



Comparative Study of the Physical Self-concept and Foot Care Self-efficacy in Non-insulin-dependent Diabetic Patients with and Without Diabetic Foot Ulcers

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ABSTRACT

Aim: In the hospital, diabetic foot ulcer is the most common cause of hospitalization of diabetic patients and the most common cause of non-traumatic lower limb amputation, which leads to increased health costs. The present study was conducted with the aim of investigating the relationship between self-efficacy beliefs in foot care and physical self-concept in people with diabetes.

Method and Materials: This study was descriptive-cross-sectional. Participants who were suffering from diabetes and referring to specialized Ahmadiyeh clinic of Torbat Hehdariyeh of Khorasan province in Iran were assessed. They were selected through systematic random sampling method. Participants completed a self-report foot Care Self-efficacy (FCS) questionnaire. Data were analyses using SPSS 24.

Findings: There was a positive and relatively strong relationship between foot care self-efficacy and physical self-concept in patients with non-insulin-dependent diabetes mellitus with and without diabetic foot ulcers ($P < 0.001$) respectively. There was no relationship between foot care self-efficacy, body self-concept, except the duration of the disease and age, which had a negative and weak relationship with other variables ($p > 0.05$).

Conclusions: This study showed the non-insulin-dependent diabetes mellitus patients who have better physical self-concept had higher foot care self-efficacy.

Keywords: Diabetes, Body Self-concept, Foot Care, Self-Efficacy.

Introduction

Diabetes Mellitus (DM) is the most common chronic disease in the world, which causes major problems for individuals and society, and is considered an emerging public health problem due to its high prevalence and association with cardiovascular diseases and even mortality^[1]. Annually in the world, there are about 4.6 million deaths due to diabetes and it is one of the ten leading causes of global disability that undermines productivity and human development^[1]. Carrying out and continuing self-care behaviors is directly related to the reduction of complications and mortality, so that compliance with self-care programs reduces more than 50% of the incidence of complications^[2]. In a previous

research it was proved that the rate of adherence to treatment in diabetics is significantly low^[3]. The global prevalence of diabetes was estimated to be 8.5% in 2016, and one out of every 10 adults will be diagnosed with diabetes by 2035^[4]. Education is an important aspect of diabetes management that improves quality of care and other health indicators and reduces treatment costs^[5]. Since the health of the lower limbs plays a decisive role in productivity and the feet are exposed to all kinds of fungal, infectious, neurological, traumatic and chronic diseases, especially in diabetics patients, special attention has been paid to their care and treatment in developed countries^[6].

Teaching the patient is one of the appropriate measures. A patient with diabetes may suffer from a number of underlying diseases that lead to problem in the foot [6]. The concept of physical self-concept and Foot care self-efficacy has been shown to be effective predictors of Foot care behavior in many health issues [6]. This study investigated the relationship between foot care self-efficacy beliefs and physical self-concept in people with diabetes.

Method and Materials

This study was descriptive-cross-sectional. Participants who were suffering from diabetes and referring to Ahmadih specialized clinic. They were selected as systematic random sampling method. Participants completed the Foot Care Self-Efficacy Questionnaire (FCS). Samples were selected regularly from individuals or members of the community who referred to the clinic. The sample of this study included 450 diabetic patients referred to Ahmadih specialized clinic in Torbat Heydariyeh of Khorasan province in Iran.

They were eligible for a previous study enrollment [7]. Participants completed a short demographic characteristics questionnaire. The research instrument includes the with 15 questions that assesses patients' foot care self-care metrics over the past seven days and includes an understanding of a person's beliefs and judgments about her/his ability to do work due to her/his responsibilities. Another questionnaire is Short body self-concept questionnaire (Marsh et al.) [8] which includes 40 questions to measure 9 specific components (health, coordination, physical activity, body fat, athletic fitness, appearance, authority, flexibility and endurance (two general components), overall body self-concept and dignity. The validity of the tool calculated in terms of content and reliability. The sample of this study were included 450

diabetic patients who referral to specialized Ahmadih clinic of Torbat Heydariyeh in Khorasan province. Cochran's formula was used to estimate the sample size $n = \frac{Z^2 P(1-P)}{d^2}$ in which $Z = 1.96$, $p = 0.12$ and $d = 0.03$ were considered, so the sample size of 450 patients was calculated through.

The method of systematic sampling was used to select the participants. Inclusion and exclusion criteria were as being as: Non-insulin-dependent Diabetic Patients with and Without Diabetic Foot Ulcers.

Data were analysed using SPSS 24, Frequency and Pearson correlation method were used for analysis of descriptive data regarding physical self-concept, self-care, age, gender, and marriage. Furthermore, t-test and analysis of variance were used for analysis of analytical data. Linear regression model was used to investigate correlation between foot care self-efficacy and body self-concept as well as self-care and foot care self-efficacy. Furthermore multiple regression was used to investigate the relationship between foot care self-efficacy and body self-concept and to assess the relationship between self-care and variables such as marital status, education and gender. K-S test was used.

Findings

The first part of data was related to the demographic characteristics of the study sample. In this study, the average age of the subjects was 52.53 ± 12 years and most people were over 45 years old. The majority of the studied patients (92.4%) in this study were obese, Table 1 shows all demographic variables of the assessed participants. The relationship between foot care self-efficacy and its quantitative variables is shown in Table 2. According to this Table, two variables of age and duration of the illness have significant relationship with physical self-concept.

The relationship between two variables of

care self-efficacy and physical self-concept with the quantitative variables is shown in Table 2. According to this Table two variables of age and duration of disease have negative relationship with foot care self-efficacy and physical foot self-concept. This means that with increasing age, body self-concept will be relatively low. There is a relationship between the duration of the disease and body self-concept. This means that as the duration of the disease increases,

body self-concept will be relatively low. There is no significant relationship between other demographic variables and body self-concept ($p>0.05$).

To investigate the relationship between independent variables including self-efficacy of foot care and physical self-concept with each other, Pearson's correlation coefficient was examined and tested. According to the results obtained from the study, it can be said that there is a relationship between physical

Table 1) Participant demographic characteristics (n=450)

Demographic variable	Age group	N (%)		P-value
		with ulcer	without ulcer	
Age (M± SD) 52.53±12.00	21-24	0(0)	2 (0.9)	0.80
	25-29	1 (0.4)	5(2.2)	
	30-34	2 (0.9)	8 (3.6)	
	35-39	6 (2.7)	9 (4.0)	
	44-40	54(24)	16(7.1)	
	≥ 45	162 (72)	185 (82.2)	
	Total	225 (100)	225 (100)	
Education Level	Illiterate	133 (69.1)	117 (52)	0.27
	Diploma	70 (31.1)	68(30.2)	
	Bachelor degree	15 (6.7)	30 (13.3)	
	Masters degree and higher	7 (3.1)	10(4.4)	
	Total	225(100)	225 (100)	
Gender	Female	111(49.3)	156 (69.3)	0.35
	Male	114(50.7)	69 (30.7)	
	Total	225 (100)	225(100)	
Marital status	Single	26 (11.6)	24 (10.7)	0.79
	Married	175 (77.8)	187 (83.1)	
	Divorced	19 (8.4)	9 (4.0)	
	Widow	5 (2.2)	5 (2.2)	
	Total	225 (100)	225 (100)	
Duration of illness (M± SD) 21.5 ± 19.3	Less than 1 year	37	18	0.27
	≤5 year	125(55.5)	132(53.7)	
	6 -10 years	57 (25.3)	58(25.7)	
	≥ 10 years	6 (2.7)	17(7.55)	
	Total	225	225	

Table 2) The relationship between foot care self-efficacy and and physical foot self-concept with quantitative variables

Variables	Foot care self-efficacy		Physical self-concept	
	Pearson Coefficient	P- value	Pearson Coefficient	P- value
Age	-0.250	0.008	-0.257	0.007
Duration of illness	-0.167	0.004	-0.134	0.004
Fasting blood sugar level	0.050	0.286	0.022	0.644
Hemoglobin level	-0.052	0.290	-0.050	0.292

self-concept and foot care self-efficacy with ($P < 0.01$) On the other hand, this relationship, which is equal to 0.596, is direct (positive) and relatively strong, which means that as body self-concept increases, foot care self-efficacy will also be relatively high.

Investigating the relationship of each qualitative variable with foot care self-efficacy, physical self-concept: t-tests, analysis of variance. Pearson's correlation was used to examine the relationship between qualitative demographic variables and foot care self-efficacy variables and physical self-concept. For this self-efficacy foot care score and physical self-concept were compared and tested between the levels of qualitative demographic variables, In the case of two-level qualitative variables, independent t-test was used, and for qualitative variables with more than two levels, one-way analysis of variance was used.

Discussion

The need for preventive programs is essential for health and well-being of individuals with diabetic foot ulcers. Diabetic foot is a common, serious, and costly complication could be led to amputation. The number of diabetic patients with foot ulcers is increasing in the middle age group.

However, it has been argued that just few people inform about the impact of physical

self-concept and foot care self-efficacy in patients with diabetic foot ulcers. Clinics seem to be an ideal setting to support these patients, only a few studies have evaluated the comparison between physical self-concept and foot care self-efficacy in the patients.

There is a hypothesis that based on the present study, foot care is a vital step in treating or preventing the spread of diabetes to the patient's feet. This study aimed to determine the relationship between body self-concept and self-efficacy of foot care behaviors.

In previous studies it was shown that in terms of gender, the majority of the samples were women who suffered from diabetes [9,10]. A previous study regarding epidemiology of diabetes in Iran showed that that in more provinces, the prevalence of the disease among women compared to men is higher [10].

An existed study [11] in Iran showed 9.36% of patients suffered from diabetic foot ulcers. However, foot ulcers in present study was observed in individuals over 40 years old. The rate of diabetic foot ulcer among women and men in the present study was consistent with the previous study [10]. Body weight is also considered as a risk factor for leg ulcers in the study. [9] In comparison with previous study [13] the rate of obesity in our study was higher.

Diabetic foot ulcer is the most common cause of hospitalization in diabetic patients and its treatment is expensive. In developed countries, more than 5% of diabetic patients have foot ulcers, and if not treated quickly and properly, it leads to blood infection and gangrene and sometimes to amputation. According to the International Diabetic Foot Study Group classification (IWGDF), 70% of patients were in high-risk groups for diabetic foot ulcers^[13].

In Hosseini et al.'s study on the risk factors of diabetic foot ulcers in patients referred to the diabetes clinic of Qom's educational-therapeutic center, it was shown that in groups with a higher risk of diabetic foot ulcers, factors such as age, duration of diabetes and the illiteracy were significantly higher^[14].

Self-concept plays an important role in human daily life and it is very important to be paid attention, especially in people who suffer from chronic diseases. In a previous study, it was shown that with the improvement of the quality of life of patients with type 2 diabetes and its improvement, the level of self-concept of these patients increased for the purpose of physical, mental and psychological prevention. Mental problems are mental complications caused by this chronic disease^[15]. Therefore, in the current study, majority of the patients had poor self-concept. On the other hand, the present study also showed that body self-concept and foot care self-efficacy were significantly related in the group without diabetic foot ulcers. This difference could be due to differences in inclusion criteria, where our study focused on an older population living with a short-term care. While the other study includes adults who live in the community, near which there was a special care institution^[15].

Considering that self-efficacy is of great importance as the most important

determinant of self-care behaviors in diabetic patients, the need to strengthen it is felt and it should be emphasized in educational programs. In a study, the self-efficacy level of 220 diabetic patients referred to a health center was moderate. In this mentioned study^[12] there was a statistically significant relationship between the level of self-efficacy of diabetic patients with the variables of age and body mass index. However, in the present study, with increasing age and duration of the disease, the self-efficacy of foot care was relatively decreased.

A person's self-knowledge is related to his self-efficacy and self-concept. In the present study, there was a direct (positive) and relatively strong relationship between physical self-concept and foot care self-efficacy. The findings of this study are consistent with an existed study conducted on foot care management^[16]. Knowledge of risk factors for diabetic foot complications, foot care practices and self-care as well as use of foot care health behavior, foot care self-efficacy (efficacy-expectancy), foot care outcome expectation, foot care awareness were suggested by another document^[16]. In an existed study, the calculated mean score of foot care self-efficacy in the case group before the educational intervention with the concept map model as an intervention was 52.02 and after using the concept map model as an educational intervention, it was significantly increased. The score of foot care behavior in the case group improved significantly after the intervention^[16].

According evidences some of the most common symptoms of ulcers among people with diabetes include skin discoloration, blisters on the feet, red veins, tingling in the feet, stains on the socks, and changes in shape of the foot. However, it is also obvious that not all of these symptoms appear in the same person at the same time. Various factors such as the stage of diabetes progression, a

person's health, and a person's lifestyle are effective in determining the nature of the symptoms that a person experienced. The stage of the leg ulcer is also necessary to determine the symptoms that be appeared. The most important thing is for people to make sure they notice these changes and act before it becomes too late^[16]. Hence, it can be concluded that foot care self-efficacy training has been effective in improving the level of awareness of the studied group.

In the present study, greater self-efficacy was related with frequent foot care like taking medicine and overeating and following an ideal diet which is associated with Aljasem outcomes^[17], In addition , another document^[18] has shown that there are positive and significant direct paths from self-efficacy to diabetes self-care, which is in the line of the present study.

These findings were confirmed in both studies^[20 ,19] in which the patients with higher self-efficacy had better self-care behaviors. In the current study, the variables of illness duration and education also effect on physical self-concept significantly. In this regard, according to another study, factors like seminars and series of follow-ups as reminders strengthen the self care meaningfully^[21]. Therefore, it is effective in helping the function of elderly diabetic patients and foot self-care behavior through regularly supporting by other significant individuals. Recent clinical guidelines on diabetic foot problems recommend that complications of diabetes can be prevented with foot care education, protective footwear, and a professional foot physical examination^[21].

According the limitation of this study, it should be said that older patients with diabetes lived in different regions, so making regular clinic visits by a local health care provider was more difficult. Due to the chronic nature of the disease and the fact

that the main responsibility for care of the disease should be done by the patients, so patients must do special self-care behaviors until the end of their live. ^[22]. In most time, in the treatment and care of chronic patients, important psychological and social effects are ignored and the treatment is not patient-centered. Rather, the patient is expected to obey the doctor's opinions. Sometimes, just specific treatments are determined and completed, regardless of the patient's readiness for self-care. The importance of patient-centered methods with emphasis on empowering patients, as well as community-centered methods by transferring attention from hospitals to the patient's natural living place, are receiving more attention in updated guidelines.

The other limitations of our study are related to the patient's self-reporting and the lack of time to complete the questionnaires even though the clients were satisfied to complete them. Furthermore, the client's illiteracy and inability to complete the questionnaire was another limitation of the study. However, the findings of this study were supported by other valid studies and this is a kind of strength points of the study.

Conclusion

In Ahmadih of Torbat Heydarieh specialized clinic, there is a strong need to receive a preventive program in order to improve proper physical self-concept and foot care self-efficacy.

We need to implement a program that can target physical self-concept and foot care self-efficacy and could be applicable over long periods of time that the findings of this study is in this line. However, a comparative study should be done to be an accessible health promotion intervention, especially in patients with non-insulin-dependent diabetes mellitus with and without diabetic foot ulcers.

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Authors' Contributions

All authors participated in the design of the study. MHD is the main investigator and drafted the manuscript. BH supervised the study and contributed to all aspects of the study. All authors critically revised the manuscript also they read and approved the final manuscript.

Competing Interests

The authors declare that they have no competing interests.

Ethical Permission

This study has been approved by the ethics committee of Shiraz University of Medical Sciences under the code IR.SUMS.REC.1400.468, 12th September 2021, All participant in the study completed the written consent form.

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References

1. Tesfaye T, Shikur B, Shimels T, Firdu N. Prevalence and factors associated with diabetes mellitus and impaired fasting glucose level among members of federal police commission residing in Addis Ababa. *BMC Endocr. Disord.* 2016; 16:68 .doi: 10.1186/s12902-016-0150-6
2. Ethiopia Navidian A, Yaghoubinia F, Ganjali A, Khoshsimae S. The Effect of Self-Care Education on the Awareness, Attitude, and Adherence to Self-Care Behaviors in Hospitalized Patients Due

- to Heart Failure with and without Depression. *PLoS One.* 2015;10(6):e0130973. doi: 10.1371/journal.pone.0130973.
3. Mehdizadeh Tazangi R, Bizhani M, Karimi S, Naghizadeh M M, Khani Jeihooni A, Rahimzadeh M H. The Effectiveness of Peer Group-Based Training in Adherence to Treatment of Adults with Diabetic Foot Ulcer. *J Adv Med Biomed Res.* 2022; 12(1):41-50 URL: <http://jabs.fums.ac.ir/article-1-2705-en.html>
4. World Health Organization, Global report on diabetes, World Health Organization 2016.
5. Chen F, Jasik CB, Dall TM, Siego CV. Impact of a Digitally Enhanced Diabetes Self-Management Program on Glycemia and Medical Costs. *Sci Diabetes Self Manag Care.* 2022;48(4):258-269. doi: 10.1177/26350106221100779. Epub 2022 Jun 4.
6. Ousey K, Chadwick P, Jawień A, Tariq G, Ragavan Nair HK, Lázaro-Martínez JL, et al. Identifying and treating foot ulcers in patients with diabetes: saving feet, legs and lives. *J. Wound Care.* 2018;27(sup) doi.org/10.12968/jowc.2018.27.Sup5.S1
7. Pourhaji F, Honarvar B, Delshad MH. Short Form psychometric evaluation of foot-care self-efficacy in promoting diabetic foot ulcer self-care behaviors, working with older people. [in press].
8. Marsh, H W. The measurement of physical self-concept: A construct validation approach. In K. R. Fox (Ed.), 1997; The physical self: From motivation to well-being (pp. 27–58). Human Kinetics.
9. Barber GA, Weller CD., Effects and associations of nutrition in patients with venous leg ulcers: A systematic review. *J Adv Nurs* 2018;74 (4):774-787
10. Kitabchi AE, Umpierrez GE, Miles JM, Fisher JN. Hyperglycemic Crises in Adult Patients With Diabetes. *Diabetes Care.* 2009;32(7): 1335–1343.
11. Ali S, Basit A, Sheikh T, Mumtaz S., Hydrie M., Diabetic foot ulcer-a prospective study, *J Pak Med Assoc.* 2001 51(2):78-80.
12. Esmailnasab N, Afkhamzadeh A, Ebrahimi A, Effective Factors on Diabetes Control in Sanandaj Diabetes Center, *IRJE* 2010; 6(1): 39-45. <http://irje.tums.ac.ir/article-1-92-fa.html>.
13. van der Bijl JJ, Shortridge-Baggett LM. The theory and measurement of the self-efficacy construct. *Sch Inq Nurs Pract.* 2001 Fall;15(3):189-207.
14. Hosseini R, Rasouli A, Baradaran HR. Diabetic risk factors of diabetic foot ulcer in patients referred to diabetes clinic of Kamkar educational-therapeutic center in Qom city, 2015, *Qom Univ Med Sci J* 2008, 2(3): 25-32.
15. Yen-Fan Chin RN, Tzu-Ting Huang RN, PhD, Brend Ray-Sea Hsu MD, PhD Impact of action cues, self-efficacy

- and perceived barriers on daily foot exam practice in type 2 diabetes mellitus patients with peripheral neuropathy. *J. Clin. Nurs* 2013; 22(1-2): 61-68.
16. Johani RMA, Elgamil A, Al Nagshabandi EA. Effectiveness of Concept Map as Diabetic Foot Care Educational Intervention among Type 2 Diabetic Patients, *Am. J. Nurs. Res.* 2019; 5(1): 1-11
 17. Aljaseem LI, Peyrot MW, Wissow L, Rubin RR. The impact of barriers and self-efficacy on self-care behaviors in type 2 diabetes, *Diabetes Educ.* 2001;27(3):393-404.
 18. Gao J, Wang J, Zheng P, Haardörfer R, Kegler MC, Zhu Y, et al., Effects of self-care, self-efficacy, social support on glycemic control in adults with type 2 diabetes, *Comparative Study BMC Fam Pract* 2013;14:66. doi: 10.1186/1471-2296-14-66.
 19. Mohamed EI, Meshref RA, Abdel-Mageed SM, Moustafa MH, Badawi MI., Darwish SH. A novel morphological analysis of DXA-DICOM images by artificial neural networks for estimating bone mineral density in health and disease. *J. Clin Densitom* 2019;22(3) :382-390.
 20. Zhao J, Zhu Y, Hyun N., Zeng D, Uppal K, Tran VT. et al., Novel metabolic markers for the risk of diabetes development in American Indians. *Diabetes Care* 2015;38(2):220-7
 21. Hingorani A, LaMuraglia GM, Henke P, Meissner MH, Loretz L, Zinszer KM, et al. The management of diabetic foot: a clinical practice guideline by the Society for Vascular Surgery in collaboration with the American Podiatric Medical Association and the Society for Vascular Medicine. *J. Vasc. Surg.* 2016;63(2): 3S-21S.
 22. Mohamadzadeh S, Ezate G. A determination of self-care performance among diabetic patients in endocrine clinic of Taleghane hospital in Tehran. *Iran. J. Nurs. Res* 2014; 8(4): 11-18.