Chellan, et al, 2012**).

Community health nurse play an essential role in empowering diabetic patients to better manage their disease through self-care and improving the quality of life through providing them and their families with the needed information. Nurses as care providers should consider client-centered care and effective communication with clients and their families through health education and instructing their diabetic elderly patients about increase risk of lower extremity complications and refer those patients to routine schedule of foot care. Promptly preventive foot care should be performed as early as possible in order to cut down number of lower limbs infections and future amputations (**Meiner, 2015**).

Significance of the study

Diabetes is a fast-growing health problem in Egypt with a serious effect on morbidity, mortality, and health care resources. Diabetic foot complications are considered to be a serious consequence of this disease, it is estimated from a recent study conducted among diabetics in Egypt, that (29.3%) of diabetics had foot ulcer disease; (63.3%) had vascular complications, and neuropathy was reported in (88.0%) of them and concluded that diabetic foot complications were attributed to the lack of knowledge about foot care among diabetic patients (**Touhy, et al, 2016**) This explains that diabetic foot posing a major medical and economical threat and needs patient education to accomplish sufficient control and prevention of unfavorable health outcomes (**Gawish, 2012, Peterson & Virden, 2013**).

Aim of the study

The aim of the study was to estimate the effectiveness of an educational program on diabetic foot care for elderly.

Study hypothesis

The health education program will have a positive effect on elderly' knowledge and practice regarding diabetic foot and foot care.

2. SUBJECTS AND METHODS

Study design:

Quasi experimental (Pre- posttest) research design was utilized in the present study

Setting: Assiut city include 18 villages which contain rural health center. The study was conducted in four rural villages named (El shagaba village, Elwan village, Manqbad village and Salam village) these area were chosen randomly by simple random sample

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Sample: A multi stage sampling technique was used in this study; the total number of diabetic elderly who were recorded and had a diabetic file in health center at the previous setting was 221. Then 50% from the total number were chosen randomly. The total sample size included 111 elderly in which 25% of elderly from each village. The final sample size was 100 participants whereas 11 elderly had dropped from the sample for many reasons as refused to complete the program, some cases traveled to another country or death.

Tools of the study:

Two tools were developed by the researchers and used in the present study as the follows:

Tool I: A structured interview questionnaire to assess the foot self-care knowledge of the elderly. It was used as pre, post, and follow up tests and divided into two parts. The 1st Part included demographic data as age, sex, education, and occupation. The 2nd part included 13 questions for assessing foot self-care knowledge as definition, causes, signs and symptoms, and complications of foot ulcer, foot examination, nail care, how to choose and wear shoes, how to choose the soak, and prevention of foot ulcer with response of (Yes/ No); each correct answer took 1 grad and incorrect answer took zero, the total score was (50 grad); whereas the questions' response could have more than one answer. The elderly' knowledge was considered good when the total percent score was $\geq 70\%$ & considered fair when it (50% - 70%), and poor if $< 50\%$ of the correct answers (Abozeid, 2010)

Tool II:

An observational check list to assess the elderly' practice regarding foot care it was filled pre, post intervention and follow up. It included 12 items; inspect his/ her feet, inspect shoes before putting on, wash feet with warm water, dry feet after washing, use moisturizer for dry skin, cut toenails properly, walking bare foot, wear shoes without socks, check between toes, dry between toes, check of water temperature before using and seek professional help for any problem. It was presented as (Done/Not done) with scores of one degree for each step except the two steps (negative statements) of (walking bare foot, and wear shoes without socks). The total score was 12 grads. The elderly' practice was considered satisfactory when the total percent score was $\geq 50\%$ and considered unsatisfactory when $< 50\%$ of the steps done correctly (Sharkawy et al 2017)

Validity and Reliability

To assess the reliability and stability of the tool, the questionnaire was offered to a group of 11 elderly, who were not enrolling in the study. Then the same questionnaire was re-administered to the same group after two weeks (test- re- test reliability). The answers were compared and r was computed ($r=0.89$).

The faced and contented validity was presented by asking 3 experts in the field of medical surgical nursing, community health nursing. Modifications were done according to the jury's comments on clearness of sentences and the suitability of the contents

Pilot study

The pilot study was carried out on 11 of diabetic elderly by 10%. It was done to evaluate the clarity, practicality and applicability of the tool. Also, to determine the time needed to fill the form. Clarification was made and the needed changes were also done after the pilot study. These 11 elderly in the pilot study were excluded from the actual sample.

Ethical considerations

The participating elderly were assured that their identity will be unnamed, and that the information will be kept secret at all times and will be used only for the rationale of the study. It also briefly explained the aim of the study for each elderly. Oral permission was obtained, and the participants were informed that they have the right to pull out from the study at any time they need.

Methods:

- An official approval letter was acquired from the undersecretary of ministry of health prior to start the study to obtain a list of name and number of family health centers
- An official letter to every family health centers director for obtaining a list of name and number of families who have diabetic elderly.

Field work:

The rural health centers director allowed the center' worker in each village to help the researchers to identify the selected families' home and to be a source of security and confidentiality for elderly and the researchers. Data collection and program intervention was done through home visits over a period of four months from the first of October, 2018 to the end of January, 2019. The intervention program done on two days per week, each day has three sessions the duration of each session was about half hour. A period of communication with elderly and their caregivers was allowed on the 1st session of the first day, then assessment of elderly' knowledge (pretest) and giving handout before starting the program. The 2nd session for explaining the program. The 3rd session for doing posttest.

The second day, the 1st session for demonstration of foot care, and before the start of 2nd session, feedback regarding to the topics discussed in the previous session to identify the elderly' comprehension; misunderstanding or unclear points were re-emphasized by the researchers. The 2nd session for re- demonstration of foot care, and the 3rd session for doing posttest. After one month posttest was done to the participating elderly.

Teaching methods included discourse, role-playing, display, re-display, pictures, brain storming, and posters. The selected content was organized in topics for better perception. Brochure, in Arabic language, concerning (foot complications, foot investigation, foot protection, diabetic foot prevention) was given to each elderly to direct and enrich their memory about activities conducted in each session.

3. STATISTICAL ANALYSIS

The data were revised, organized, and coded. SPSS 16.0 statistical software package was used in data analysis. Data was displayed using descriptive statistics in the form of frequency and percent, means, standard deviations and chi square test. Statistical significance was considered at P- value <0.05.

Table (1): Distribution of the studied diabetic elderly by their socio-economic characteristic

Item	No.	%
Sex		
Male	48	48.0
Female	52	52.0
Age		
60 - <70	71	71.0
70 - <80	23	23.0
80 and more	6	6.0
Mean ± Std. Dev.	66.7100±7.41319	
Marital status		
Single	3	3.0
Widow	77	77.0
Divorced	19	19.0
Married	1	1.0
Level of education		
Not educated	63	63.0
Educated	37	37.0
Occupation		
No working	70	70.0
Worked after retirement	30	30.0

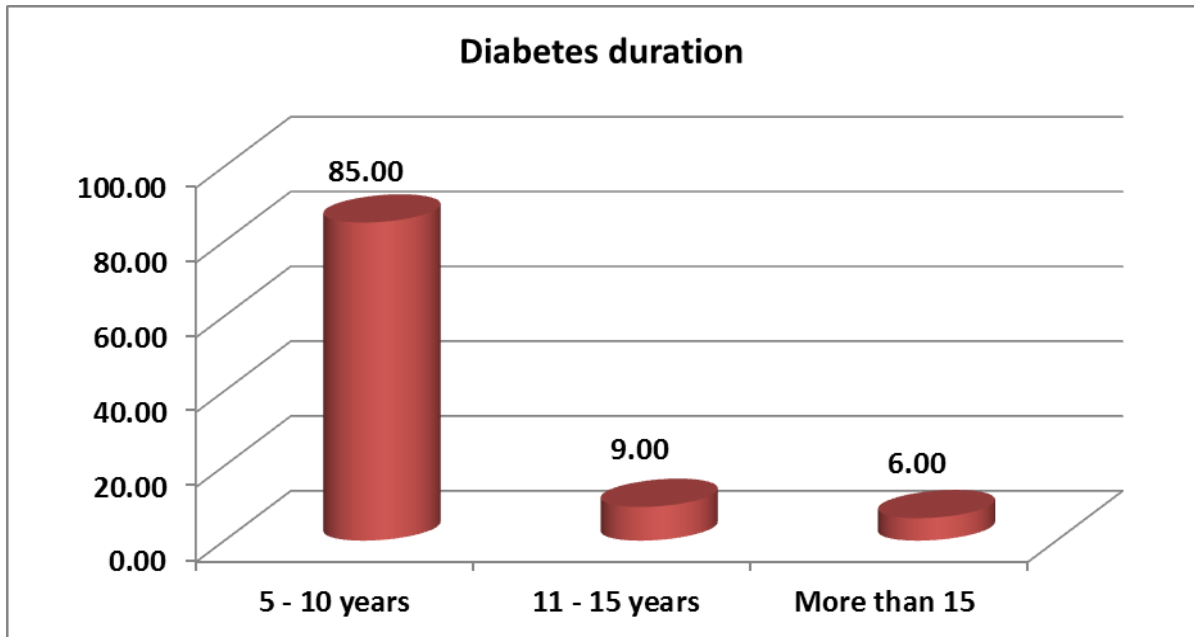


Figure (1) Distribution of studied elderly according to their diabetes duration

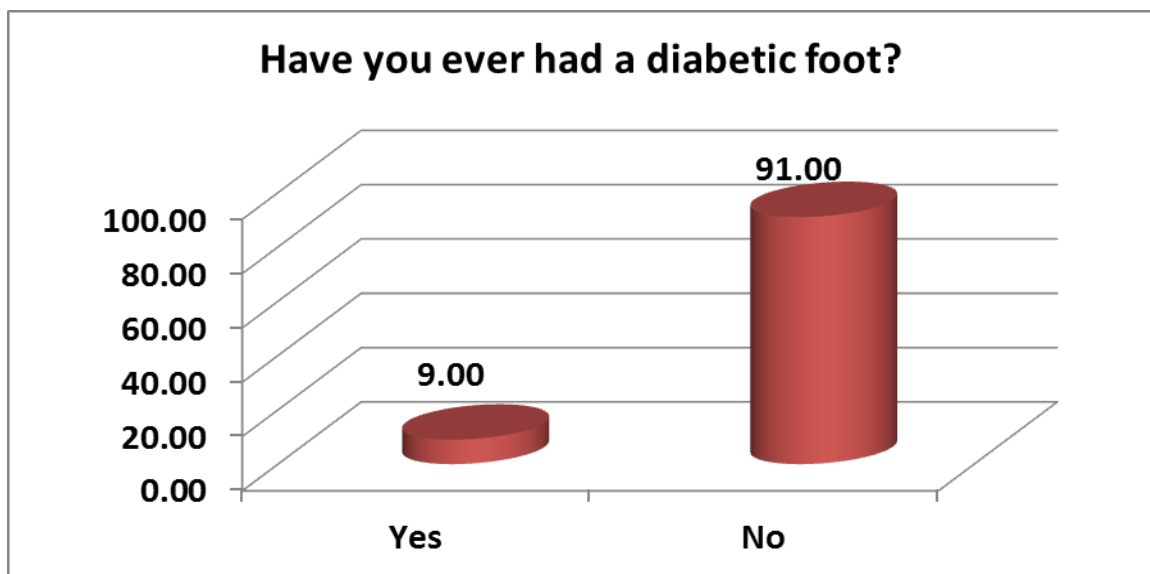


Figure (2) Distribution of studied elderly according to their diabetic foot

Table (2) Total score of knowledge among the studied elderly about diabetic foot in pre, post and follow up tests

Knowledge level	Pre		Post		Follow up		X1	P1	X2	P2
	No.	%	No.	%	No.	%				
Poor	98	98.0	21	21.0	35	35.0	7.677*	0.022	10.714**	0.005
Fair	2	2.0	58	58.0	49	49.0				
Good	0	0.0	21	21.0	16	16.0				

There is significant difference - Significant at P < 0.05

P1=between pre and post test P2= between pre and follow up test

Table (3) Total score of practice among the studied elderly about foot care in pre, post and follow up tests

Item	Pre		Post		Follow up		X1	P1	X2	P2
	No.	%	No.	%	No.	%				
Unsatisfactory practice	96	96.0	7	7.0	37	37.0	0.314	0.575	2.447	0.118
Satisfactory practice	4	4.0	93	93.0	63	63.0				

There is significant difference - Significant at $P < 0.05$

P1=between pre and post test P2= between pre and follow up test

Table (4): Relation between knowledge level of studied elderly and their socio-demographic characteristics in pre, post and follow up tests

Socio-demographic characteristics	Level of knowledge					
	Pre		post		follow up	
	X ²	P.V.	X ²	P.V.	X ²	P.V.
Sex	2.211	0.137	4.474	0.107	0.576	0.750
Age	0.896	0.639	9.171	0.057	8.393	0.078
Marital status	0.610	0.894	9.682	0.139	2.231	0.897
Level of education	3.475	0.062	8.452*	0.015*	0.425	0.809
Occupation	0.389	0.533	3.136	0.209	8.907*	0.012*
Residence	0.510	0.475	0.241	0.886	1.964	0.375
Diabetes duration	0.360	0.835	10.461*	0.033*	2.758	0.599
History of diabetic foot	0.202	0.653	1.187	0.552	1.239	0.538

Table (5): Relation between practice level of studied elderly and their socio-demographic characteristics in pre, post and follow up tests

Socio-demographic characteristics	Practice					
	Pre		post		follow up	
	X ²	P.V.	X ²	P.V.	X ²	P.V.
Sex	4.514*	0.034	1.138	0.286	0.264	0.607
Age	0.267	0.875	10.035**	0.007*	15.031**	0.001*
Marital status	1.245	0.742	0.694	0.875	0.971	0.808
Level of education	2.581	0.108	4.421*	0.036*	1.332	0.248
Occupation	0.794	0.373	0.007	0.932	1.963	0.161
Residence	1.042	0.307	1.882	0.170	0.043	0.836
Diabetes duration	0.735	0.692	1.258	0.533	14.046**	0.001*
History of diabetic foot	0.412	0.521	0.744	0.388	0.057	0.811

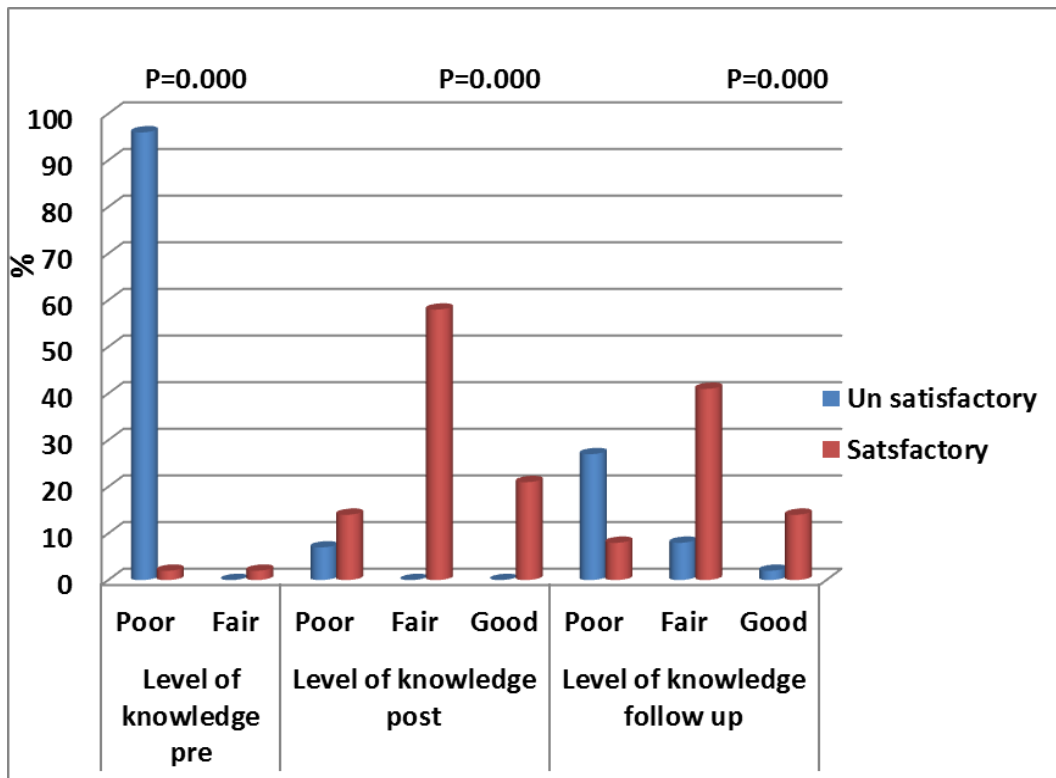


Fig (3): relation between total score knowledge among studied elderly and their total score of practice about foot care in pre, post and follow up tests

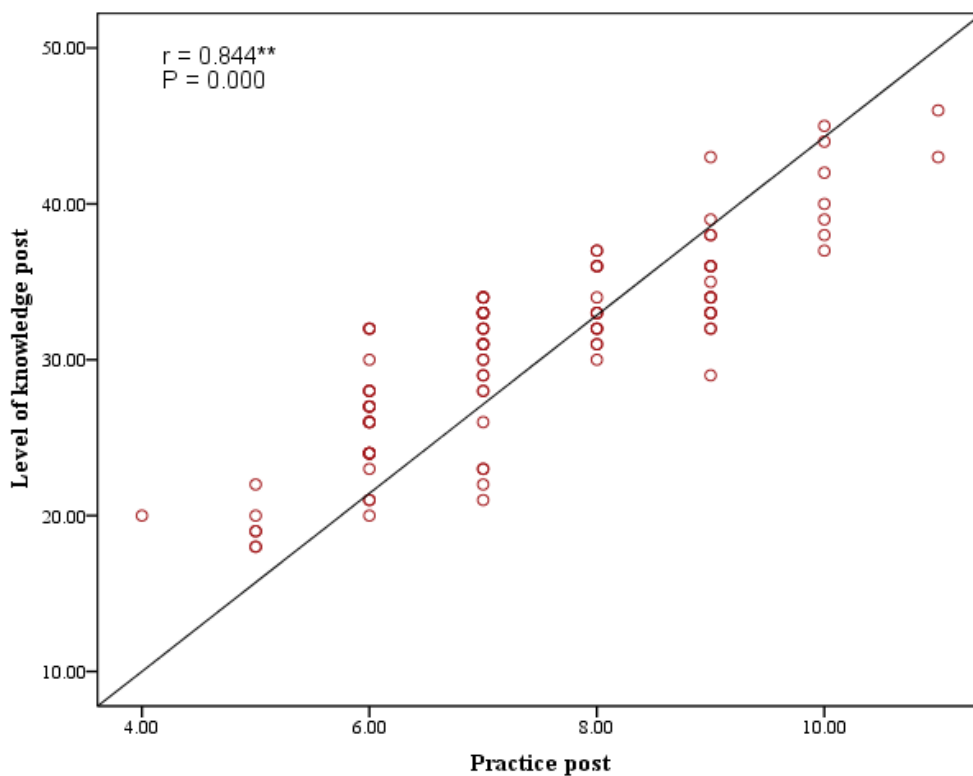


Fig (4): Pearson correlation coefficient between knowledge and practice in post test about foot care among studied elderly

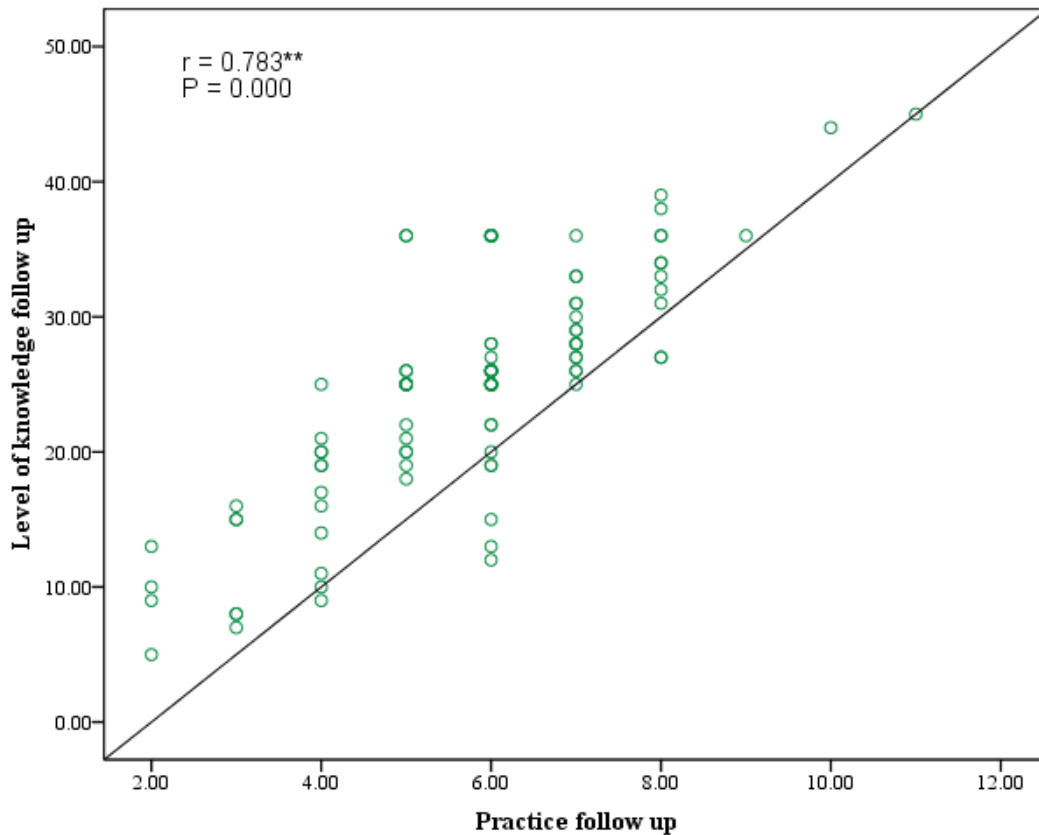


Fig (5): Pearson correlation coefficient between knowledge and practice in follow up test about foot care among studied elderly

Table (1) shows that 71.0% of studied elderly were in the age group 60 - <70 years and 23.0% of them were 70 - <80 years and the mean age of them was (66.7100±7.41319). While 48.0% of studied elderly were males and 52.0% were females. As regards to the education of the studied sample, it is observed that 63.0% of them had not educated, Moreover 70.0% of them had no working after retirement.

Figure (1) represents the distribution studied elderly according to their diabetes duration it was clear that (85.0%) of them are complain from diabetes from 5-10 years.

Figure (2) reveals the distribution of studied elderly according to their presence of diabetes foot it was clear that (91.0%) of them hadn't complain from diabetes foot.

Table (2) shows the total score of knowledge about foot ulcer and foot care; it was found that (98.0%, 21.0% and 35.0% respectively) of studied elderly had poor score of knowledge in pre, post and follow up and only (0.0%,21.0% and 16.0% respectively) had good score of knowledge in pre, post and follow up.

Table (3) clears the total score of practice about foot care; it was found that (96.0%, 7.0% and 37.0% respectively) of studied elderly had unsatisfactory score of practice in pre, post and follow up and only (4.0%,93.0% and 63.0% respectively) had satisfactory score of practice in pre, post and follow up.

Table (4) illustrated that there are statistically significant difference between elderly levels` of education, diabetes duration and their knowledge in post test also between elderly occupations in follow up test

Table (5) represent the relation between practice level of studied elderly and their socio-demographic characteristics it was found that there was statistically significant difference between elderly sex, age , levels` of education , diabetes duration and their practice in pre, post test and follow up test

Figure (3) clear that there was statistically significant differences in pre and post tests and in pre and follow up tests

Figure (4) illustrates positive correlation between knowledge and practice in post test among studied elderly about foot care ($r = 0.844$) it was revealed that there was statistically significant correlation between knowledge and practice ($P= 0.000$)

Figure (5) This figure represents positive correlation between knowledge and practice in follow up test among studied elderly about foot care ($r = 0.783$) it was revealed that there was statistically significant correlation between knowledge and practice ($P= 0.000$)

4. DISCUSSION

Diabetic foot (DF) is one of the most widespread type 2 diabetes mellitus complications; it originates from the conjunction of neuropathy and vascular disease (**Gamal et al, 2018**).

The present study aimed to estimate the effectiveness of an education program on diabetic foot for elderly people. This study illustrated that less than two thirds of the studied elderly are not educated, those who should be targeted group that needs assistance with compliance and regular foot care and education. **Zhang et al 2017** who study on global epidemiology of diabetic foot ulceration and from our data presented that diabetic foot was more frequent in male diabetic patients than female patients. One clarification of this gender difference might be the participation in increased physical efforts in males.

Abd-Allah et al, 2016 revealed that patients' foot self-care practices are affected by some personal data such as; education, occupation, revenue, and smoking, as well as by the period of the disease. The present study revealed that although the majority of studied elderly are complain from diabetes from 5-10 years. Also 91.0% of them hadn't complain from diabetes foot. This target needs educational program about foot care because the complications of diabetic foot occur after many years of disease without glucose level control.

Regarding the total score of knowledge about foot care among the studied elderly it was found that the vast majority of them had poor knowledge in pre-test and improvement in the score of knowledge was occurs after implementation of the educational program. There were statistically significant differences between pre and post-test regarding their knowledge about foot care ($p < 0.001$). Also the finding revealed that statistically significance difference between elderly knowledge and their education and their duration of diabetes been found in post-test.

The finding of these study agree with **Chiwanga & Njelekela , 2015, and Abd elsalam et al, 2017** they revealed significant enhancement in the knowledge of their participants after application of the health education intervention

While this in accordance with **Mohamed et al, 2015** who study the effect of diabetic foot care training program on elderly adults' shows that all diabetic elderly had inadequate knowledge about diabetic foot before implementation of the program with a mean \pm SD 12 ± 7.9 . This finding come inconsistency with studies conducted by **Hassan, 2012** about the effect of educational program on knowledge and practice for Diabetic elderly patients at Egypt, Mansoura University who showed that all diabetic elderly patients in study group compared with 99% in control group had poor knowledge before implementation of the educational program.

This improvement may be due to the participant's readiness to promote and maintain their health status. Increasing the knowledge in post- test I can be attributed to the planned teaching program which was effective in increasing the knowledge of clients with diabetes. Therefore, it is of importance for persons with newly diagnosed diabetes to understand self-management and its impact on blood glucose level, and overall health in order to improve clinical outcomes and to avoid diabetes complications. The continuation of follow-up and support avoided or delayed chronic complications in diabetic patients.

Also the present study showed improvement in foot care practice, from about 4.0% in the pre test to 93% in post test and 63% had satisfactory practice in follow up test. The current study also highlighted there was a statistically significant difference between pre and post test for performance of the studied elderly in relation to age and sex also association between low educational status with poor practice of diabetic foot care, these result agree with **Saeed et al, 2010** who applied the international guidelines of patients with diabetes about foot care and found that association between educational status and diabetes knowledge level was found with poor practice of diabetic foot care.

This finding in the same line with **Abdelsalam et al, 2017** who findings also revealed poor baseline practice in the majority of their studied group. Also, our results showed that low level of education had a significant effect on the baseline practice which was in line with a similar study of **Mohamed et al, 2015** which showed that more than half of diabetic elderly had satisfactory practices about diabetic foot care before implementation of the program with the mean \pm SD 23 ± 4.4 , while there are improvements of practices after implementation of the program as it noticed that the majority had satisfactory practices with the mean \pm SD 30 ± 5.6 while in post-test II it is noticed that more than half of elderly adults in the study sample had satisfactory practices with the mean \pm SD 27 ± 6.1 . Also, our results were agreements with **Mersal and Merasl, 2011** who applied nursing strategy for enhancing foot care practices for adult patients with type 2 diabetes. And found that lack of practice and no statistically significant difference between the study and control group regarding foot and nail care practice before program implementation.

The other hand the results of the current study were in disagreement with **Beiranv et al, 2015** who state of the practice of foot care in group of patients and showed that 43.4% of the subjects had a weak practice. **Desalu et al, 2011** conduct study about diabetic foot care in Nigeria and found that 78.4% of patients with diabetes had a weak practice of their feet care, which was consistent with the results obtained in the current study. The results of the current study was in the same line with **Mohamed et al 2018** who study barriers of foot care practice among older adults with diabetes in Alexandria, Egypt and clarified that more than half of the study subjects (60.3%) had satisfactory level of foot care practice.

Concerning the relationship between elderly knowledge and their practice in the current study it was found that inadequate knowledge on diabetes and foot care was reported as a barrier of foot care practice. A statistically significant association was found between practicing foot care of the participants and their knowledge, good foot care practice associated with satisfactory level of knowledge .this result in accordance with **Mohamed et al 2018, Aggarwal et al 2015, Hjelm K & Beebwa 2013, Onwudiwe et al 2011, and Jinadasa & Jeewantha, 2011** they revealed that a statistically significant association was found between practicing foot care of the participants and their knowledge, good foot care practice associated with satisfactory level of knowledge. While **Chin et al, 2013** reported that study refuted the present finding and displayed that there was no association between foot care knowledge and daily foot care practice.

The current study reveals that there are positive statistically significant correlation between knowledge, of studied diabetic elderly and their practice pre, post and follow up of program implementation. These finding disagree with study of conducted by **El-Khawaga et al, 2015** they did not confirm the present finding and explained that there is a negative significant correlation between the knowledge and practice of foot care; knowledge did not translated into action to modify foot self-care behaviors.

5. CONCLUSION

This study showed poor diabetic foot care knowledge and practice. And positive statistically significant correlation between knowledge of studied diabetic elderly and their practice pre, post and follow up of program implementation. Health education intervention succeeded in improving them.

6. RECOMMENDATION

based on the results of current study, the researchers suggest that:

- The diabetic elderly needs to essential foot care education should be introduced to a larger group in different health care centers over a longer period of time.
- Advanced research is recommended to determine at whether the increases in foot care practices should be implemented and re-enforced.
- Foot examination and education should be encouraged by the nurse to be routinely as integral part of diabetic patient care to the older adults attending the outpatient clinics, and it should be scheduled with proper appointment.
- Nurses in the outpatient clinics should provide posters, leaflets, booklets and videos showing foot care steps and its importance to be available for older adults with low education.

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