

Self-efficacy of foot care behaviour of elderly patients with diabetes

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Abstract

Introduction: Elderly patients with diabetes are at a high risk of contracting diabetic foot problems. Self-efficacy is essential to help improve foot care behaviour.

Aim: To identify levels of self-efficacy and foot care behaviour and their relationship with demographic characteristics in elderly patients with diabetes

Methods: A cross-sectional study was conducted in two general hospitals in Malaysia from May to June 2015. Diabetes patients aged 60 years with specific inclusion criteria were invited to participate in this study. The respondents were interviewed using a set of validated questionnaires. Data were analysed with descriptive and inferential statistics (multiple linear regression) using Statistical Package for the Social Sciences version 20.0.

Results: Levels of foot self-efficacy (mean=31.39; standard deviation=7.76) and foot care behaviour (mean=25.37; SD=5.88) were high. There was a positive significant relationship between foot self-efficacy ($\beta = 0.41, p < 0.001$) and gender ($\beta = 0.30, p < 0.001$) with foot care behaviour.

Conclusion: Self-efficacy can be incorporated in diabetes education to improve foot care behaviour. High-risk patients should be taught proper foot inspection and protection as well as the merits of skin care to prevent the occurrence of diabetic foot problems.

Introduction

Diabetes is a chronic condition caused either by the insufficiency of insulin secreted by the pancreas or if the body cannot use the glucose produced by the pancreas.¹ The number of diabetic patients is prevalent among the elderly due to population growth and The International Diabetes Federation reported that the global prevalence of diabetes in the elderly is estimated to be more than 134.6 million and the number is expected to increase to 252.8 million by 2035. That number is projected to increase beyond 252.8 million.² The number of cases of diabetes in Malaysia is increasing among the older population,³ and the prevalence of diabetes among elderly in Malaysia was 34.4%.⁴

Elderly with diabetes have a shorter life expectancy.⁵ They are particularly burdened by foot disease that can lead to amputation and other disabilities, and physical and psychological suffering.⁶ In Malaysia, it was reported that 55.3% of patients diabetes would develop with diabetic foot problems and 38.3% of them were among the elderly.⁷ The National Diabetes

Registry (NDR) reported the prevalence of neuropathy, diabetic foot ulcer and amputation were 70.0%, 11.1% and 11.0% respectively.⁸ The incidence and average annual incidence of diabetic foot ulceration are about 10% and 1%, respectively.⁹ Previous local studies reported that people with diabetic foot problems often experienced anxiety about when or whether their foot problems will be healed.¹⁰

Self-care behaviour are actions taken by a person to control their health problems.¹¹ Diabetes is a disease where individuals need to perform regular self-care to reduce the risk of complications.¹² Foot care behaviour can help to reduce foot problems¹³ by 49% to 85%.¹⁴ However, it is difficult to get patients to develop the habit of daily foot self-care.¹⁵ A study conducted in Malaysia reported that the majority of patients with diabetes had poor knowledge and practice related to proper foot care.¹⁶ The highest risk factors for foot problems involved lots of walking/standing while doing activities at work (47.4%), wearing inappropriate footwear (47.3%) and being barefoot at home (49.5%).⁷ Therefore, special

attention should be taken to overcome this problem. The elderly must be empowered with knowledge, confidence and skills to manage their disease.¹⁷

Self-efficacy in health behaviour is essential to improve patients' behaviour towards healthy lifestyles. Self-efficacy can be defined as the individuals' belief about one's capability to achieve designated levels of performance that actively influence events affecting their lives.¹⁸ Self-efficacy is related to a particular activity; patients may perceive themselves as being good in a specific task and poor in another task. It means that this concept emphasis not the individuals' skills, but their judgment of what they believe they can do. Therefore, self-efficacy is an important factor to be investigated in this study as it may influence the foot care behaviour.¹⁹ Previous international studies showed positive relationships between self-efficacy and foot self-care behaviour.^{20–22} The findings suggested that patients with a high self-efficacy level had better foot self-care behaviour. However, a study in the United States found no significant relationship between self-efficacy and foot self-care behaviour.²³ In Malaysia, research on the influence of self-efficacy and other variables on foot care behaviour is limited. Thus, this study proposes to contribute new evidence among elderly patients with diabetes in Malaysia.

Study objective

This study aimed to identify levels of self-efficacy and foot care behaviour and their relationship with demographic characteristics in elderly patients with diabetes.

Methods

This cross-sectional study was conducted in the diabetes clinics of Hospital Kuala Lumpur, Malaysia and Hospital Sungai Buloh, Malaysia. The respondents were recruited from May to June 2015 using convenient sampling. Raosoft software was used to calculate the sample size; assuming a 200 population size of elderly diabetic patients coming for treatment in both hospitals every month, 95% confidence level and a 5% margin of error (amount of error that can be tolerated).²⁴ The recommended sample size was 132 respondents; however, assuming a non-participation rate of 20%, a total of 150 respondents were invited to participate in this study.

The inclusion criteria were elderly aged 60

and above, diagnosed with diabetes, able to communicate in Malay and had no diabetic foot complications (e.g., ulcers, gangrene and amputation). They were assessed for cognitive status with the Mini-Cog screening tool²⁵ prior to the study. A Mini-Cog score of three or less out of five indicates dementia²⁶ and these patients were excluded from the study.

Structured interviews to the respondents were conducted by the researcher individually with a set of questionnaire consist of closed ended items.

Instrument of the study

The questionnaire was divided into three sections. Section A: patients' characteristics; section B: the foot care confidence scale (FCCS);²⁷ and section C: the diabetes foot self-care behaviour scale (DFSBS).²⁸ The FCCS had a Cronbach's alpha of 0.92, and the instrument is reported as applicable to many settings.²⁷ The Cronbach's alpha in the DFSBS was 0.73 and interclass correlation coefficient for test-retest reliability was 0.92.²⁸ The FCCS is a five-point Likert scale comprising 12 items divided into seven subscales: overall confidence/protection (one item), inspection (one item), hygiene (two items), skin (two items), safety (two items), footwear (two items) and professional care (two items). The DFSBS is a five-point of Likert scale consisting of seven items. The scores for the FCCS ranged from 12–60²⁷ and for the DFSBS was 7–35.²⁸ A high score for the FCCS and DFSBS indicates that the respondents have high confidence levels and better self-care behaviour, respectively.^{27,28}

Face and content validity of the questionnaire were evaluated by a panel of four experts comprising a diabetic nurse educator, endocrinologist, orthopaedic surgeon, as well as an elderly diagnosed with diabetes. The back-to-back translation was performed by two bilingual professional translators from the Institute of Language and Literature Malaysia. A pilot study was conducted among 30 respondents, and they were excluded from the data analysis. The pretesting results showed that the Cronbach's alpha value was acceptable for the Malay-FCCS ($\alpha = 0.85$) and the Malay-DFSBS ($\alpha = 0.73$).

Ethical consideration

The Research Ethical Committee of the Faculty of Health Sciences, Universiti

Teknologi MARA, Puncak Alam (Ref: 600-FSK (PT.5/2) and National Medical Research Register (NMRR) (ID NMRR-15-69-24051) had approved this study. Prior to data collection procedures, the respondents were briefed by the researchers about the purpose of the study and were requested to express their written consent to participate in the study. All the respondents' information was kept confidential by the researchers.

Data analysis

Data were analysed with descriptive and inferential statistics in Statistical Package for the Social Sciences version 20.0. A descriptive statistical test (means and standard deviation) was performed to identify levels of self-efficacy and foot care behaviour of elderly patients with diabetes while multiple linear regression (MLR) was used to determine the relationship between the demographic characteristics of respondents and foot self-efficacy towards foot self-care behaviour of elderly with diabetes.

Results

A total of 150 elderly patients were invited to participate in the study. However, 24 of them did not complete the study for several reasons. Some withdrew for non-specified causes and were unable to understand the questions properly. Therefore, 86% or 126 respondents' data were analysed from the two study settings.

Patients' characteristics

Referring to **Table 1**, the mean age of the respondents was 66.09 (SD = 5.90) years. The majority were female (n=83, 65.9%) and received education at secondary level (n=58, 46.0%). The largest number of respondents were Malay (n=91, 72.2%).

The foot self-efficacy of elderly with diabetes

Table 2 Table 2 shows the foot self-efficacy mean scores was 31.39 (SD=7.76). the specific subscales, the highest score was obtained for footwear (mean = 5.84, SD = 1.76) and the lowest was inspection (mean = 2.88, SD = 1.12).

Table 1. Demographic characteristics

Items	Frequency (n)	Percentage (%)
Age (years)	Mean (SD), 66.09 (5.90)	
60–65	76	60.3
66–70	31	24.6
≥71	19	15.1
<i>Gender</i>		
Male	43	34.1
Female	83	65.9
<i>Educational level</i>		
Never	7	5.6
Primary	45	35.7
Secondary	58	46.0
Tertiary	16	12.7
<i>Race</i>		
Malay	91	72.2
Chinese	15	11.9
Indian	20	15.9

Table 2. Distribution of foot self-efficacy for each subscale (n = 126)

Variables	Mean (SD)
Total score of foot self-efficacy	31.39 (7.76)
<i>Subscale</i>	
Overall confidence (protection)	2.98 (0.87)
Inspection	2.88 (1.12)
Hygiene	5.67 (1.43)
Skin	3.94 (1.46)
Safety	5.20 (1.74)
Footwear	5.84 (1.76)
Professional care	4.88 (2.08)

The foot self-care behaviour level of elderly with diabetes

Table 3 shows that the total score of foot self-care behaviour of the elderly with diabetes was 25.37 (SD=5.88) (mean = 25.37, SD = 5.88). The highest score of foot self-care behaviour was item number 3: "I wash between my toes" (mean = 4.26, SD = 1.22) and the lowest foot self-care behaviour level was item number 5: "If my skin is dry, I apply moisturising lotion to my feet" (mean = 2.97, SD = 1.51).

Table 3. Distribution of foot self-care behaviour for each item (n = 126)

Sl. no.	Variables	Mean (SD)
	Total score of foot self-care behaviour	25.37 (5.88)
1	I (my caregiver) examine the bottoms of my feet	3.70 (1.32)
2	I (my caregiver) examine between the toes of my feet	3.98 (1.33)
3	I (my caregiver) wash between my toes	4.26 (1.22)
4	I (my caregiver) dry between my toes after washing my feet	3.67 (1.38)
5	If my skin is dry, I (my caregiver) apply moisturising lotion to my feet	2.97 (1.51)
6	Before I put it on my shoes, I (my caregiver) check the inside of the shoes	3.36 (1.54)
7	I break in new shoes slowly	3.44 (1.14)

The relationship between demographic characteristics and foot self-efficacy towards foot self-care behaviour of elderly with diabetes

MLR was performed to examine the relationship between demographic characteristics (age, gender, educational level and race) and foot self-efficacy towards foot self-care behaviour of the elderly with diabetes (**Table 4**). Since there were three categorical variables, the numerical code was performed for gender (male = 1, female = 0), educational level (low/attended to primary school or never go to school = 1, high/attended to secondary or tertiary school = 0) and race (Malay = 1, non-Malay = 0).

Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity and homoscedasticity. There was no

multicollinearity, since the tolerance value between the variables were high (>0.6). The results showed the MLR model summary and overall fit statistics. The adjusted R² of the model is 0.25 with the R² = 28 meaning that the linear regression explains 28% of the variance in the data. The F-test is statistically significant (F (5, 120) = 9.24, *p* < 0.001). It can be assumed that there was a linear relationship between the variables in the model.

From the model, it can be concluded that gender and foot self-efficacy were associated with the foot care behaviour (*p* < 0.001). The absolute of the standardised coefficient beta showed that foot self-efficacy (β = 0.41) had a greater influence on foot self-care behaviour than gender (β = 0.30). Practice of foot care was among males was higher than in females.

Table 4. The differences of HHI measurements between pretest and post-test (N = 58)

Variables	B (SE)	Beta	t-value	TOL, VIF
DV: Foot self-care behaviour				
IV: Age	0.07 (0.09)	0.07	0.80	0.75, 1.34
IV: Gender (male)	3.71 (0.98)	0.30	3.78*	0.95, 1.05
IV: Educational level (low)	0.20 (1.16)	0.02	0.17	0.67, 1.50
IV: Race (Malay)	1.06 (1.03)	0.08	1.03	0.96, 1.04
IV: Foot self-efficacy	0.31 (0.06)	0.41	5.03*	0.90, 1.11

Initial model summary = 0.28, SE of the estimate = 5.10, F (5, 120) = 9.24, *p* < 0.001.

SE = standard error, B = unstandardised coefficients, beta = standardised coefficients, DV = dependent variable, IV = Independent, TOL = tolerance statistic, VIF = variance inflection factor value.

**p* < 0.001.

Discussion

Foot self-efficacy level of elderly with diabetes

This study found that the level of foot self-efficacy of elderly with diabetes was 31.39 (SD=7.76). A previous study conducted in Australia found the elderly had a high score in the foot self-efficacy 41.13 (± 10.71) as compared to this study.²¹

The highest subscale scores in this study was for footwear, hygiene and safety. This is in parallel with the findings of another study conducted in Jordan where hygiene was the highest score.³² It showed that the elderly patients were aware of these were aware of the importance of these components in preventing foot complications.

Professional and skin care subscales only received moderate scores. Previous research stated that only a small number of elderly with diabetes seek medical advice when they develop an illness.²¹ Most only seek professional healthcare for medical treatment once the disease becomes severe. Such foot care activities are necessary to prevent dryness of the skin, damage of skin between the toes and calluses on the foot that might reduce the circulation of blood to the skin.³³

The lowest subscale scores in this study were inspection and protection. The elderly were less confident in protecting and checking their feet daily for any abnormalities such as redness, cuts, blister and dry skin. Barrier to perform these tasks may be due to geriatric conditions such as vision impairment and having other medical diseases that limit their ability to inspect and protect their feet properly.³⁴

Foot self-care behaviour level of elderly with diabetes

This study showed foot care behaviour level was 25.37 (SD=5.88). However, a previous study among diabetics in China showed that foot self-care behaviour was 20.82 (SD=7.01).¹⁵ The highest score for each item was "I wash between my toes". This finding is similar to previous studies.^{7,15,16} It is possible that elderly patients bathe everyday and washed their feet during bath times.

In terms of feet examination and keep the feet dry, the elderly patients were found to be moderately to perform these tasks. This is consistent with previous local studies that reported that half of their respondents inspect

their feet.^{7,16} However, a study in other country found low levels of performance when it comes to daily foot examination among those surveyed.¹⁵ Daily checking at the bottom of feet and between the toes is essential to identify foot problems such as a blister, corn and callous, skin fissures, cuts and other skin infections.³⁵ Toes need proper care and must be dry always³⁶ because wet and moist condition between toes contributes to bacterial infection.

Breaking in a new shoe helps to prevent from feet injury. Meaning that, the patients need to walk with the new shoes for a few minutes per day for several days before they can use the new shoes permanently.³⁷ In Muhammad Luthfi's study, 51% patients with diabetes check inside of their shoes before wearing.¹⁶ The respondents in this study seldom performed these behaviours properly perhaps due to environment factors. As Malaysia has a hot climate, the majority of them might use sturdy sandals rather than shoes, and this is suitable and reasonable for wear.³⁷ The National Orthopaedic Registry of Malaysia also reported that only 24% of Malaysian diabetics use appropriate shoes.⁷ However, these activities can be practised as to protect the feet from injury.³⁷

The lowest score was "If my skin is dry, I apply moisturising lotion to my feet". Similarly, it was reported that only 19% of patients with diabetes in this country apply lotion to their feet.⁷ Application of lotions or creams can protect from dry and cracked skin, but not between the toes.^{3,36}

The relationship between demographic characteristics and foot self-efficacy towards foot self-care behaviour of elderly with diabetes

This study revealed an association between foot self-efficacy and gender towards foot self-care behaviour of elderly with diabetes. The result emphasises that elderly with high levels of confidence to perform foot care will have better foot self-care behaviour. This finding is supported by previous research that showed self-efficacy is significantly associated with the foot self-care behaviour of elderly with diabetes.²⁰⁻²²

This finding also indicates that the foot self-care behaviour was higher among males. Similarly, other international studies found that men was more likely to perform effective self-care as compared to women.^{38,39} However, previous local study found no association between gender and foot self-care.¹⁶ In this study, the

foot self-care behaviour reported was less among elder women. In general, women spend a lot of time doing household tasks and preparing meals, and this could influence their foot care behaviour.

Recommendation

To increase foot self-efficacy and foot care behaviour of elderly with diabetes, patients need to have a thorough understanding, confidence and receive support from healthcare providers and families. Older women with diabetes, and those have limitations to perform foot inspection and protection as well as skin care, are a high-risk population.

The healthcare providers should provide a specialised foot care education based on self-efficacy theory to improve the knowledge and awareness as well as motivate patients to perform better foot care.

Study limitation

This study sampled an elderly population,

some of whom suffer from several ageing problems (e.g., hearing problems and blurred vision) that could influence the study's results. Some respondents were illiterate and needed assistance from family members to understand the question. Cross-sectional and convenience sampling may lead to bias and the respondents were recruited from only two hospitals, which may not represent the whole population. In future, including clinical data such as the disease duration, treatment, glycated haemoglobin, co-morbidity would be more useful.

Conclusion

In summary, the foot self-efficacy and foot self-care behaviour of elderly with diabetes in this study were high. Foot self-efficacy and gender were associated with foot self-care behaviour. Specialised intervention should be conducted to improve foot self-efficacy and foot self-care behaviour. Self-efficacy should be incorporated in diabetes education to improve foot self-care behaviour. Patients should be educated about foot protection and inspection, and use moisturising lotion because these factors help prevent developing diabetic foot problems.

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