



Evaluation of self-care knowledge and skills among people living with diabetic foot ulcers and its relationship with general health in a developing country

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Abstract

Background Diabetes mellitus is a chronic metabolic disease with increasing prevalence. One of the main complications of diabetes is diabetic foot ulcers, which can lead to physical problems and high costs. Self-care and patient awareness are of particular importance and can help prevent complications.

Objective This study aimed to assess the knowledge and skills of people living with diabetic foot ulcers regarding self-care and its relationship with general health in Iran.

Methods This descriptive-correlational study aimed to determine the knowledge and skills of people living with diabetic foot ulcers regarding self-care and its relationship with general health in the hospitals of Ardabil University of Medical Sciences in 2023. A convenience sample of 220 patients was selected, and data were collected and analyzed using demographic questionnaires, general health questionnaires, and the Diabetic Foot Ulcer Self-Care Knowledge and Skills Scale.

Results In this study, 220 people living with diabetic foot ulcers participated. The mean age of the participants was 65.7 years, and 56.8% were male. Ninety-five percent of the patients had type 2 diabetes, and 81.3% had high self-care knowledge scores. Additionally, 66.3% of the patients had satisfactory self-care skills scores. A significant positive correlation was observed between patients' self-care knowledge and skills. There was also a significant positive correlation between general health and patients' self-care skills.

Conclusion This study showed that the self-care knowledge and skills of people living with diabetic foot ulcers are desirable and satisfactory and are positively associated with education level, non-smoking status, and regular doctor visits. Additionally, general health is positively related to patients' self-care skills. Strengthening educational and counseling programs can help improve general health and reduce complications in these patients.

Keywords Self-care knowledge · Self-care skills · General health · Diabetic foot ulcer

Introduction

Diabetes mellitus is a chronic metabolic disease characterized by elevated blood glucose levels. This condition arises due to insulin production deficiency (type 1 diabetes mellitus) or insulin resistance (type 2 diabetes mellitus) [1]. Diabetes is a major public health issue with increasing

prevalence worldwide, and it is estimated that by 2030, the number of people with diabetes will rise to 643 million globally [2] and to 10 million in Iran [3]. Diabetes affects various systems and leads to multiple complications [4].

One of the main complications of diabetes is diabetic foot ulcers [5]. The risk of developing diabetic foot ulcers ranges from 19 to 34%, and it is estimated that up to 26 million diabetic patients develop foot ulcers annually [6]. Foot ulcers not only cause physical problems but also impose significant costs on patients and often lead to amputations [7]. Diabetic foot ulcers involve infection, ulceration, or destruction of deep soft tissues associated with neurological abnormalities and varying degrees of peripheral vascular disease in the lower limbs [7–9].

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Diabetic foot ulcers are among the most common, serious, and costly complications of diabetes, significantly increasing the risk of mortality in diabetic patients [10, 11]. However, among diabetes complications, diabetic foot ulcers are considered the most preventable [12]. It is estimated that through preventive care, at least 75% of all cases of diabetic foot ulcers can be prevented [13].

One of the most important factors in controlling and preventing diabetes is self-care behaviors [14] and successful diabetes management largely depends on patients' self-care [15]. Self-care is a process in which patients use their knowledge and skills to perform recommended behaviors and maintain or improve their health [16]. Adequate self-care knowledge and skills in these patients reduce the risk of subsequent complications, hospitalization duration, and mortality rates [17]. However, self-care skills in these patients are often low, as evidenced by research findings [18, 19]. For example, the study by Bagchi and Das showed that only 38% of people living with diabetic foot ulcers had knowledge and awareness about self-care of their feet [18]. Lack of awareness and skills in self-care among diabetic patients is one of the reasons for readmission [20]. Therefore, healthcare workers should identify the level of self-care knowledge and skills regarding diabetic foot care in diabetic patients and determine the gap between self-care knowledge and skills [21].

Moreover, complications from diabetes, including diabetic foot ulcers, have various psychological impacts on patients [22]. People living with diabetic foot ulcers experience higher levels of psychological disorders such as depression and anxiety compared to the general population [6, 23]. These psychological disorders can reduce their quality of life and general health [24, 25] and potentially interfere with disease management and self-care knowledge and skills [26].

Therefore, considering the aforementioned points, the aim of this study is to assess the knowledge and skills of people living with diabetic foot ulcers regarding self-care and its relationship with general health in Iran.

Materials and Methods

This study employed a descriptive correlational design to evaluate the self-care knowledge and skills of people living with diabetic foot ulcers and to explore their relationship with general health in the hospitals of Ardabil University of Medical Sciences in 2023. The research population included all people living with diabetic foot ulcers referred to the hospitals of Ardabil University of Medical Sciences. This study included people living with diabetic foot ulcers, excluding those with isolated diabetic neuropathy. Although neuropathy is a significant risk factor for diabetic foot ulcer, our

focus was strictly on patients with active foot ulcers to assess their self-care practices and general health.

After determining the sample size based on Cochran's formula, which was 220 people, the samples were selected by convenience sampling. The researcher, after obtaining permission from the Ethics Committee of Ardabil University of Medical Sciences, visited the research environments. Initially, information about the purpose of the research was given to the research samples, and after obtaining informed consent from them, the questionnaires were distributed among the samples selected by convenience sampling. Since the sampling method was convenient, the sampling continued until the predetermined sample size was reached.

The research questionnaires included a demographic variables questionnaire (age, gender, education level, marital status, duration of diabetes, type of diabetes, time interval to visit the doctor, smoking, history of other diseases), a general health questionnaire, and a diabetic foot ulcer care knowledge and skills scale.

The 28-item General Health Questionnaire (GHQ-28) was used to assess non-psychotic disorders and examine the individual's mental state over the past month. This questionnaire consists of 4 subtests: somatic symptoms, anxiety and insomnia symptoms, social dysfunction, and depression symptoms, each containing 7 questions. All items of the GHQ-28 have 4 options and are scored using the Likert method. In this questionnaire, a total score of 23 or lower indicates optimal health, and a score above 23 indicates sub-optimal health and the presence of pathological symptoms [27]. The psychometric properties of this questionnaire were confirmed in Iran by Noorbala et al., showing validity and reliability, with a test-retest correlation coefficient of 0.85 [28].

The diabetic foot ulcer care knowledge scale consists of 15 questions with true, false, and don't know responses. The scoring is based on the proportion of correct answers. Overall, a total score above 70% indicates high knowledge, a score between 50 and 70% indicates satisfactory knowledge, and a score below 50% indicates poor knowledge of diabetic foot ulcer care. The psychometric properties of this scale were previously confirmed by Hasnain and Sheikh [29].

The diabetic foot ulcer care skills scale (NAFF) consists of 29 items. Responses to each question in this scale are based on a 4-point Likert scale, with scores ranging from 0 to 3, and the scoring is based on the proportion of correct answers. Overall, a total score above 70% indicates high skill (score 61 and above), a score between 50 and 70% indicates satisfactory skill (score 43 to 60), and a score below 50% indicates poor skill. This scale was previously psychometrically validated by Lincoln et al., with an internal consistency reliability of 0.53 [30].

Since these scales were previously validated outside of Iran but not in Iran, they were revalidated in this study.

The diabetic foot ulcer care knowledge and skills scales were reviewed by 10 expert professors in this field. After reviewing the tools, the reliability coefficient was calculated using Cronbach's alpha (internal consistency) for the diabetic foot ulcer care knowledge scale (0.80) and the diabetic foot ulcer care skills scale (0.72), which were acceptable. The validity of the scales was also assessed using face and content validity methods, and it was found that all items of the scales had acceptable validity in terms of necessity.

In this study, data were analyzed using SPSS software. Descriptive statistics, including frequency, mean, and standard deviation, were used to describe the data. Given that the data distribution was normal based on the Kolmogorov–Smirnov test, Pearson correlation, one-way ANOVA, and independent *t*-test were used to assess the relationships between variables. In all tests, a *p*-value of less than 0.05 was considered significant.

Results

In this study, 220 people living with diabetic foot ulcers participated. The average age of the participants was 65.7 ± 2.9 years, with an age range of 46 to 88 years. Most participants were male (56.8%) and married (80%). In terms of education level, 76.8% of the participants reported having a low level of education. Regarding the type of diabetes, 95% of the participants were diagnosed with type 2 diabetes. The duration of diabetes varied, with nearly half of the participants (52.7%) having lived with the disease for more than

10 years. In total, 37 patients (46.2%) had another chronic disease as well.

Regarding the patients' self-care knowledge about diabetic foot ulcer care, Table 1 shows that almost all participants (92%) correctly recognized the importance of regular medication use to prevent complications. Similarly, the majority of patients correctly answered questions related to daily foot washing (88.7%), using lukewarm water (93.7%), checking water temperature (88.7%), and thoroughly drying after washing (86.2%). Additionally, a significant portion (78.7%) understood the importance of daily sock changes and proper nail trimming (87.5%). However, some knowledge gaps were identified. Specifically, a significant percentage of participants were unsure about using talcum powder between the toes (40%) and using lotion between the toes (37.5%). Furthermore, 15% were unaware of the importance of using lotion or moisturizer to prevent dry skin.

Overall, the results showed that out of 220 people living with diabetic foot ulcers, 179 (81.3%) had high self-care knowledge scores (above 70%), 33 (15%) had satisfactory self-care knowledge scores (50–70%), and 8 (3.8%) had poor self-care knowledge scores (below 50%).

Regarding the self-care skills of people living with diabetic foot ulcers, the results showed that among the research samples, 47 patients (21.2%) had high self-care skills scores (above 70%), 146 patients (66.3%) had satisfactory self-care skills scores (50–70%), and 27 patients (12.5%) had poor self-care skills scores (below 50%).

One of the most notable findings, as shown in Table 2, was that 75% of patients consistently maintained daily foot washing, which is crucial for hygiene and preventing

Table 1 Responses to self-care knowledge questions for diabetic foot ulcers

Questions	Correct (number, percentage)	Incorrect (number, percentage)	I don't know (number, percentage)
Anti-diabetic medications should be taken regularly to prevent complications	202 (92)	18 (8)	0 (0)
Feet should be washed daily	195 (88.7)	25 (11.3)	0 (0)
Lukewarm water should be used for washing feet	206 (93.7)	6 (2.5)	8 (3.8)
Water temperature should be checked before washing feet	195 (88.7)	6 (2.5)	19 (8.8)
Feet should be thoroughly dried after washing	190 (86.2)	6 (2.5)	25 (11.3)
Talcum powder should be used to keep the area between the toes dry	47 (21.3)	85 (38.7)	88 (40)
Lotion or moisturizer should be used on feet to prevent dry skin	170 (77.5)	17 (7.5)	33 (15)
Lotion should not be used between the toes	83 (37.5)	55 (25)	82 (37.5)
Socks should be changed daily	173 (78.7)	22 (10)	25 (11.3)
Toenails should be trimmed straight across	193 (87.5)	8 (3.8)	19 (8.7)
Feet should be checked at least once a day	203 (92.5)	6 (2.5)	11 (5)
Diabetic patients should wear comfortable shoes	212 (96.2)	0 (0)	8 (3.8)
Inside of shoes should be checked before wearing	203 (92.5)	0 (0)	17 (7.5)
Diabetic patients should not walk barefoot	173 (78.7)	14 (6.3)	33 (15)
Diabetic patients should see a doctor if there is redness, or sores on their feet	182 (82.5)	8 (3.8)	30 (13.7)

Table 2 Responses to self-care skills questions for diabetic foot ulcers

Questions	Response frequency (3)	Response frequency (2)	Response frequency (1)	Response frequency (0)
Do you examine your feet?	102 (25/46)	66 (30)	30 (75/13)	22 (10)
Do you check your shoes before wearing them?	165 (75)	17 (5/7)	19 (75/8)	19 (75/8)
Do you check your shoes when you take them off?	102 (25/46)	44 (20)	38 (5/17)	36 (25/16)
Do you wash your feet?	49 (5/22)	102 (25/46)	44 (20)	25 (25/11)
Do you check your feet for dryness after washing them?	135 (25/61)	44 (20)	33 (15)	8 (75/3)
Do you dry between your toes?	100 (45)	38 (5/17)	41 (75/18)	41 (75/18)
Do you use lotion or moisturizer on your feet?	102 (25/46)	41 (75/18)	5 (5/2)	72 (5/32)
Do you use lotion or moisturizer between your toes?	107 (75/48)	41 (75/18)	14 (25/6)	58 (25/26)
Do you trim your toenails?	105 (5/47)	82 (5/37)	14 (25/6)	19 (75/8)
Do you wear sandals?	33 (15)	19 (75/8)	28 (5/12)	140 (75/63)
Do you wear flip-flops?	187 (85)	5 (5/2)	11 (5)	17 (5/7)
Do you wear sneakers?	110 (50)	36 (25/16)	25 (25/11)	49 (5/22)
Do you wear lace-up shoes?	17 (5/7)	17 (5/7)	25 (25/11)	161 (75/73)
Do you wear pointed shoes?	195 (75/88)	0 (0)	14 (25/6)	11 (5)
Do you wear regular slippers?	44 (20)	5 (5/2)	64 (75/28)	107 (75/48)
Do you gradually break in new shoes?	28 (5/12)	74 (75/33)	58 (25/26)	60 (5/27)
Do you wear synthetic (plastic) socks?	118 (75/53)	17 (5/7)	55 (25)	30 (75/13)
Do you wear hole-free socks?	79 (25/36)	11 (5)	33 (15)	97 (75/43)
Do you wear shoes without socks?	118 (75/53)	25 (25/11)	47 (25/21)	30 (75/13)
Do you change your socks?	17 (5/7)	107 (75/48)	47 (25/21)	49 (5/22)
Do you walk barefoot at home?	30 (75/13)	11 (5)	38 (5/17)	141 (75/63)
Do you walk barefoot outside?	185 (75/83)	11 (5)	19 (75/8)	5 (5/2)
Do you use a hot water bottle on your feet while sleeping?	174 (75/78)	22 (10)	19 (75/8)	5 (5/2)
Do you warm your feet near a fire?	123 (25/56)	28 (5/12)	33 (15)	36 (25/16)
Do you warm your feet near a radiator?	118 (75/53)	28 (5/12)	33 (15)	41 (75/18)
Do you check the water temperature when washing your feet?	157 (25/71)	49 (5/22)	3 (25/1)	11 (5)
Do you use medication for calluses on your feet?	19 (75/8)	17 (5/7)	38 (5/17)	146 (25/66)
Do you apply dry dressing on blisters on your feet?	145 (25/66)	30 (75/13)	17 (5/7)	28 (5/12)
Do you apply dry dressing on wounds and burns on your feet?	145 (8/65)	36 (5/16)	17 (6/7)	22 (1/10)

foot infections. Additionally, 61.2% of patients regularly trimmed their toenails, a vital habit to prevent ingrown nails and related infections. Another significant strength in the research results was regular foot inspections, with 85% of patients adhering to this practice, ensuring regular monitoring and care. Furthermore, 88.7% of patients regularly measured their feet, essential for ensuring proper shoe fit and preventing related issues.

However, there were areas where most patients did not perform well. For example, a significant majority of patients (73.7%) did not use diabetic socks, which are essential for preventing foot ulcers. The use of skin moisturizers was also low, with only 22.5% of patients always using them, which is important for maintaining

skin moisture and preventing dryness. Additionally, only 15% of patients regularly checked their feet for wounds, a practice crucial for early detection and management of potential problems.

Based on the data results, out of 220 diabetic foot ulcer patients, 135 patients (61.3%) had a general health score within the desirable range (score of 23 or lower), and 85 patients (38.8%) had an undesirable general health score (score above 23).

After data analysis, the results of the Pearson correlation analysis showed that the variable of self-care knowledge had a significant positive relationship with the self-care skills of diabetic foot ulcer patients ($r = 0.39$, $p = 0.000$) (Table 3).

Table 3 Pearson correlation analysis test regarding the knowledge and self-care skills of diabetic foot ulcer patients

		Self-care skills	Self-care knowl- edge
Self-care knowl- edge	Pearson correlation	0/39	1
	Sig. (2-tailed)	0/000	
Self-care skills	Pearson correlation	1	0/39
	Sig. (2-tailed)		0/000
Total		220	220

Additionally, based on the data analysis shown in Table 4, the results of the Pearson correlation analysis indicated that the variable of self-care skills had a significant positive relationship with the general health of diabetic foot ulcer patients ($r = 0.258$, $p = 0.021$), but the variable of self-care knowledge of diabetic foot ulcer patients had no relationship with their general health.

Based on the results of the independent t -test analysis shown in Table 5, among the demographic variables, only the self-care knowledge score in the variable of smoking status of diabetic foot ulcer patients had a significant difference ($p = 0.009$), meaning that the average self-care knowledge score was higher in non-smoking patients.

Additionally, regarding demographic variables, the results of the one-way ANOVA test showed that the self-care knowledge score only had a significant difference in the education level of diabetic foot ulcer patients ($p = 0.046$).

On the other hand, based on the results of the one-way ANOVA test, the self-care skill score showed a significant difference only in the variable of the interval between visits to the doctor for diabetic foot ulcer patients ($p = 0.011$). Specifically, there was a significant difference in the self-care skill score between the interval of 0 to 3 months and less than once a year. In other words, the mean self-care skill score was higher in patients who visited the doctor every 0 to 3 months.

Finally, the results of the independent t -test showed that the self-care skill score did not have a significant difference in any of the demographic variables of diabetic foot ulcer patients.

Table 4 Pearson correlation test for the relationship between general health and self-care skills in diabetic foot ulcer patients

Variable		Self-care skills	General health
General health	Pearson correlation	0/258	1
	Sig. (2-tailed)	0/021	
Self-care skills	Pearson correlation	1	0/258
	Sig. (2-tailed)		0/021
Total		220	220

Table 5 Mean, standard deviation, and results of the independent t -test for comparing the differences in demographic variables with the self-care knowledge score of diabetic foot ulcer patients

Self-care knowledge (mean and standard deviation)	Independent t -test results (p -value)	Variable	
12/26 (1/30)	0/256	Female	Gender
11/67 (2/96)		Male	
13/16 (1/16)	0/009	No	Smoking
11/57 (2/48)		Yes	
14 (1/02)	0/380	Type 1	Type of diabetes
11/92 (2/33)		Type 2	
11/77 (2/85)	0/454	No	History of underlying disease
12/16 (1/53)		Yes	

Discussion

This study aimed to examine the knowledge and skills of people living with diabetic foot ulcers regarding self-care and its relationship with general health in Iran. For people living with diabetic foot ulcers, daily foot care is the most crucial aspect to prevent complications, including amputation, which is largely dependent on the patients' level of knowledge and skills [31].

In this study, most participants were male, which is consistent with the results of a study showing that most participants were men. Since men generally have less care and management of diabetic foot ulcers and are less likely to seek health services, they are more prone to developing diabetic foot ulcers [31].

The majority of patients in this study were married. Similarly, in the study by Ahmed et al., most people living with diabetic foot ulcers were married [32]. Marriage and having a spouse usually lead to a greater inclination towards self-care behaviors to maintain health [33].

Additionally, most patients in this study had type 2 diabetes. In a similar study, the majority of people living with diabetic foot ulcers had type 2 diabetes [34]. Patients with type 2 diabetes are more likely to experience complications such as peripheral artery disease, mechanical changes in foot structure, and peripheral neuropathy, leading to a higher prevalence of diabetic foot ulcers [35].

The results showed that most people living with diabetic foot ulcers were non-smokers. In the study by Negash et al., a small percentage of people living with diabetic foot ulcers were smokers [34]. Smoking causes vascular constriction, which can reduce tissue blood flow and delay wound healing or cause diabetic ulcers [36].

In this study, less than half of the patients had another chronic disease. Consistent with this result, in the study by Negash et al., nearly half of the people living with diabetic

foot ulcers had another chronic disease [34]. However, contrary to the present study, another study found that most people living with diabetic foot ulcers did not have another chronic disease. Diabetic patients without comorbidities can adopt a better lifestyle and daily habits. Healthy individuals continuously seek information to prevent chronic diseases [21].

Nearly half of the patients and participants in this study had been living with the disease for more than 10 years, which is consistent with the results of the study by Alsaleh et al., showing that nearly half of the participants had diabetic foot ulcers for more than 10 years [21]. In people living with diabetic foot ulcers, longer duration of diabetes provides more opportunities for patients to gain information and education, including self-care education, from health-care providers [34].

Regarding education level, most participants in this study reported having a low level of education. Contrary to this result, another study found that most people living with diabetic foot ulcers had a high school diploma or higher, which could be due to differences in sample sizes. Higher education levels can lead to better self-care knowledge in people living with diabetic foot ulcers [21].

The results of the present study showed that most patients had high self-care knowledge scores. Since information related to diabetic foot ulcer care is simple and understandable and can be easily considered basic information for these patients, understanding these principles is not difficult, and improving knowledge in these patients can be achieved through adequate and effective counseling [31]. However, the use of audiovisual aids could serve as an effective tool to reinforce preventive measures and improve self-care knowledge. Implementing such interactive and visual methods in educational programs could ensure better understanding and retention, thereby reducing the risk of diabetic foot complications among this vulnerable group.

According to a study consistent with the present study, most people living with diabetic foot ulcers had appropriate knowledge about foot problems and the importance of regular foot examinations [37]. Contrary to this finding, the results of the study by Ahasanul Haque et al. showed that patients' knowledge about self-care of diabetic foot ulcers was poor due to insufficient education [18].

According to the results of the study by Saber et al., most patients had strong knowledge about daily foot washing, daily foot examination, and the necessity of wearing appropriate socks, but their knowledge about using appropriate slippers at home was low [38].

In this study, patients' self-care knowledge had a statistically significant positive correlation with their education level. Consistent with this result, Hala's research showed a significant positive correlation between education and self-care knowledge in people living with diabetic foot ulcers.

This may be because educated patients can more easily understand foot care skills. They may also better understand the importance of foot health care compared to those with lower education levels. Health care providers should emphasize the importance of regular foot examination and care practices [31].

The present study found that the average self-care knowledge score was higher in non-smoking people living with diabetic foot ulcers. Contrary to this finding, another study showed that the self-care knowledge score was higher in smoking diabetic patients. Generally, the prevalence of disease is higher in smokers, so they are more aware of the disease. On the other hand, non-smokers may be more concerned and seek information to protect themselves from chronic diseases, resulting in more knowledge about the disease and foot self-care [32].

In this study, most patients had satisfactory or high self-care skills scores, and only a small percentage had poor self-care skills scores. Similarly, a study in Kuwait showed that most people living with diabetic foot ulcers had satisfactory self-care performance, and only a small percentage had poor self-care performance. Better self-care prevents the development or progression of diabetic foot ulcers. In fact, a history of foot ulcers is an important predictor of foot self-care [21].

Consistent with this result, another study found that most people living with diabetic foot ulcers had good self-care performance, and a small percentage had poor performance. Most patients examined their feet daily, washed their feet daily, dried between their toes, and trimmed their nails straight across [39].

Contrary to the results of this study, Hala's study showed that most patients had poor foot care skills. Most patients did not follow practices such as washing feet with lukewarm water, properly trimming toenails, regularly checking inside shoes, and walking with appropriate footwear. These findings should encourage health service providers to offer appropriate educational sessions, including proper foot examination techniques, for people living with diabetic foot ulcers [31].

The present study found a significant positive correlation between patients' self-care knowledge and their self-care skills for diabetic foot ulcers. However, a similar study showed no positive correlation between nurses' knowledge and skills [40]. Consistent with the present study, another research indicated that in people living with diabetic foot ulcers, knowledge is directly related to their willingness to engage in self-care. Patients with higher self-care knowledge usually monitor and care for their feet more diligently. Daily self-care practices can prevent further injuries and infections in the lower limbs. Therefore, it is essential for healthcare providers to emphasize the necessary care practices [33].

In this study, more than half of the patients had good general health. Contrary to this result, Khajebishak et al. found that the mental health status of diabetic patients was poor, which could be due to the long-term complications of the disease [41].

Additionally, the present study showed that the general health of people living with diabetic foot ulcers is positively related to their self-care skills. Consistent with this result, a similar study found that self-care behaviors in diabetic patients are positively associated with their health status [42]. Poor general health status in people living with diabetic foot ulcers often leads to non-adherence to a healthy lifestyle and improper self-care practices, such as foot care [41].

Finally, the results of this study showed that the average self-care skills score was higher in patients who visited their doctors every 0 to 3 months. Consistent with this result, another study found that patients who regularly and frequently had their feet examined by doctors had better foot care performance [43]. Patients who frequently visit doctors spend more time with them, leading to more education about self-care for diabetic foot ulcers [21].

One limitation of this study is the potential for social desirability bias in participants' responses. As the data on self-care knowledge were self-reported, there is a possibility that some participants may have overstated their knowledge to present themselves in a more favorable light, which could have affected the accuracy of the findings.

Future studies could benefit from comparing the self-care knowledge and practices between people living with diabetic foot ulcers and those without to provide a broader understanding of preventive behaviors and risk factors associated with ulcer development. They also could benefit from conducting a longitudinal follow-up study to assess the sustained impact of self-care knowledge and practices on improving general health and preventing complications. In addition, future research should explore the role of socio-cultural practices in shaping self-care knowledge and skills among individuals with diabetic foot ulcers. Understanding how cultural beliefs, social norms, and traditional practices influence self-care behaviors could lead to more tailored educational interventions that address specific cultural contexts.

Finally, future studies should consider evaluating not only foot care knowledge but also general awareness regarding appropriate footwear, the risks associated with developing diabetic foot ulcers, and additional preventive strategies. Expanding the scope of knowledge assessment in this way could lead to more effective educational interventions and help reduce the incidence of foot ulcers in diabetic populations.

Conclusion

The present study showed that the knowledge and self-care skills of people living with diabetic foot ulcers in Iran are generally at a desirable level. These findings highlight the importance of effective education and counseling in improving patients' self-care knowledge and skills. Additionally, the results indicated that factors such as education, non-smoking, and regular visits to the doctor have a positive impact on patients' self-care knowledge and skills.

Given that patients' self-care skills are positively correlated with their general health, strengthening educational and counseling programs for diabetic patients can improve general health and reduce complications from diabetic foot ulcers. Furthermore, addressing the specific needs of patients with lower education levels and providing appropriate training for this group can improve treatment outcomes. Finally, more research is needed to examine the factors affecting diabetic patients' self-care and to develop suitable educational programs for these patients. These measures can reduce the disease burden and improve the quality of life for diabetic patients.

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Declarations

Competing interests The authors declare no competing interests.

Ethical considerations Ethical considerations in this study included obtaining approval from the Ethics Committee of Ardabil University of Medical Sciences, obtaining an introduction letter from the Vice Chancellor for Research and Technology of Ardabil University of Medical Sciences, visiting the research environment, explaining the study's purpose, obtaining informed consent from the research samples, participating in the research if desired, and assuring the participants that the collected information would remain confidential.

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