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Correlates of Self-care Practices Among Elderly Diabetic Foot Ulcer Patients

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Abstract:

Background: Diabetic foot ulcer is one of the frightening complications of diabetes and is the leading cause of hospitalization among elderly diabetic patients. Self-care practice has a direct effect on DFU. **Aim of the study:** To investigate Correlates of Self-care practices among elderly diabetic foot ulcer patients. **Subjects and Methods:** *Research design:* A Descriptive cross-sectional study design was used to carry out the current study. *Setting:* The present study was conducted at surgery and diabetic foot outpatient clinic at Zagazig University hospitals. *Subjects:* A purposive sample composed of 200 elderly patients with diabetic foot ulcer. **Tools of data collection:** Two tools were used in the present study. *Tool (I):* A structured interview questionnaire which composed of three parts (sociodemographic data, medical history & history of self-care habits) *Tool (II):* Diabetes Self-Management Questionnaire (DSMQ). **Results:** The study revealed that 62% of studied elderly DFU patients had unsatisfactory level of self-care practices. **Conclusion:** Diabetes self-care tended to be unsatisfactory especially the physical activity and dietary control domain. **Recommendations:** empowerment program about self-care practice should be directed to diabetic elderly patients at an early-stage and counseling sessions to provide emotional support to elderly DFU patients.

Keywords: Diabetic foot ulcer, Self-care practices, Elderly

Introduction

People aged 60 years and older are increasing. In 2019, their number was 1 billion worldwide, and will increase to 1.4 billion by 2030 and 2.1 billion by 2050. This increase is occurring at an unprecedented pace and will accelerate in coming decades, particularly in developing countries (**World Health Organization [WHO], 2022**). In this context, life expectancy in Egypt rose from 73.9 years in 2019 to 74.3 years in 2021 (73.4 years for male and 75.9 for female), according to official data by the (**Central agency for public mobilization and statistics [CAPMAS], 2022**)., the number of elderly people in Egypt reached 6.8 million, representing 6.7% of the total population. This percentage is expected to rise to 17.9% in 2052

Diabetes mellitus (DM) is one of the common chronic diseases affecting older people which has become an international health concern, increasing morbidity and mortality (**Alsaleh et al., 2021**). In 2019, it was estimated that 19.3% of people aged 65 to 99 years (135.6 million) live with diabetes globally. Over the next two decades, the number of people with diabetes will grow from 195.2 million to 276.2 million worldwide (**Hu et al. ,2022**). In this stream, in 2019, the international diabetes federation (IDF) estimated that one in five people with diabetes is above 65 years in Egypt (**Abdel-Ghany et al., 2021**)

Diabetic foot ulcer (DFU) is common and is considered one of the depleting complications of diabetes mellitus (**Tuglo et al., 2022**). Moreover, **Elhgry et al. (2023)** reported that Diabetic foot is " ulceration, destruction, or Infection of foot tissues associated with neuropathy in the lower extremity of a person with diabetes mellitus". DFU lead to costly complications including infection, considerable pain poor quality of life, lower-extremity amputation hospital admissions and mortality.

According to **Zhang et al.(2022)**, 6.3% of the total DM patients worldwide had DFU. The highest prevalence is in Northern America (13.0%), followed by Africa (7.2%) and Asia (5.5%). In Egypt, 6.1% to 29.3% of diabetes patients have DFU. In this regard, **Seguel (2022)** clarified that the risk of developing DFU and amputation increases with male gender, diabetes for more than 10 years and advanced age.

There are many patterns to diabetic foot ulcer, they vary in severity between elderly patients. This may be one of the reasons why outcomes, prognosis, treatment and care seem to vary. The classification of diabetic foot ulcer is essential in order to organize the appropriate care plan and follow up (**Rincón et al. ,2022**).

Senior is a distinctive experience, with possible health hazards such as an increased risk of chronic diseases and lack of social support. There are four categories of diabetes-related social support, Instrumental (tangible), emotional, informational, and appraisal. For patients with chronic diseases, daily activities and social support (supplied by family members, neighbors, and friends and institutions) are of great importance for maintaining a satisfactory quality of life. Social support and integration in the community are important factors, which help patients to be adjusted to a chronic illness including DFU (**Athanasίου ,2020**).

Regarding diabetes self-care management, literature shows that adherence to activities carried out by elderly to preserve their life, health and well-being enhances therapeutic

success. Since self-care is the decisive determinant of the course of diabetes, reflecting/monitoring relevant behaviors in individuals to identify areas of potential improvement and offer suitable education and support may be useful for routine clinical practice (Vicente et al.,2020). Previous research linking perceived social support and DFU self-management illustrated that social support reduce emotional distress and positively influences diet and exercise among elderly patients with DFU (Lapoulou et al., 2020).

According to (WHO,2022), nursing profession is among the key health groups involved in almost all levels of medical care. In this context, Hassan et al.(2021) reported that gerontological nurse have critical role in managing foot ulcer among elderly. They have educational role, they teach patients how to perform physical examination and take care of their feet on a daily basis and also teach about the importance of regular visits to the clinic, blood tests at specific intervals, they are in charge of detecting any changes in skin and evaluation of foot sensation as well providing foot care, dressing management, and assess psychosocial factors/ life style.

Significance of the Study:

Diabetic foot ulcer is critical complication and challenging health concern for the elderly that can lead to hospitalization and amputation. Moreover, Diabetic foot ulcer is considered a prominent cause of death in seniors. Diabetes foot ulcers accounted for 85% of lower limb amputations followed by a mortality rate ranging from 24.6% within five years to 45.4% within ten years in elderly, so it may have negative impacts on the patients, family and community in large (Adam et al.,2020). Self-management can affect outcome expectations in elderly people with diabetes than any improvement in specific treatments (Li et al.,2022). So, the aim of the current study is to investigate correlates of Self-care practices among elderly diabetic foot ulcer patients.

Aim of the study:

The aim of the study was:

The current study aims to investigate correlates of Self-care practices among Elderly diabetic foot ulcer patients.

Research questions:

- What are the correlates of Self-care practices among elderly diabetic foot ulcer patients?

Subjects and Methods:

Research design:

Descriptive cross-sectional study design was used to carry out the current study.

Study Setting:

The study was conducted at surgery and diabetic foot outpatient clinic at Zagazig University hospitals.

Study Subjects:

A purposive sample of 200 elderly patients with diabetic foot ulcer attending the above-mentioned outpatient clinics and fulfill the following inclusion criteria:

- Aged 60 years and more, able to communicate, agree to participate in the study, and Independent in activity of daily living

Tool for data collection:

In order to fulfill the objectives of the study two tools were used to collect necessary data:

Tool 1: A structured interview questionnaire which consisted of three parts;

Part one: Sociodemographic characteristics. It included data about age, sex, residence, income, educational level, marital status, number of family members, monthly income, ...etc

Part two: Patients' medical history It included patients' clinical characteristics as comorbid conditions, medications, family history of diabetes, habits including smoking etc

Part three: History of Self-care habits. This part is divided into five main subitems they are: foot care, wound care, follow up, previous history of foot problems, current history of foot problems.

Tool II: "Diabetes Self-Management Questionnaire (DSMQ)" (Schmitt et al., 2015)

The DSMQ is a multidimensional questionnaire contains a total of 27 items, 20 on general behaviors relevant for most people with diabetes and seven on specific insulin treatment behaviors. It is divided into four dimensions:

- **Glucose management** (items 1-9) as checking and recording blood glucose level before each meal, adjust the timing of insulin injections and food intake, etc.
- **Dietary control** (Q10-18), as following dietary regimen, regular meals and snacks over day, etc,)
- **Health care use** (Q 19-24) as periodical follow up with medical practitioner(s), etc.
- **Physical activity** (Q 25-27) as following regular physical exercise or not. These questions (Q1 to 27) were closed ended questions (multiple choice questions). The adequacy of diabetes self-care was assessed using three-point Likert scale ranging from:
 - Applies to me very much :2
 - Applies to me to some degree :1
 - Doesn't apply to me: Zero

Scoring system:

The total score of the total scale was the sum of the four dimensions. The higher score indicated satisfactory self-care. The adequacy of self-care behaviors categorized as follow:

- Satisfactory self-care: >60% (>32 point)
- Unsatisfactory self-care: ≤60 % (≤ 32 point)

Content Validity:

The tools were revised by three experts in the field of community health nursing, Faculty of Nursing in Zagazig University and community medicine, Faculty of medicine Zagazig

University, where the panel reviewed the tools content for relevance, clarity, comprehensiveness and understandability. All recommended modifications were done.

Reliability:

The reliability of the items of the tools was assessed using Cronbach's alpha test, its results was 0.877 for total diabetes self-management.

Field work:

Once the official permission was granted to proceed with the study, the researchers started to prepare a schedule for collecting the data. Each elderly were interviewed individually by the researchers who introduced self and explained the aim of the study briefly and reassured them that information obtained is strictly confidential and would not be used for any purposes other than research. After that, the oral approval was obtained to collect the necessary data. The study tools were answered individually for each elderly during the interview, and the time needed ranged from 20 to 25 minutes, according to understanding and cooperation of the elderly. The fieldwork was executed over six months from beginning of April 2023 up to the end of September 2023.

Pilot study:

A pilot study was carried on 20 elderly patients at diabetic foot outpatient clinic in Zagazig University Hospitals. The purposes of the pilot study were to test applicability, feasibility and practicability of the tools. It also, helped to estimate the time needed to fill out tools of data collection. According to the results of pilot study no modification was made. so, those who shared in the pilot study were involved in the study sample.

Ethical consideration:

Firstly, the study proposal was approved by the Research Ethics Committee (REC) and Postgraduate Committee of the Faculty of Nursing at Zagazig University (Appendix VI). Then, oral informed consent for participation was obtained from each subject after full explanation of the aim of the study. Participants were given the opportunity to refuse participation, and they were notified that they could withdraw at any time of filling out the questionnaire. Anonymity of each elderly was protected by the allocation of code number for each elderly. They were assured that the information would be confidential and used for research purpose only.

Administrative issues

Before starting any step in the study, an official letter containing the aim of the study was issued from post graduates affairs at faculty of nursing Zagazig University to the director of out-patient clinics in Zagazig University Hospitals explaining the nature and aim of this study and seeking cooperation facilitating the role of researchers in data collection.

Statistical Analysis:

Data collected was revised, coded and entered using Personal Computer (PC). Computerized data entry and statistical analysis were fulfilled using the Statistical Package for Social Sciences (SPSS) version 22. Data were presented using descriptive statistics in the

form of frequencies, percentages and Mean $\pm$ SD. A correlation coefficient "Pearson correlation" was used to measure the relationship between two variables. Chi-square (χ^2) was used to determine the relationship between categorical variables. Linear regression analysis was used to predict the value of a variable based on the value of another variable.

Results:

Regarding Sociodemographic characteristics of elderly diabetic foot ulcer patients, the studied elderly' mean age was 64.82 ± 3.57 and 53% of them their ages ranged from 60 to less than 65 years old. Also, 67% of them were males and 60.5% of them were married. As regards educational level, 42.5% of them had secondary education and 21% of them were read and write. Concerning professions before retirement, 57% of them were employees and all of them reported not working currently. Regarding their monthly income, 91% of them reported that it is not enough.

Regarding elderly patients' medical history, 41% of the studied patients reported suffering from diseases rather than diabetes and 64.6% and 47.6% of them suffered from hypertension and cardiac diseases respectively. Regarding mean time of suffering from diabetes, it was $\bar{x} \pm S.D$ 17.32 ± 1.93 and 63.5% of them suffered from it since 15 to less than 20 years. Additionally, 23% of them reported having family member of diabetic foot with a degree of kinship father (76.1%). Furthermore, 94.5% of them had insulin as a diabetic treatment and 30.5% of them were smokers.

Table 1 clarifies that 88.5% of the studied patients reported ability of reaching the bottoms of feet and examine them and all of them checked their feet regularly, they did so when they have a problem (73.5%) or once a week or less (14%). Additionally, all of them reported washing their feet daily, 45.5% of them soaked their feet in warm water every day, and 44.5% of them put moisturizing creams or Results lotions between fingers. Moreover, 67.5% of them never walked with feet bare, 33.5% of them wearied soft socks and 87.5% of them were changing shoes when are damaged. Also, all of them reported never wear shoes without socks and 94.5% of them reported always check shoes for the presence of foreign objects.

Table 2 clears that 62% of the studied elderly had unsatisfactory diabetes self-management. Moreover, they had satisfactory glucose management and health -care use (44.5% & 39%) respectively. While they had unsatisfactory physical activity and dietary control (69.5% & 62.5%) respectively.

Table 3 indicates that female gender, being married, having high education and enough income are statistically significant independent positive predictors of total self-management score, meanwhile age is statistically significant independent negative predictor of self-management. The results of r-square shows that the model accounts for 43% of variation in this score .

Table 1: Distribution of the studied elderly patients according to their past history of diabetes self-care before ulcers “foot care” (n=200).

Items	N	%
Can reach the bottoms of feet and examine them		
Yes	177	88.5
Check feet regularly		
Yes	200	100.0
Frequency		
Daily	8	4.0
From 2-6 times a week	17	8.5
when having problem	147	73.5
Once a week or less	28	14.0
Wash feet every day		
Yes	200	100.0
Soak feet in warm water		
Yes	91	45.5
No	109	54.5
Put moisturizing creams or lotions between fingers		
Yes	89	44.5
Walk bare foot		
Yes	19	9.5
No	135	67.5
Sometimes	46	23.0
Kind of socks weared		
Soft socks	67	33.5
Synthetic	0	0
Wool	33	16.5
Cotton	42	21.0
Polyester -Synthetic Fibers	56	28.0
Diabetes socks	2	1.0
Change shoes when		
Damaged	175	87.5
Once a year	25	12.5
More than once a year	0	0
Wear shoes, without wearing any socks		
Yes	0	0
Always check shoes for the presence of foreign objects		
Yes	189	94.5

Table 2: Distribution of the studied elderly according to their total domains of diabetes self-management (n=200).

Items	Satisfactory		Unsatisfactory	
	No	%	No	%
Glucose management	89	44.5	111	55.5
Dietary control	75	37.5	125	62.5
Health -care use	78	39.0	122	61.0
Physical activity	61	30.5	139	69.5
Total	76	38.0	124	62.0

Table 3: Multiple Linear regression model for total self-management (n=200).

		Unstandardized Coefficients		standardized Coefficients			
		<i>B</i>		<i>B</i>		<i>T</i>	<i>P. value</i>
Gender (Female)		0.176		.115		2.223	<0.05*
Age		-0.218		.164		2.790	<0.05*
Marital status (Married)		0.276		.221		4.602	<0.01**
Education level (High)		0.302		.257		5.100	<0.01**
Income (Enough)		0.188		.125		2.219	<0.05*
Model	R²	Df.		F		P. value	
Regression	0.43	4		7.409		<0.01**	

a. Dependent Variable: total **self-management**

b. Predictors: (constant): Gender (Female), Age, Marital status (Married), Education level (High), Income (Enough)

Discussion:

Diabetic foot ulcer (DFU) is a major medical, socioeconomic problem and a leading cause of morbidity and mortality, especially in the developing countries. Following a diagnosis of diabetic foot ulcer, more intensive surveillance and aggressive care by a multidisciplinary team involved in diabetic foot care may improve patient's outcome and reduce risk of the amputation (**Zubair et al.,2023**) Self-care practice (SCP) is necessary therapeutic treatment that aims to improve the pathological, psychological, emotional and social domain, in order to cure chronic disease patients (**Mayberry & Osborn, 2022**)

One of the noticeable findings of the current study was that more than two third of diabetic elderly patients included in the study were males. Possible explanation of this result is that diabetic men are at increased risk of foot ulcers or amputation compared with diabetic women (**Charles & Thomas, 2021**). This finding is supported by **Mohsen and Shehata (2022)** who published their study about foot self-care: knowledge, practice and barriers among elderly diabetic patients in Menoufia University and found that 55% of their study were male. In disagreement with **Mohamed (2022)**, in Bennah, Egypt, who studied factors contributing to diabetic patients' foot ulcers and concepts of prevention as perceived by geriatric nurses and reported that 83.5% of the study were female.

Concerning age, the present study revealed that studied elderly mean age was 64.82 ± 3.57 years. This result might be attributed to the fact that diabetic foot problems are unusual in young age patients, and occur most commonly in those aged 60 years and older. However, **Charles & Thomas (2022)** reported that duration and control of diabetes are greater predictors of diabetic foot problems than chronological age. This finding is in agreement with **Al-Sayah et al. (2022)**, in Canada, who studied experience in diabetic foot management, and stated that the mean age of the patients presented with diabetic foot ulcer in the study was 64.75 ± 3.53 years.

Concerning duration of being diabetic, the present study results revealed that, slightly less than two third of patients included in the study were diabetic since 15 to less than 20 years with mean 17.32 ± 1.93 years. This long disease duration could explain the relatively DM-related complications among them. It is known that the complications of diabetes, especially the neuro vascular problems (e.g. DFU) increase with advancing age. This result agrees with the result of **Baye et al. (2022)** in Babol, North of Iran: who found that 65% of patients in their study were diabetic for 11-20 years and in accordance with **Abd Elrazak (2021)** in Tanta, Egypt, who reported that about one half of patients had diabetes of more than five years, and this finding might be due to the chronicity of the disease.

As regards family history of diabetes, the present study results revealed that almost one quarter of patients had positive family history of diabetic foot. This indicates that, family history may not essentially play significant role in increasing the incidence of diabetic foot ulcer. This finding is in agreement with **Abd-Elrazak (2021)**, who reported that elderly diabetic patients were having positive family history of diabetic foot (26%). Also, **Margolis (2022)**, in Bangladesh stated that, the lowest percentage of chronic disease among elderly patient's family in both groups were diabetes. In the same stream, the result of **Mokhtar (2022)** in Tanta, revealed that 24.5% of studied elderly sample had a family history of diabetic foot.

Meanwhile, almost two third of the studied elderly patients reported suffering from hypertension and almost half of them had cardiac diseases. This might be related to that hypertension and cardiac disease are commonly occurring disease after age 40 years and comorbidity of diabetes and hypertension is common. This result is in agreement with **Ali (2022)**, in Bannah, Egypt, who found that 55% of the elderly sample suffered from hypertension and cardiac diseases.

Considering self-care practices before occurrence of foot ulcers, all participants reported washing feet daily, this is quite expected as it is usually done for prayer in the process of ablution. Also, the highly reported practices were, moisturizing dry areas of the feet daily, never walking barefoot, cleaning the wound with warm water if having a cut on foot or when trimming nails, never wear shoes without wearing any socks and always check shoes for the presence of foreign objects. Possible explanation is that these practices would not cost any money or need any health literacy. these costless practices would save elderly diabetic patients lot of direct and indirect costs.

In line with this, **Buysman et al. (2022)** in the United States of America found that adherence to DFU preventive practices only would lead to significant reductions in healthcare costs. The finding is consistent with that of **Seid and Tsige (2022)**, in London who found that 85% the elderly diabetic patients wash foot daily, daily checking feet for injury and cleaning the wound with warm water if having a cut on foot or when trimming nails.

Concerning self-care practices, the results indicated that less than two third of elderly had unsatisfactory foot self-care practices. This low level of adequate foot self-care practice might be related to the patients themselves as education, income, residence(rural) and limited functional abilities. or their living conditions. Thus, a longer DM duration seems to have a negative influence on patients' practice of foot self-care. This might be explained by the boredom patients feel with the longer years they suffer from disease. This may make them more reluctant to abide with their foot care.

In agreement with this finding, **Al-Sayah et al. (2022)** in a study carried out in Canada on elderly patients with DFU showed that the participants' practice of self-care was low particularly regarding foot self-care, which was properly practiced by only 14% of them. Meanwhile, a percent of adequate practice close to the current study was reported by **Desalu et al. (2021)** where 40% of the elderly participants had adequate practice. In congruence with this, a study in India revealed low adherence to DFU management among elderly diabetic patients, and this was attributed to their lack of related knowledge and health literacy (**Chavan et al. ,2021**).

As for domains of diabetes self-care practices, around two third of elderly were not following dietary control, furthermore, more than two third of them were not following physical activities. This might be due to their old age which make them unable to perform regular physical activities. Also, the long history of diabetes and its related food restrictions which make it difficult to comply all time.

Also, **Al Dawish et al. (2022)**, in Saudi Arabia reported that 67% of elderly DFU sample weren't following dietary control. As well, **Emerenziani et al. (2021)**, in Italy reported that 78% of elderly DFU sample weren't following physical activities.

As regards patients' compliance to glucose management and follow-up, the current study results revealed that more than half of them had no regular checkup of their blood glucose and had no regular health care use (follow up). The findings point to a major deficiency in those patients' health care practices that need to be addressed by their providers. In agreement with this, a study in Iran by **Tol et al. (2022)** revealed that foot self-care practices were better among elderly diabetic patients practicing regular blood glucose. In the same line, a study in Italy (**Napolitano et al.,2021**) showed that only approximately 40% of the elderly patients were adherent to their medications and follow up.

I. Gender and self-care practices:

The present study revealed that there was significant positive relation between self-care practices of elderly DFU patients and their gender, where female gender was an independent positive predictor for self-care practices. This might be due to that females tend to feel more worried about their disease complications, and also, it is the nature of women to bear

responsibility about others and self. In accordance with **Namazi et al. (2021)** in Iran who reported that females appear to be more compliant with self-care practices than men. Moreover, **Lee (2022)** in China added that the percentage of poor compliance was similar between the two sexes. In the same line, a study in Brazil revealed better knowledge and glycemic control among elderly females (**Lemes Dos Santos et al., 2021**).

II. Age and self-care practices:

The present study revealed significant negative relation between self-care practices of elderly DFU patients and their age. The patient's age was independent negative predictor for self-care practices, where younger patients had more self-care practices score. From the researcher point of view, this finding might be attributed to physical abilities to care for self which decline with advancing age and feeling of hopelessness and graving these changes force elderly not to adhere to good self-care behaviors. On the contrary to the results of the current study, **Abbasi (2021)** in Iran found no relationship between self-care practices and age.

III. Marital status and self-care practices:

The present study revealed significant positive relation between self-care practices of elderly DFU patients and their marital status. it was found that being married was an independent positive high significant predictor for self-care practices. This might be attributed to married patients have better support and enough care from their spouses that increase their self-care practices adherence. Similarly, **Abo Ali et al. (2021)**, in Tanta the relation with marital status was confirmed through Multiple Linear regression model, which identified being married as a significant positive predictor of patient's practice.

III. Educational level and self-care practices:

This study findings revealed a statistically significant positive relation between self-care practices and educational level. High educational level was an independent positive high significant predictor for self-care practices. This means that patients with high educational level, were having a high self-care practice. Furthermore, these findings might be attributed to the fact that high educated people know the importance and benefits of engagement in self-care behaviors, and they have a better access to different health promotion resources. Also, high educated people are more aware of the negative consequences of unhealthy behaviors on their health. High educated patients have self-confidence and more awareness. In agreement with this, a recent study in the United Arab Emirates revealed that illiteracy was a significant risk factor for increased foot complications among elderly DFU patients (**Al-Kaabi et al.,2023**). In contrast with other study in Tanzania revealed that noncompliance with self-monitoring blood glucose (SMBG) was noted in high level educated patients (**Chiwanga & Njelekela ,2023**).

V. Income and self-care practices:

The present study revealed significant relation between self-care practices of elderly DFU patients and their income, where enough income was an independent positive significant predictor for self-care practices. Possible explanation might be having enough income help patients to get equipment or supplies needs for self-care. The effect of Socioeconomic level is

clear in improving patients' disease and its complications, and the better economic level helps them to comply with needed provisions. This indicates that a higher socio-economic level is reflected on better health behavior. In agreement with this, a study in Iran by **Abbasi (2021)** revealed that socioeconomic status is considered one of the positive factors among elderly DFU patients of successful Self-Care behaviors.

Conclusion:

The current study results bring about the conclusion that, diabetic self-care tended to be unsatisfactory especially the physical activity and dietary control domain.

Recommendation:

Based on findings, the study recommended:

- 1-Empowerment program about self-care practices should be directed to diabetic elderly patients at an early-stage to tackle the occurrence of DFU.
- 2-Illustrative teaching materials about self-care practices in simple Arabic language should be available to elderly DFU patients and their caregivers.
- 3- Replicate the study on larger sample to permit for generalization.

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