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Assessment of foot care self-efficacy and foot care behaviour among patients with diabetes mellitus

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Abstract

Background: India is known as the "Diabetes Capital of the world". Uncontrolled diabetes can lead to foot problems. It is one of the cause of disability. Foot care is often neglected. Diabetes foot care is simple, low- cost and most effective nursing intervention and self- efficacy influence the foot self-care behaviour and prevent foot ulcers and amputation.

Purpose: The study aimed to assess foot care self-efficacy and foot care behaviour among patients with diabetes mellitus.

Materials and Methods: A quantitative approach was used. Non probability convenient sampling technique was used to select 150 diabetic patients. Data was collected using socio demographic variables and Foot Care Confidence Scale and Foot Care Behaviour Scale. The data was analysed using descriptive and inferential statistics using SPSS version 20.

Results: The majority of the subjects (33.3%) were in age group of 50-59 years and majority of the subjects (50.7%) were females and (34.0%) have done graduation, (30.0%) were non govt. employees,(86.0%) of the subjects were married, that 32.0% of the subjects had monthly income of 20,000-30,000 and (54%) were residing in urban area, 47.3% of the subjects had been diagnosed with diabetes mellitus, 58.0% of the samples had received information on foot care, 48.0% of the subjects were using insulin injection to control blood glucose levels and 83.4% of the subjects did not visit any podiatrist for foot problems.

Levels of foot care self-efficacy (mean 51.04; standard deviation=±4.396) and foot care behaviour (mean=64.50 standard deviation =±7.316). There was a moderate positive relationship (r=0.382, p=0.000) between foot care self-efficacy and foot care behaviour.

The result showed that there was no association between foot care self- efficacy and selected socio demographic variables except for education (p= 0.026), occupation (p=0.02), marital status (p=0.00) and information on foot care (p=0.040) as the calculated value was more than the table value. There was no significant association between foot care behavior and selected socio demographic variables except for age (p=0.002), gender (p=0.014), education (p=0.00), occupation (p=0.00), monthly family

income (p=0.00) duration of diabetes mellitus (p=0.00) and information on foot care (p=0.033) as the calculated chi-square values were more than the table value.

Conclusion: 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.

Keywords: Diabetes mellitus, foot care self-efficacy, foot care behaviour, knowledge of foot.

Introduction

Diabetes Mellitus is a group of metabolic diseases characterized by high blood glucose levels caused by failure of pancreas to produce hormone insulin, which is essential to carry out carbohydrate metabolism. [1,2] According to American Diabetes Association, there are two major types of diabetes mellitus called Type 1 or insulin dependent diabetes mellitus(IDDM), caused by destruction of beta cells present in islets of pancreas, Type 2 or non-insulin dependent diabetes mellitus (NIDDM), caused when body can`t use available insulin efficiently.[3]

Diabetes mellitus cannot be cured but it can be managed with interventions such as regular glucose monitoring, dietary modification, lifestyle changes, exercises and adherence to hypoglycemic medication. If not, it leads to uncontrolled hyperglycemia and severe complications.[4] Hyperglycemia leads to a condition called peripheral arterial disease which reduces the flow of blood in the legs and feet. When the nerve gets damaged it become harder, painful and develop ulcer. Ulcers are dangerous as they can lead to infection and cause gangrene.[5]

According to International Diabetes Federation India is home to 69.1 million people with diabetes mellitus and is estimated to have the second highest number of cases of diabetes mellitus in the world after China in 2015.

It is estimated that 15 to 25% of people with diabetes develop foot ulcer which leads to physical disability and quality of life. Diabetic foot is a worldwide economic burden due to high morbidity and mortality. Diabetes related foot problems increases hospital admissions. 40% to 70% of lower extremity amputations are due to diabetes. [7]

Foot self-care has a significant impact on prevention of foot complications in diabetes. Self-care includes foot inspection, foot hygiene, skin care, foot safety, and selection and wearing of right footwear to prevent foot problems like foot ulcer, gangrene and amputation. Foot care is often neglected by adults and elderly and often does not practice the foot care require maintaining healthy feet. Patients sense of self –efficacy predicts behavior in many areas of health. Self-efficacy in health behavior is essential to improve patient's behavior towards healthy lifestyles. [8]

Self-efficacy can be defined as the individual`s belief about one's capacity to achieve designated levels of performance that actively influence events affecting their lives. Self-efficacy is related to a particular activity, patients may perceive themselves as being good in a specific task and poor in another task. [9]

Diabetes management requires major changes in behavior which includes knowledge, skills and confidence to make improvements in self-care behaviors. Foot care is a part of standard practice guidelines in diabetes self-care behavior.[10]

Foot Self-care behaviors are actions taken by a person to control their foot problems.[11] Diabetes is a disease where individuals need to perform regular self- care to reduce the risk of foot complication by 49 to 85%.[9] The cheapest and best treatment is prevention. In addition to metabolic control and screening for foot problems can be achieved through education with demonstrated benefits for

knowledge, skills and self-care behaviors.[12] Therefore, special attention should be taken. Foot care education is one of the best tools available to increase the awareness of patient with diabetes mellitus on proper foot care behavior.

Materials and Methods

Research Approach: Quantitative research approach

Research Design: The selection of the design depends upon the purpose of the study, research approach and variables to be studied. The research design selected for the study was descriptive correlational research design.

Variables

Study variable: Foot care self-efficacy and foot care behaviour.

Attribute variables: Age, Gender, Educational qualification, Occupation, Marital Status, Monthly Family Income, Residential area, Duration of diabetes mellitus, Have you received any information on foot care, Type of control of blood sugar levels(Diet, hypoglycaemic agents, Insulin), History of visiting Podiatrist.

Setting and Sample size

The study was carried out at OPDs and admitted patients of Tertiary care hospitals in Bangalore, Karnataka (M.S. Ramaiah Memorial and M.S. Ramaiah Teaching hospital). 150 diabetes mellitus patients(type2) were selected as sample for study.

Sampling technique

A non probability convenient sampling technique was used to select the samples.

Inclusion and exclusion criteria

Inclusion criteria

Diabetes mellitus patients who are:

1. Diagnosed with type II Diabetes Mellitus.
2. Above 18 years of age.
3. Available at the time of data collection.
4. Willing to participate in the study.
5. Able to read and understand English or Kannada.

Exclusion criteria

Diabetes mellitus patients who are:

1. Visual problems with diabetic retinopathy.
2. Having cognitive or communication impairments.
3. Critically ill patients.

Ethical Consideration

Ethical clearance was obtained from ethical committee of Ramaiah Medical College and Hospitals, Bangalore. (Approval No: MSRMC/EC/SP-05/09-2022).

Development and Description of tool

The development of tool required an extensive effort. Various literatures were reviewed including researchers, journals, newspaper articles, etc. Opinions were taken from experts and research guide and the English tool was translated to Kannada and again Kannada tool was translate in English by the expert. The tool was validated and then put forth for the data collection. The tool consists of two sections.

Tool for data collection

Section A: Socio-demographic variables includes 11 items like Age, Gender, Educational qualification, Occupation, Marital Status, Monthly Family Income, Residential area, Duration of diabetes mellitus, Have you received any information on foot care, Type of control of blood sugar levels(Diet, hypoglycaemic agents, Insulin), History of visiting Podiatrist.

Part 1: Foot care confidence scale (FCCS):

- The scale was used to assess the foot self-care efficacy.
- It has 100% validity and reliability of 0.92.
- It was a 5 points Likert scale and it consists of 12 items.

- The score ranges from 1 to 5 (1=Strongly disagree,2=Disagree,3=Neither disagree nor agree,4=Agree,5=Strongly agree).
- The maximum score is 60 and minimum score is 12.
- The highest score indicates high efficacy levels and lowest score indicates low efficacy levels.

Interpretation

12-36 indicates low level of self- efficacy.

37-60 indicates high level of self- efficacy.

Part 2 - Foot Care Behaviour scale (FCBS):

- The scale was used to assess foot care behaviour.
- It has repeated validity of 0.73 and reliability of 0.92.
- It was a 5 points Likert scale and it consists of 17 items.
- The score ranges from 1 to 5 (1=Never, 2=once a week, 3=twice a week, 4=every three days, 5=daily).
- The maximum score was 85 and minimum score is 17.
- The highest score indicates adequate foot care behaviour and lowest score indicates inadequate foot care behaviour.

Interpretation

17-51 indicates low foot care behaviour.

52-85 indicates high foot care behaviour.

Data collection procedure

Formal permission was obtained from higher authority of Ramaiah Medical College Hospital. Subjects who met inclusions criteria were included in the study. A total of 150 subjects were selected using non-probability convenient sampling technique. Self- introduction was given, the subjects were given detailed information about the study and the informed consent was obtained. Data was collected and confidentially was maintained. Subjects were requested to respond to all three tools completely; Section A (socio-demographic profile), Section B foot care confidence scale (FCCS) and foot care behaviour scale (FCBS) was given to the subjects to assess foot care self-efficacy and foot care behaviour.

Data from 150 subjects were analysed by using SPSS version 20.0 for data analysis. Data was analysed using descriptive and inferential statistics. Average time taken to complete the questionnaire by each subjects was 15-20 minutes. Doubts were clarified pertaining the tool.

Statistical method

The data analysis was done by using descriptive and inferential statistics. SPSS (version 20) was used to analyze the data.

1. Frequency and percentage distribution of selected socio-demographic variables.
2. Frequency and percentage distribution of foot care self-efficacy and foot care behaviour.
3. Mean and standard deviation of foot care self-efficacy and foot care behaviour
4. Correlation co-efficient between foot care self-efficacy and foot care behaviours.
5. Association between foot care self-efficacy, foot care behaviour and selected socio demographic variables.

Results

The statistical analysis showed that 2% of the subjects had low foot care self-efficacy and 98% of the subjects had high self-efficacy and 4% of the subjects had low foot care behaviour and 96%of the subjects had high foot care behaviour.

Mean and standard deviation of foot care self-efficacy is 51.04 with standard deviation of±4.396 and the mean of foot care behaviour is 64.50 with standard deviation of ±7.316.

Karl's Pearson correlation co-efficient test was used to find the correlation between foot care self-efficacy and foot care behaviour. The results showed that there was a moderate positive degree of correlation(r=0.382,

P=0.000) between foot care self-efficacy and foot care behaviour and it was statistically significant at 0.01 level of significance.

Chi-square test was used to find the association between foot care self-efficacy and foot care behaviour and selected socio-demographic variables. The result showed that there was no association between foot care self-efficacy and selected socio demographic variables except for education, occupation, marital status and information on foot care as the calculated value was more than the table value. Hence the Hypothesis H_3 was rejected. There was no significant association between foot care behavior and selected socio demographic variables except for age, gender, education, occupation, monthly family income duration of diabetes mellitus and information on foot care as the calculated chi-square values were more than the table value. Hence the Hypothesis H_3 was rejected.

Table1: Frequency and percentage distribution of subjects with regard to socio-demographic variables (age, gender, education). n = 150

Sn.	Socio demographic variables	Frequency	Percentage (%)
1.	Age in completed years		
	30-39	18	12
	40-49	15	10
	50-59	50	33.3
	60-69	40	26.7
	70-79	27	18
2.	Gender		
	Male	74	49.3
	Female	76	50.7
3.	Educational		
	No formal education	9	6.0
	Primary education	29	19.3
	Secondary education	22	14.7
	Higher Secondary education	18	12.0
	Graduation	51	34.0
	Post-graduation	21	14.0

4.	Occupation		
	Unemployee	9	6.0
	Govt. employee	28	18.7
	Non govt. employee	45	30.0
	Self-employee	26	17.3
	Home maker	19	12.7
	Daily wager	-	-
	Retired personnel	23	15.3
5.	Marital status		
	Married	129	86.0
	Unmarried	17	11.3
	Divorced	3	2.0
	Separated	1	0.7
6.	Monthly Family Income		
	<10,000	15	10.0
	10,000-20,000	26	17.3
	20,000-30,000	48	32.0
	30,000-40,000	28	18.7
	Above 40,000	33	22.0
7.	Residential area		
	Urban	81	54
	Rural	69	46
8.	How long you have been diagnosed with diabetes mellitus.		
	<1 years	-	-
	1-5 years	71	47.3
	6-10 years	59	39.3
	>10 years	20	13.3
9	Have you received any information on foot care.		
	Yes	87	58.0
	No	63	42.0

10.	How do you control your blood glucose levels.		
	Diet	2	1.3
	Oral hypoglycemic agents	51	34.0
	Insulin Injection	72	48.0
	Both oral plus insulin injection	25	16.7
11.	Have you visited any Podiatrist for foot problems?		
	Yes	25	16.7
	No	125	83.4

The above table depicted that majority of the subjects (33.3%) were in age group of 50-59 years and majority of the subjects (50.7%) were females and (34.0%) have done graduation, (30.0%) were non govt. employees,(86.0%) of the subjects were married, that 32.0% of the subjects had monthly income of 20,000-30,000 and (54%) were residing in urban area, 47.3% of the subjects had been diagnosed with diabetes mellitus, 58.0% of the samples had received information on foot care, 48.0% of the subjects were using insulin injection to control blood glucose levels and 83.4% of the subjects did not visit any podiatrist for foot problems.

Table 2: Frequency and percentage distribution of subjects in terms of foot care self-efficacy and foot self care behavior. n = 150

Scale		Score	Frequency (f)	Percentage (%)
Foot Care Confidence Scale	Low	12-36	3	2
	High	37-60	147	98
Foot Care Behavior Scale	Low	17-51	6	4
	High	52-85	144	96

The above table depicted that (2%) of the subjects had low foot care self-efficacy and (98%) of the subjects had high foot care self-efficacy and 4% of the subjects had low foot care behavior and 96% of the subjects had high foot care behavior.

Table 3: Mean and standard deviation of foot care self-efficacy and foot care behavior. n = 150

FCCS Score	Minimum	Maximum	Mean	SD
	35	57	51.04	±4.396
FCBS Score	42	77	64.50	±7.316

The above table depicted that the mean of foot care self-efficacy was 51.04 with standard deviation of ± 4.396 and the mean of foot care behavior was 64.50 with standard deviation of ±7.316.

Table 4: Correlation between foot care self - efficacy and foot care behavior. n = 150

Variables	Correlation (r)	P value
Foot care self-efficacy	0.382	0.000
Foot care behavior		

S= significant at ≤ 0.01.

The above table depicted that there was moderate positive degree of correlation (r=0.382, P=0.000) between foot care self -efficacy and foot care behaviour and it is statistically significant at 0.01 level of significance.

Table 5: Association between foot care self-efficacy and selected socio- demographic variables. n= 150

Sn.	Socio-demographic variables	Foot Care Confidence Scale Low	High	Chi-square (x^2)	P value (≤0.05)
1.	Age in completed years				
	30-39	1	17	3.930 df = 4	0.415 NS
	40-49		15		
	50-59	2	48		
	60-69		40		
	70-79		27		
2	Gender			0.314 df =1	0.576 NS
	Male	1	73		
	Female	2	74		
3.	Education				
	No formal education		9	12.773 df = 5	0.026 **S***
	Primary education	1	28		
	Secondary education		22		
	Higher secondary education		18		
	Graduation	2	49		
	Post -graduation		21		
4.	Occupation				
	Unemployed	1	8	13.349 df =6	0.02 **S***
	Govt. employed		28		
	Non govt. employed	1	44		
	Self-employed		26		
	Home maker	1	18		
	Daily wager				
	Retired personnel		23		
5.	Marital status				
	Married	2	127	65.361 df =3	0.00 **S***
	Unmarried		17		
	Divorced	1	3		
	Seperated		1		
6.	Monthly Family Income				
	<10,000	2	13	8.189 df = 4	0.085 NS
	10,000-20,000	1	25		
	20,000-30,000		48		
	30,000-40,000		28		
	Above 40,000		33		

7.	Residential area				
	Urban	1	80	0.570	0.752
	Rural	2	67	df =1	NS
8.	How long you have been diagnosed with diabetes mellitus				
	<1 years				
	1-5 years	2	69		
	6-10 years		59	2.949	0.229
	>10 years	1	19	df=2	NS
9.	Have you receive any information on foot care.				
	Yes	2	85	4.227	0.040
	No	1	62	df=1	**S***
10.	How do you control your blood sugar levels.				
	Diet		2		
	Oral hypoglycemic agents	1	50	3.316	0.345
	Insulin Injection	1	71	df= 3	NS
	Both oral plus injection	1	24		
11.	Have you visited any Podiatrist for foot problem.				
	Yes		25	0.625	0.731
	No	3	122	df =1	NS

S* = Significant at p < 0.05, NS = Not significant at p < 0.05, df= degree of freedom.

Chi – square test was used to find out the associations between diabetes foot care self-efficacy and selected socio- demographic variables. The result showed that there was no significant association between foot care self- efficacy and selected socio demographic variables except for education, occupation, marital status and information on foot care as the calculated chi-square values were more than table value at < 0.05 level of significance. Hence the research hypothesis H_3 was rejected and restated that there was no significance association between foot care self-efficacy and selected socio demographic variables.

Table 6: Association between foot care behaviour and selected socio- demographics data. n = 150

Sn.	Socio-demographic variables	Foot Care Behavior Scale LOW	HIGH	Chi-square (χ^2)	P value(≤0.05)
1.	Age in completed years				
	30-39		18		0.002
	40-49		15	17.188	S*
	50-59	4	46	df=4	

	60-69	1	39		
	70-79	1	26		
2	Gender				
	Male	4	70	6.086	0.014
	Female	2	74	df =1	S*
3.	Education				
	No formal education	3	6	36.364	0.00
	Primary education	1	28	df=5	S*
	Secondary education	1	21		
	Higher secondary education		18		
	Graduation	1	50		
	Post -graduation		21		
4.	Occupation				
	Unemployed	2	7		
	Govt. employed	1	27	43.092	0.00
	Non govt. employed	1	44	df=6	S*
	Self-employed	1	25		
	Home maker		19		
	Daily wager				
	Retired personnel	1	22		
5.	Marital status				
	Married	3	126		
	Unmarried	2	15	1.017	0.797
	Divorced	1	2	df=3	NS
	Seperated		1		
6.	Monthly Family Income				
	<10,000	2	13		
	10,000-20,000	2	24	56.250	0.00
	20,000-30,000	2	46	df=4	S*
	30,000-40,000		28		
	Above 40,000		33		
7.	Residential area				
	Urban	2	79	5.324	0.070
	Rural	4	65	df=1	NS

8.	How long you have been diagnosed with diabetes mellitus				
	<1 years				
	1-5 years	3	68	40.625 df= 3	0.00 S*
	6-10 years	2	57		
	>10 years	1	19		
9.	Have you receive any information on foot care.				
	Yes	2	85	4.526 df=1	0.033 S*
	No	4	59		
10.	How do you control your blood sugar levels.				
	Diet		2	6.771 df=3	0.080 NS
	Oral hypoglycemic agents	2	49		
	Insulin Injection	3	69		
	Both oral plus injection	1	24		
11.	Have you visited any Podiatrist for foot problem.				
	Yes	1	24	1.310 df=1	0.519 NS
	No	5	120		

S* = Significant at $p < 0.05$, NS = Not significant at $p < 0.05$, df= degree of freedom.

Chi – square test was used to find the association between foot care behaviour and selected socio-demographic variables. The result showed that, there was no significant association between foot care behavior and selected socio demographic variables except for age, gender, education, occupation, monthly family income, duration of diabetes mellitus and information on foot care as the calculated chi-square values were more than the table value at < 0.05 level of significance. Hence, the research hypothesis stated that there was a significant association between foot care behavior and selected socio demographic variables hypothesis H_3 was rejected and restated that there was no significance association between foot care behavior and demographic variables.

Discussion

This chapter deals with the discussion in accordance with the objectives of the study and hypothesis. The findings obtained from the study are discussed as follows.

The study findings of the present study showed that 2% of the subjects had low foot care self-efficacy and 98% of the subjects had high foot care self-efficacy and 4% of the subjects had low foot care behaviour and 96% of the subjects had high foot care behaviour.

A similar study was conducted by Nuh Huda, Tintin Sukartini (Indonesia 2019). The results showed that only 21 respondents(19.8%) had low self-efficacy and 85 respondents(80.2%) had high self-efficacy and 83

respondents (78.2%) had low foot care behaviour and 23 respondents (21.7%) had high foot care behaviour.

A similar study was conducted by Janu Purwona in Indonesia in 2021. The results showed that 61 respondents had high self-efficacy and perform foot care and 35 respondents had low self-efficacy and did not perform foot care behaviour.

Another similar study was conducted by Yi-Jun Cheng in China. The results showed that 51.4% had moderate foot care behaviour and 42.1% had poor foot care behaviour.

The study was contraindicated by a study conducted by Gupta Saurabh Kumar (North India 2022). The study results revealed that 84% (588) of the respondents had poor foot care behaviour, 16% (112) had satisfactory, and none of the participants were following good foot care behaviour.

The present study showed that there was moderate degree of positive correlation(r=0.382, p=0.000*) between foot care self-efficacy and foot care behaviour and it was statistically significant at 0.01 level of significance. Hence, research hypothesis ($H_{2)}$ is accepted.

The results are consistent with previous study conducted by Janu Purwona in Indonesia 2021. The results showed that there was a relationship between self-efficacy of people with diabetes mellitus and behaviour in foot care activities. (p-value= 0.000(p<0.05), r=0.786).

The study was contraindicated by a study conducted by Nuha Huda, Tintin Sukartini (Indonesia 2019). The results showed that there was a negative relationship between the self-efficacy of people with diabetes mellitus and foot care behaviour (p value=0.001(p<0.05), r= -0.542)

The present study findings showed that there was a significant association found between self-efficacy and sociodemographic variables such as age, monthly family income, duration of diabetes mellitus, how do you control your blood sugar levels and history of visiting podiatrist for foot problem as the calculated chi-square values were more than table value and foot care behaviour was found to be significant association with gender, education, monthly family income and history of visiting any podiatrist for foot problems as the calculated chi-square values were more then table value at <0.05 level of significance. The study findings also showed that there was a significance association between foot care behaviour and selected socio demographic variables such as gender, education, monthly family income and history of visiting any podiatrist for foot problems as the calculated chi-square values were more then the table value at< 0.05 level of significance.

A similar study was conducted by Janu Purwona in Indonesia 2021. The results showed that there was a significant association between variables such as age, gender, ethnicity, religion, education, occupation and foot care self-efficacy and foot care behaviour.

The findings of the study was contraindicated by a study conducted by Manjula GB, Dr. Jayarani Premkumar in Kerela 2018. The results showed that there was no significance association between foot care self-efficacy, foot care behaviour and demographic variables except for age.

Limitation

- Authenticity of the information regarding socio-demographic variables is based on the response of the subjects.
- Limited sample size has been restricted the generalization of the findings.

Conclusion

The findings of the study showed that patients with diabetes mellitus have high self-efficacy and high foot care behavior. An on-going patient education and counseling program led by trained nurse educator should

be initiated at outpatient clinic of tertiary care hospitals. Information booklet on diabetes mellitus, importance of self-efficacy and foot care behavior and prevention of complications of diabetes mellitus could be made available for patients with diabetes at endocrinology OPD'S.

Recommendations

Based on the findings of the study, the following recommendations have been made.

1. The study recommends an education program should be designed and implemented to increase patient's information about foot care self-efficacy and foot care behaviour in order to reduce or prevent foot complications.
2. An informative booklet should be used for facilitating patients with diabetes mellitus as guidance for foot care behaviour.
3. Structured teaching program on improving knowledge, self-efficacy and foot care behaviour among patients with diabetes mellitus.
4. Health professionals must develop competency to address the psychosocial factors affecting diabetes self-care management.
5. Design behavioural intervention programmes for diabetic patients that incorporates strategies to develop self-efficacy.

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