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Foot Care Practices and Knowledge among the Hospitalized Diabetic Older Adults in the Teaching Hospital, Kuala Lumpur

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Abstract: Background: The increasing rate in a diabetic's foot ulcer among the older adults has become a challenge that continually rising and worsening. The Diabetic foot ulcers have a considerable negative impact on the older adults' lives and often lead to lower end amputation.
Objective: This study is conducted to determine the relationships between foot care practices and knowledge among diabetic hospitalized older adults in the UKM Medical Centre (UKMMC), a teaching hospital in Kuala Lumpur Malaysia.
Methods: This is a quantitative cross-sectional descriptive study.
Results: The result revealed 6.2% of the respondents show good practices of foot care. Meanwhile, 90.1% of the respondents reported having a high level of knowledge of foot care. There was a significant relationship between gender and marital status with the knowledge of foot care among the diabetic older adults in UKMMC. However, there is no significant difference between with or without of foot ulcer and knowledge level of foot care among the diabetic older adults.
Conclusion: In conclusion, high knowledge of foot care alone is not enough to prevent diabetic foot ulcers but needs to translate into daily health practices. The result of this study will help the health organization, hospital, nurses and caregiver to take more responsibilities in taking care of the diabetic older adults in foot care.

Keywords: Diabetes foot ulcer, older adults

INTRODUCTION

Diabetes Mellitus becomes one of the major public health concern and rising disease that affects the world. The global prevalence of diabetes was estimated to be 9% in 2014[1]. About 326.5 million people aged 20 to 64 years in the world living with diabetes and an approximately, 122.8 million older adults aged 65 and above with diabetes[1,2]. These figures were expected to increase up to 438.2 million, and it is estimated that the number of older adults aged 65-99 years with diabetes will be increased to 253.4 million in 2045[2]. In the United State, the rate per 1,000 diabetic population was recorded about 3.5 among people aged 65-74 years, and 3.7 among people aged 75 years or older[6]. Meanwhile, about 3.5 million of adults in Malaysia are diagnosed with diabetes in 2015. With these figures, Malaysia becomes the fourth country in Asian to have the highest number of diabetes patients[5]. In fact, the number of diabetes patients is steadily increasing and for the year 2017, Malaysia has been ranked 12th out of 194 countries worldwide[4,5]. Furthermore, the mean age for Type 2 Diabetes Mellitus patients who are enrolled in the Malaysia National Diabetes Registry (NDR) from 2009 to 2012 in Wilayah Kuala Lumpur is 60.5 years old [4].

A diabetic foot ulcer is the most common complication of diabetes mellitus among older adults. An estimated one in every six people with diabetes who live in developed countries will have an ulcer during their lifetime[1,4,5]. Meanwhile, in Malaysia, the NDR reported that the rate of diabetic foot ulcer is increased from 841 in 2011 to 1 527 in 2012[4]. Of concern is that the incidence of diabetic ulcer is increasing among the older adults[4,7]. Previous studies identified several risk factors had been related to diabetic foot such as peripheral neuropathy, microangiopathy, smoking, and cardiovascular risk factors[8,9,10]. However, some studies highlighted the aging process can be associated with changes in glucose metabolism including a relative insulin resistance, and islet cell dysfunction. In fact, the increase in glucose intolerance with age has been clear for more than 30 years. Hence, older adult's diabetics with glucose intolerance may represent a subset of the population exposed to high risk of diabetic complications such as diabetic foot ulcers, amputation, and early death.

On the other hand, amputation was one of the complications of diabetic foot ulcer [2,6]. Across the world, up to 70% of all foot amputations are among those with diabetes[4,6]. Even in Malaysia, the statistic from the NDR showed an increase in foot amputation from 0.5% in 2011 to 0.9% in 2012[4]. Moreover, diabetic foot problems were one of the major problems that cause higher rates of morbidity among the older adults who have diabetes[2,3,4,6,11,12,13].

Knowledge about foot care is essential to prevent older adults walk from diabetic foot ulcers and amputation[11,15,17,18]. A study conducted in Sri Lanka reported

more than 50% of respondents (n=110) had knowledge of the principles of diabetic foot care[12]. The researchers found that some of older adult knew about the care of callosities, minor injuries or cuts. Meanwhile, a study in Jeddah, found that the median score of the knowledge aspect in foot practice for elderly age 60 years old and above is between 6 over 10, which were the lowest compared to other categories of age[14]. On top of that, half of the older adults did not know about the techniques of cutting toenails properly and footwear during outdoor activities only[12]. In fact, they still use a shoe made of hard materials, high-heeled and not constantly practice wearing a full covered shoes[12,14,19].

Knowledge and awareness are not enough to prevent diabetic foot ulcer, as it should be translated into daily health practices. Previous studies have found that higher levels of knowledge among the older adults but their practice are at the lower levels[11,15,16,17]. Results of several studies reported less than half of the respondents aged 65 and above did not practice foot care[7,11]. As well as these group of age did not perform regular foot observations[12]. Indeed, the practice score was significantly lower in patients with lower educational level. In addition, there is a significant relationship between the low level of knowledge on foot care and the reduction in exercise practices among the elderly[14]. Out of concern, older adults either man or women are more prone to foot ulcers with diabetes duration than the history of diabetes over 16 years compared with those with less than 15 years [7,11]. This suggests that there are other factors affecting the practice of foot care among older adults despite the good knowledge of diabetes mellitus and foot care as they have experienced a long period of illness. However, few studies highlighted poor foot care practices is due to other complications of diabetes such as limited vision and other chronic diseases that preventing a good foot care practices among elderly and unable to evaluate their feet[20].

Consequently, the older adults with diabetes still have a problem with foot care practices. Previous researchers claimed that all of these risk factors can be prevented from getting worsened by having a proper foot care knowledge and practice. The aim of this study is to assess the level of knowledge and practice of foot care among the older adult who had admitted to UKM Medical Center (UKMMC). In addition, the study also examines the relationship between socio-demographic data with knowledge of foot care among diabetic older adults who were hospitalized in the teaching hospital, UKM Medical Center (UKMMC) situated in Kuala Lumpur, Malaysia.

METHODOLOGY

Methods and material:

This study was a cross-sectional descriptive quantitative research. The study was conducted in UKMMC which is a teaching hospital situated in Kuala Lumpur, Malaysia. A convenience sampling technique was used as people in the ward and clinic would be an example of this sampling strategy. The respondent was recruited among the older adults aged 60 years old and above diagnosed with diabetic mellitus. The sample size was calculated, 81 respondents. The pilot study has been done and the respondents from the pilot study were then been excluded in the real study.

Measurement tools:

In this study, the practice of foot care was measured using the questionnaire developed by Hasnain and Sheikh[11]. This tool consists of 15 items and categorized into a poor, satisfactory and good practice of foot care. For the 15 items, the score below 8 was indicated a poor practice of foot care. Meanwhile, score 8-10 indicate the satisfactory practice of foot care and score 11-15 indicate the good practice of foot care. This questionnaire was translated back-to-back translation to Bahasa Malaysia and the translate questionnaires have a good internal consistency of 0.87.

Furthermore, knowledge of foot care among the older adults was measured using the questionnaires develop by Qadi and Al Zahrani[6]. These sets of questions consist of 9 items about knowledge of foot care. This questionnaire was modified in order to meet the culture setting in Malaysia and translated back-to-back translation to Bahasa Malaysia. The translate tools have a good internal consistency of 0.81. For the 9 items, the score between 1 and 4 scores indicate a low knowledge of foot care and the score 5-9 indicate a high knowledge of foot care.

Statistical Analysis:

The data were analyzed using SPSS Statistics version 23 for Windows in accordance with the purpose of the study and the characteristics of the variables. The significant level was set at $P<0.05$.

Ethical consideration:

This research study was guided by the ethical principles of autonomy, beneficence, confidentiality, and anonymity to ensure participants' rights were protected. The study was approved by Ethics Committee of University Kebangsaan Malaysia Medical Centre (UKMMC) was obtained before conducting this research. Code project was FF-2016-132.

RESULTS

The results of this study showed the majority of respondents were aged 60-74 (77.8%), female (56.8%) and a total of 72.8% has an income below RM1000. 72.8% of respondents were married followed with widowed (19.8%), divorced (4.9%) and 2.5% were single. Moreover, 5 (6.2%) of respondents were still working, while 42 (51.9%) respondents were not working and 34 (42.0%) respondents were retired. The majority of respondents had secondary education 35(43.2%), primary education 31(38.3%), and tertiary education 4(4.9%). 13.6% of respondent had no formal education. Table 1.1 below shows that 81 respondents of diabetic elderly with two types of the duration of diabetes of fewer than 10 years with frequency of 23(28.4%) and more than 10 years is 58(71.6%).

Table 1.1: Distribution of Demographic Data

Characteristic Of Older Adults	Frequency (n)	Percentage (%)
Categorical age		
60-74	63	77.8
75-84	17	21.0
85 above	1	1.2
Gender		
Male	35	43.2
Female	46	56.8
Marital status		
Single	2	2.5
Married	59	72.8
Divorced	4	4.9
Widowed	16	19.8
Level Of Education		
No formal education	11	13.6
Primary education	31	38.3
Secondary education	35	43.2
Tertiary education	4	4.9
Occupation		
Working	5	6.2
Not working	42	51.9
Retire	34	42.0
Monthly Income		
Below RM1000	59	72.8
RM1000 - RM2000	16	19.8
Above RM2000	6	7.4
Duration Of Diabetes		
Less than 10 years	23	28.4
More than 10 years	58	71.6
Body Image		
Normal foot	58	71.6
Presence of foot ulcer	12	14.8
Foot amputation	11	13.6

Practices of Foot Care:

The results of this study showed the scoring for the practice of foot care from the 81 respondents. The frequency of respondent with results of the poor practice of foot care is 40(49.4%), satisfactory practice is 36(44.4%) and good practice is 5(6.2%).

Knowledge level of Foot Care:

Table 1.2 shows the results of the scoring for knowledge level of foot care from the 81 respondents. The frequency of respondents with result of low scoring of knowledge of foot care is 8(9.9%). In addition, the frequency of high scoring of knowledge of foot care is 73(90.1%).

Table 1.2: Knowledge and Practice of Foot Care

Variables	Frequency (n)	Percentage (%)
Knowledge level of foot care		
Low	8	9.9
High	73	90.1
Practice of foot care		
Poor	40	49.4
Satisfactory	36	44.4
Good	5	6.2

The Relationship between Socio-Demographic Data and Knowledge of Foot Care:

The results of the analysis showed low knowledge of foot care are among the respondents who had low knowledge of foot care were young older adults (60-74) who had primary education, female, widowed and having monthly income below RM1000. Moreover, respondents who diagnosed with diabetes more than 10 years but had normal foot also had the low level of foot care knowledge. In addition, the majority with a total of 77.8% shows a high knowledge level of foot care among respondent without foot ulcer. The least amount of having low knowledge level of foot care with 2(2.5%) is among respondent with the foot ulcer.

A Chi-Square test for independence was conducted to determine the relationship between the socio-demographic data (categorical age, gender, marital status, occupation, monthly income, level of education), duration of diabetes, and body image with the knowledge of foot care (categorized into low and high). The results show gender and marital status has a significant association with the knowledge level of foot care. A chi-square test for independence (with Fisher's Exact Test) indicated there no significant association between absence or presence of foot ulcer with knowledge level of foot care among diabetic elderly, ($p = 0.34$, Fisher's Exact Test). This means that the proportion of absence and presence of foot ulcer of diabetic elderly and their knowledge level of foot care are not significantly different with each other.

Table 1.3: The Relationship between socio-demographic data and Knowledge of Foot Care

Socio-demographic data	Knowledge level of foot care n(% of total)		χ^2	P ($p < 0.05$)
	Low (1-4)	High (5-9)		
Categorical Age			0.19	0.91
Young older adults (60-74)	6(7.4%)	57(70.4%)		
Middle older adults (75-84)	2(2.5%)	15(18.5%)		
Old older adults (>85)	0(0.0%)	1(1.2%)		
Gender				
Male	0(0.0%)	35(43.2%)	4.9	0.01 **
Female	8(9.9%)	38(46.9%)		
Marital status				
Single	1(1.2%)	1(1.2%)	9.69	0.02 **
Married	3(3.7%)	56(69.1%)		
Divorced	0(0.0%)	4(4.9%)		
Widowed	4(4.9%)	12(14.8%)		
Level of Education				
No formal education	2(2.5%)	9(11.1%)	4.59	0.20
Primary education	5(6.2%)	26(32.1%0		
Secondary education	1(1.2%)	34(42.0%)		
Tertiary education	0(0.0%)	4(4.9%)		
Occupation				
Working	0(0.0%)	5(6.2%)	0.00	1.00
Not working	8(9.9%)	68(84.0%)		
Monthly income				
Below RM1000	7(8.6%)	52(64.2%)	0.32	0.44
Above RM1000	1(1.2%)	21(25.9%)		
Duration of Diabetes				
Less than 10 years	3(3.7%)	20(24.7%)	0.04	0.68
More than 10 years	5(6.2%)	53(65.4%)		
Body Image				
Normal foot	6(7.4%)	52(64.2%)	0.00	1.00
Abnormal foot	2(2.5%)	21(25.9%)		
Foot Ulcer				
With foot ulcer	2(2.5%)	10(12.3%)	0.11	0.34
Without foot ulcer	6(7.4%)	63(77.8%)		

DISCUSSION

The aims of this study are to measure the practice among the diabetic older adult who hospitalized in the tertiary teaching hospital and to assess the knowledge level of foot care. Our result revealed that majority of the diabetic elderly in UKKMC has a high knowledge level of foot care. In contrast, previous studies reported a strong relationship between the poor foot care practice with lower knowledge of foot care[11,12]. Moreover, a study in Nigeria reported that nearly to fifty percent of the older adult with diabetes had a poor knowledge of diabetic foot care compared to only less than three-quarter had good knowledge of diabetic foot care [13]. In Saudi Arabia, a group of studies highlighted a lower level of foot care knowledge than the optimum[13,20]. Most researchers expressed the need for foot care education programs and improve the way of delivering it. Some inadequacies of foot care practice in our subjects include also non-inspection of the inside of their footwear and wearing shoes without socks[12,14]. The contrast between the studies is maybe due to differences in comprehensive prevention programs which include proper screening, education, and concentration on high-risk feet between UKMMC and other countries. A few of researchers stated the effectiveness of providing basic foot care instructions as a method of increasing patient's knowledge of foot care[14].

An important result was that a significant proportion of the patient had the poor practice of foot care. This finding was comparable with other related studies, which also reported the same pattern of scoring for knowledge and practice of foot care[11,16,17]. Moreover, this poor level of foot care practice in this study is similar to other studies[19,23]. On the other hand, the poor practice of foot care in this study may not attribute to the lack proper knowledge of foot care among the participants. Many other studies showed inadequate knowledge of self-foot-care among the diabetic patients[11,12,18,19]. In this study, there is a significant relationship between gender of diabetic older adults and their knowledge level of foot care. The other demographic characteristics such as level of education, occupation, monthly and age showed no significant relationship with the knowledge level of foot care. In this study, the result shows that male patient has a higher ratio percentage to have a high knowledge compared to female. A study conducted in India showed female was fewer practices of foot care compared to male. Those older women aged 60 and above were found to have low knowledge level on foot care. However, these associations were not statistically significant for this indicator[7,13]. This is maybe due to different limitations in education access for women. The most important factors are about gender comprised the access to education and income and in many developing countries or in the middle developing countries such as Malaysia. Moreover, historically noted that women had limited access to the higher education compared to men, and women receive lower salaries or allowances than men for the same job[15]. These results may influence an inequality to affect women's health in a favourable way.

The study revealed that there is a significant relationship between marital status and knowledge level of foot care diabetic older adults. In contrast, there was no previous study found to support or has a significant statistically

results. On the other hand, several studies had highlighted the importance of families' role as a motivator for therapeutic adherence among the older adults[10]. This is because the support and family participation had a positive effect on the self-care behaviours among diabetes older adults. Family life turns out to influence the decision-making in which leading patients to reorganize and meet an appropriate metabolic control. Thus, for this reason, the nurses should consider family members as participants of the process[10].

For this study, the result showed no association between level of education and knowledge level of foot care. In contrast, the previous study reported that the practice score was significantly lower in patients with lower educational level[6]. Consequently, education level has a strong relationship with knowledge about foot care[11]. These results might be contradicted by the researcher's study as due to the different background of setting and level of education of the respondents. Most of the respondents from the previous study are illiterate which is the access to have a better understanding of foot care is difficult as compared to Malaysia where the literacy rate in Malaysia is very high among older adults. Result found that poor practice of foot care is more obvious than knowledge level, so by giving the patient exposure related to the proper technique of practicing foot care by patient education; it may help the health organization to decrease the incidence of diabetic foot ulcer and amputation.

In this study, some gaps were highlighted in the older adults' knowledge and practice of foot care. As we want to reduce the gap of knowledge and practice of foot care among the older adult, a patient-friendly educational foot care intervention program is required. Indeed, these education programs influenced the incidences of diabetic foot ulcer. Many studies have proven that by giving a proper and excellent diabetic foot care education would lead better results in knowledge and practice of foot care to diabetic patients[10,13]. Therefore, it was important to educate the diabetic older adult to control diabetes-related foot complications. In addition, the education on diabetes foot care was beneficial to the older adult with the pre-diabetic state. Moreover, it is important to activate the role of health education to everyone who has direct contact with the diabetes patient especially the older adult in order to minimize the diabetic foot complications. The data of this study also could be used as a guideline tools to monitor the level of knowledge and practice of foot care among the diabetic older adults in other units or health setting. This might help the health organization to find the alternative way to make improvement about the patient education on foot care for the diabetic patient to take a preventive measure on the incidence of diabetic foot ulcer and amputation.

Despite this strength, the study has some limitations that should be mentioned to facilitate the proper understanding of study outcomes. Firstly, this quantitative study design was cross-sectional surveys which seem only provide information about the current situation of the experiences, but cannot explore the direction of relationships or causal of foot care practices. Therefore, the results of this study cannot be generalized to the older adults in Malaysia. Secondly, this is a hospital-based study, which the hospital-based studies cannot provide the real picture of diabetic foot care knowledge and practices of the older adults in the community. The recommendation for further studies is to evaluate the current health education prevention strategies of foot care among the older adults.

CONCLUSION

In conclusion, this research has given a clear figure of knowledge level and practices of foot care among diabetic elderly in UKMMC. A high level of foot care knowledge does not mean good in foot care practices. The findings provided some recommendation for future improvement in health organization and nursing practice in order to enhance the knowledge and practice of foot care among the diabetic elderly thus prevent the complication of diabetes mellitus such as foot ulcer and amputation among diabetic elderly.

CONFLICT OF INTERESTS

The authors declared no potential conflict of interests with respect to the research, authorship, and/or publication of this paper.

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