



Physical Body Self-Concept and Foot Care Self-Efficacy in Preventing Diabetic Foot Ulcers

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ABSTRACT

Aim: Diabetic Foot Ulcer (DFU) is the most common reason for non-traumatic lower limb amputation, which is most costly. This study aimed to investigate the relationship between body self-concept and foot care self-efficacy with diabetic foot ulcer.

Method and Materials: In this cross-sectional study 450 diabetic patients including 225 patients with foot ulcer and 225 patients without foot ulcer were selected randomly and assessed. Participants were asked to complete demographic questionnaire as well as two self-report questionnaires of Foot Care Self-efficacy (FCSE) and Body Self-Concept (BSC) questionnaires. Data were analyzed through descriptive/analytical tests by SPSS version 24.

Findings: Totally, 450 diabetic patients with and without foot ulcer (225 participants in each group) were assessed. The mean scores of FCSE of patients with and without foot ulcer were 29.24 ± 6.65 and 47.52 ± 11.01 respectively which was significantly different ($P < 0.001$). Moreover, these scores of body self-concept of patients with and without foot ulcer were 60.24 ± 8.60 and 84.36 ± 11.41 respectively which was different significantly ($P < 0.001$).

Conclusions: This study verified diabetic patients who suffering from foot ulcer had lower beliefs regarding foot care self-efficacy and body self-concept. Therefore, practicing with these patients to improve their self-efficacy and self-concept is strongly recommended.

Keywords: Physical Body Self-Concept, Foot Care Self-Efficacy, Diabetic Foot Ulcer

Introduction

Diabetes Mellitus (DM) is an important health problem for individuals and society worldwide [1]. It is a common chronic disease that causes major consequences such as cardiovascular diseases which could be resulted in mortality [1]. Among complications of diabetic mellitus, foot ulcers are more serious and costly complication which may cause foot amputation [2]. The prevalence of foot ulcers in diabetic patients is increasing in few recent years [3]. It has been argued that physical foot care self-concept and self-efficacy could be important strategies to enhance preventive foot care behavior among diabetic patients [4]. In a recent study, McCleary-Jones [5] identified that self-efficacy was associated with foot self-care.

The other study revealed that those with higher self-efficacy also were more likely to perform regular foot self-care behaviors [6]. As physical self-concept and foot care self-efficacy declared on ones' own abilities to do self cares, it seems promoting self-efficacy and self-concept of diabetic patients could motivate them to care their foot during their disease. In this regard, an existed evidence revealed that there is a positive and relatively strong relationship between these beliefs of foot care self-efficacy and physical self-concept in patients with non-insulin-dependent diabetes mellitus with and without diabetic foot ulcers respectively [7]. In this regards this study aimed to evaluate the relationship between foot care self-efficacy and physical self-concept with diabetic foot ulcer.

Table 1) Comparison of demographic characteristics between participants with and without diabetic ulcer (n=450)

Demographics variable		With ulcer	Without ulcer	P-value
		N (%)	N (%)	
Age group (Yrs)	21-24	0 (0)	2(0.9)	0.80
	25-29	1(4)	5(2.2)	
	30-34	2(9)	8(3.6)	
	35-39	6(2.7)	9(4.0)	
	44-40	54(24.0)	16(7.1)	
	Above 45	162(72)	185(82.2)	
M±SD				
52.53±12				
Education Level	Total	225 (100)	225 (100)	0.27
	Illiterate	133 (59.1)	117(52.0)	
	Diploma	70(31.1)	68(30.2)	
	Bachelor's degree	15(6.7)	30(13.3)	
	Master's degree and higher	7(3.1)	10(4.4)	
Gender	Total	225(100)	225(100)	0.35
	Fmale	111(49.3)	156(69.3)	
	Male	114(50.7)	69(30.7)	
Number of children	Total	225(100)	225(100)	0.47
	without children	6 (2.7)	10(4.4)	
	One	29(12.9)	30(13.3)	
	Two	58(25.8)	57(25.3)	
	Three	81(36.0)	56(24.9)	
	Four	32(14.2)	47(20.9)	
	Five	14(6.2)	14(6.2)	
	Six	2(0.9)	5(2.2)	
	Seven	2(0.9)	5(2.2)	
	Eight and more	1(0.4)	1(0.4)	
Work experience (Yrs)	Total	225(100)	225(100)	0.57
	Less than 5 yrs	13(5.8)	20(8.9)	
	5-10 yrs	49(21.8)	39(17.3)	
	11-15 yrs	54(24.0)	50(22.2)	
	16-20 yrs	56(24.9)	54(24.0)	
Occupational status	M±SD			
	3.41±1.26			
	Total	225(100)	225(100)	0.63
	Farmer	150 (66.7)	134(59.6)	
	housewife	30(13.3)	80(33.6)	
	manual worker	18(8.0)	0(0)	
	Unemployed	10(4.4)	0(0)	
	Employee	4(1.8)	0(0)	
	Free Job	4(1.8)	0(0)	
Retired	9(4.0)	11(4.9)		
Total	225 (100)	225(100)		

Table 1) Comparison of demographic characteristics between participants with and without diabetic ulcer (n=450)

Demographics variable		With ulcer	Without ulcer	P-value
		N (%)	N (%)	
Economic status	Less than three million	67(30.2)	65(28.5)	0.45
	Three to five million	107(47.6)	104(45.9)	
	Five to seven million	37(16.4)	38(16.5)	
	Seven to nine million	13(5.8)	13(5.4)	
	Nine to eleven million	1 (0.4)	5 (1.8)	
	Total	225 (100)	100 (100)	
Place of residence	Village	63(28.0)	95(42.2)	0.79
	City	162 (72.0)	130(57.8)	
	Total	225 (100)	225(100)	
Marital status	Single	26 (11.6)	24(10.7)	0.27
	Married	175(77.8)	187(63.1)	
	Divorced	19 (8.4)	9 (4.0)	
	Widow	5(2.2)	5 (2.2)	
Total	225 (100)	225 (100)		
Duration of illness 21.5 ± 19.3	Less than 1 year	37 (16.8)	18 (8.0)	0.79
	1 year	35(15.6)	26(11.6)	
	2 years	22(9.8)	19(8.4)	
	3 years	18(8.0)	25(11.1)	
	4 years	28(12.4)	31(13.8)	
	5 years	22(9.8)	31(13.8)	
	6 years	23(10.2)	20(8.9)	
	7 years	11(4.9)	16(7.1)	
	8 years	6(2.7)	4(1.8)	
	9 years	1(4)	4(1.8)	
	10 years	16(7.1)	14(6.2)	
	More than 10 years	6) (2.7)	17(7.6)	
	Total	225 (100)	225 (100)	
BMI	Less than 18.5	4(1.8)	6(2.7)	0.72
	18.5 to 24.9 (ideal)	6(2.7)	11(4.9)	
	25 to 30 (obese)	50(22.2)	40(17.7)	
	30 to 35 (obese 1)	54(24)	53(23.5)	
	35 to 40 (fat 2)	87 (38.7)	97(43.1)	
	More than 40 (morbid obesity)	24(10.7)	18(8.0)	
	Total	225 (100)	225(100)	

Method and Materials

In this study 450 eligible diabetes patients who were referred to the specialized clinics and also comprehensive health service centers of Torbat Heydarieh, Iran were selected randomly. These participants provided with a consent form to be signed and then they were asked to complete demographic questionnaire and two self-report questionnaire of Foot Care Self-Concept (FCSC) and Foot Care Self-Efficacy (FCSE).

The inclusion criteria of this study were as being suffered from diabetes according to the national protocol or if their glycosylated hemoglobin (Hb A1C) was measured more than 6. The patients who had no disease history in the clinic or the comprehensive health service centers in the city were excluded from the study.

Foot Care Self-Efficacy (FCSE) Questionnaire included 15 questions that assessed patients' foot self-care metrics over the past seven days and also understanding of the patients regardingly. Answers to the questions of this questionnaire were evaluated on a 3-option scale from never to always (range 1 to 3). Therefore, the total score of this questionnaire ranges from 8 to 24 points, and a higher score indicates a better situation. Body Self-Concept (BSC) questionnaire (Marsh et al.)^[2] 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. Each of the questions was as a simple sentence that was answered on a six-point Likert scale from completely true to completely false, and a higher score indicated a better situation. Based on sample size formula 450 eligible diabetic patients were selected randomly.

The data were entered into SPSS version 24 and analyzed through descriptive and analytical tests. In this study all ethical principals were considered. Ethics committee of Torbat Heydarieh University of Medical Sciences confirmed this study.

Findings

In this study 450 participants including 225 participants with diabetic ulcer and 225 participants without diabetic ulcer were studied. The average age of the participants was 52.53 ± 12 years and most people were over 45 years old. Table 1 shows all studied demographic variables which compared between two groups of with and without diabetic ulcer.

Descriptive characteristics of patients' foot care self-efficacy in both groups of with and without diabetic ulcer has been shown in Table 2.

The independent t-test revealed that body self-concept in the group without diabetic

Table 2) Frequency distribution of foot care self-efficacy

Variable	Without diabetic foot ulcer	With diabetic foot ulcer	Total Frequency
	N (%)	N (%)	
Poor self-efficacy	72 (16)	225(50)	297 (66)
Medium self-efficacy	153(34)	0(0)	153(34)
Strong self-efficacy	0(0)	0(0)	0(0)
Total	225 (100)	225 (100)	450 (100)

Table 3) Comparison of the mean score of body self-concept and foot care self-efficacy in diabetic patients with and without diabetic foot ulcers

Studied variables	Mean	Standard Deviation(SD)	probability value
Foot care self-efficacy	No diabetic foot ulcers	47.5289	<0.001
	with diabetic foot ulcers	29.2400	
Body self-concept	No diabetic foot ulcers	84.3644	<0.001
	with diabetic foot ulcers	60.2489	

foot ulcers is significantly more than other group. Furthermore, the independent t-test showed that the foot care self-efficacy in the group without diabetic foot ulcers is significantly more than other group.

Discussion

This study investigated the relationship between body self-concept and foot care self-efficacy with diabetic foot ulcer. According the findings of this study the majority of the patients with foot ulcer had poor self-concept and also self-efficacy of participants who suffered from foot ulcer were significantly lesser than the patients without foot ulcer. The previous studies verified that self-concept plays a significant role in individuals' health and should be paid attention, especially in people who suffer from chronic diseases. Self-concept appears to be an important aspect that is associated with positive diabetes control. Identifying associations among adolescents' self-concept, their attitudes toward illness and disease severity, as well as family functioning will add to current knowledge and may also help in optimizing diabetes treatment by providing evidence-based practice in psychosocial care and improving treatment adherence^[8]. In an existed study, it was reported that with the improvement of the quality of life of the diabetic patients, the

level of their self-concept were increased, so that they were more motivated to care their physical, mental and psychological health^[9]. Diabetic foot ulcer (DFU) is the most common cause of hospitalization in diabetic patients and its treatment is expensive. This ulcer is the most costly and devastating complication of diabetes mellitus, which affect 15% of diabetic patients during their lifetime. Based on National Institute for Health and Clinical Excellence strategies, early effective management of DFU can reduce the severity of complications such as preventable amputations and possible mortality, and also can improve overall quality of life^[10]. 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^[12]. 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, age, duration of diabetes and the number of illiterate people were significantly higher^[12].

On the other hand, the present study also

showed that body self-concept and foot care self-efficacy were significant in the group without diabetic foot ulcers.

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. 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 a previous study.^[13]

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 increased significantly to 64.89. The score of foot care behavior in the case group improved significantly after the intervention. The effect of education on improving foot care self-efficacy among diabetic patients has been verified somewhere else^[10]. Hence, it can be concluded that foot care self-efficacy training has been effective in improving the level of awareness of the studied group^[13].

In the present study, greater self-efficacy predicts frequent foot care, which is associated with an documented research^[14]. Moreover, in a previous evidence^[15] it has been shown that there were 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 other studies that patients who had higher self-efficacy and were married had better self-care behaviors. In the current study, the effect of illness duration and education level on physical self-concept was significant that is supported by the documented evidences^[16-17].

In consistent with a previous study, seminars and continuous follow-ups could remind and strengthen self care among the participants and showed meaningful behavior changes^[18]. Furthermore, it was effective in helping elderly diabetic patients to function better. The previous researches showed that foot self-care behavior was regularly supported by individuals. These researches verified that clinical recent guidelines on diabetic foot problems can be prevented with foot care education, protective footwear, and a professional foot physical examination^[18].

As other studies, the current study has its own strong and limited points. One of the weak issues of this study is that older patients with diabetes lived in different regions that making regular clinic visits difficult by a local health care provider. However, the existed studies confirmed that due to the chronic nature of the disease and the fact that more than 90% of care is the responsibility of the individuals, patients needed special self-care behaviors until the end of their life^[19].

The advantage of the present study is the use of observational tools to measure body self-concept and foot care self-efficacy in patients with non-insulin-dependent diabetes mellitus with and without diabetic foot ulcers, so it could be a standard questionnaire for evaluation.

Conclusion

In Ahmadiyah Torbat Heydarieh specialized clinic, there is a strong need for patients to receive a preventive program in order to improve proper body self-concept and foot care self-efficacy.

We need to implement a program that can target body self-concept and foot care self-efficacy and be applicable over long periods of time. Doing health promotion intervention, especially in patients with non-insulin-dependent diabetes mellitus with

and without diabetic foot ulcers is strongly recommended.

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Authors' contributions: All authors participated in the design of the study. MHD was 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 and approved the final manuscript.

Conflicts of Interest: 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 on 12th September 2021. We invited all of the available patients with non-insulin dependent diabetes mellitus with and without diabetic foot ulcers who were satisfied to participate through announcement by Ahmadiyah Torbat Heydariyeh specialized clinic principal.

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References

1. Tesfaye T, Shikur B, Shimels T, FirduN. Prevalence and factors associated with diabetes mellitus and impaired fasting glucose level among members of federal police commission residing in Addis Ababa, BMC Endocrine Disorders (2016) 16:68 .doi: 10.1186/s12902-016-0150-6
2. Marsh HW. The measurement of physical self-concept: A construct validation approach. In K. R. Fox (Ed.), *The physical self: From motivation to well-being 1997*; 27–58. Human Kinetics.
3. World Health Organization, *Global report on diabetes*, World Health Organization, 2016.
4. 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.
5. McClearly -Jones V. Health literacy and its association with diabetics knowledge , self efficacy and disease self management among African Americans with diabetes mellitus.
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, HonarvarB, 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 (2023).
8. Ho J, Lee A, Kaminsky L, Wirrell E. Self-concept, attitude toward illness and family functioning in adolescents with type 1 diabetes. *Paediatr Child Health*. 2008 Sep;13(7):600-4. doi: 10.1093/pch/13.7.600. PMID: 194365589.
9. Chin YF, Huang TT, Hsu BR. 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 Jan;22(1-2):61-8. doi: 10.1111/j.1365-2702.2012.042910.
10. Yazdanpanah L, Nasiri M, Adarvishi S. Literature review on the management of diabetic foot ulcer. *World J Diabetes*. 2015 Feb 15;6(1):37-53. doi: 10.4239/wjd.v6.i1.37. PMID: 2568527711.
11. Van der Bijl JJ, Shortridge-Baggett LM. The theory and measurement of the self-efficacy construct. *Sch Inq Nurs Pract*. 2001;15(3):189-207. PMID: 11871579.
12. 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
13. Al Johani RM, Al Nagshabandi E. The Effectiveness of Concept Mapping as an Educational Nursing Intervention Strategy to Handle Diabetic Foot: Integrative Review. *Open J. Nurs*. 2020, 10, 143-154
14. Aljasem LI., Peyrot MWissow 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.
15. 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.
 16. 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.
 17. 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
 18. 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.
 19. 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.