International Journal of Community Medicine and Public Health
Begum S et al. Int J Community Med Public Health. 2019 Jan;6(1):203-207
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: http://dx.doi.org/10.18203/2394-6040.ijcmph20185243

Original Research Article

Foot care practices, its barriers and risk for peripheral neuropathy among diabetic patients attending medical college in rural Puducherry

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Received: 06 September 2018
Revised: 03 December 2018
Accepted: 05 December 2018

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ABSTRACT

Background: Diabetes has becoming an increasing cause of morbidity and mortality worldwide. Along with the rising prevalence of diabetes increase in the complications are expected which will further burden our health care services. Poor knowledge of foot care and poor foot care practices were identified as important risk factors for foot problems in diabetes.
Methods: The present study was a mixed methods study conducted among diabetic patients attending medicine OPD. Quantitative data for foot care practices and peripheral neuropathy was collected from 190 diabetic patients and free listing among 20 diabetic patients was done to identify perceived barriers for foot care practices. Collected data were entered in Epi Info (3.5.3) and analysed using SPSS version 24 software.
Results: The prevalence of peripheral neuropathy among the study participants was 52.9%. Significant association was found between peripheral neuropathy and male sex (p=0.006), occupation (p=0.003), smoking status (p=0.013) and longer duration of disease (p=0.04). The various reasons for poor foot care practices perceived by patients were poor knowledge about foot care, lack of knowledge about complications and health care provider did not teach them.
Conclusions: The prevalence of peripheral neuropathy is common among diabetic patients and most of them are having poor foot care practices so there is a need in the community to lay emphasis on health education programs to improve foot care practices.

Keywords: Peripheral neuropathy, Diabetes foot care, Barriers

INTRODUCTION

Diabetes has becoming an increasing cause of morbidity and mortality worldwide. According to international diabetic federation the prevalence of diabetes among adults in India is 8.7% and it is estimated 36 million undiagnosed cases are present in India in 2015.[1] Along with the rising prevalence of diabetes increase in the complications are expected which will further burden our health care services. One of the important complications among diabetics is diabetic ulcer which leads to amputation.[2] Beside the direct costs of foot complications, there are also indirect costs relating to loss of productivity, individual patients and family costs, and loss of health related quality of life. The lifetime risk of a person with diabetes developing a foot ulcer could be as high as 25%. A study from rural India shows that the prevalence of diabetic foot in outpatients and inpatients is 10.4%.[3]

Of all the complications of diabetes, those that occur in the foot are considered the most preventable. Poor knowledge of foot care and poor foot care practices were identified as important risk factors for foot problems in

diabetes.[4] Evidence suggests that consistent patient education with prophylactic foot care for those judged to be at highest risk may reduce foot ulceration and amputations. Hence the present study was conducted to find out foot care practices among diabetics, perceived barriers and to find out the prevalence of peripheral neuropathy among them.

METHODS

Study setting

The present study was undertaken in the Medicine Out Patient Department (OPD) of Sri ManakulaVinayagar Medical College and Hospital (SMVMCH), Pondicherry. It is tertiary care hospital with 900 beds located in rural Puducherry.

Study period

The present study was conducted for a period of six months during April to September 2017

Study design

We used Mixed method study (Quantitative and qualitative) design for the present study. A convergent design was used as a type of mixed method design in which quantitative data was collected among the diabetic patients and qualitative data including free listing activity was done to identify their perceived barriers for foot care practices. The reason for collecting both quantitative and qualitative data was to bring together the strengths of both forms of research to corroborate results.

Inclusion criteria and exclusion criteria for the study subjects

Diabetics with disease more than 6 months duration was included. Newly diagnosed diabetics with less than 6 months duration and patients with diabetic ulcer were excluded from the study

Quantitative method

Sample size and data collection: Considering the proportion of diabetes with good foot care practices as 67% with 95% confidence limits and a 7.5% precision, design effect of 1, with a 10% of non-response rate the minimum sample size required was 190, calculated using Open EPI version (2.3) software package.

The quantitative data collection was done at the medicine OPD. After obtaining informed consent from the patients trained undergraduate student administered the questionnaire to the respondents consisting of age, sex, education, marital status, socioeconomic status, family history, occupation, duration of disease, co-morbid conditions, smoking, alcohol, type of medications, place of treatment, adherence to treatment and foot care practices. Screening for peripheral neuropathy was done using Michigan Neuropathy Screening Instrument (MNSI) in which a brief physical examination was done involving 1) inspection of the feet for deformities, dry skin, hair or nail abnormalities, callous, or infection; 2) semi-quantitative assessment of vibration sensation at the dorsum of the great toe; 3) grading of ankle reflexes; and 4) monofilament testing. The total possible score is 8 points and any score more than 2.5 was considered abnormal.

Qualitative method

A purposive sample of 20 patients was selected from the OPD. They were asked to make an individual free list of the barriers for the foot care practices. Before each interview, the study details were explained to the participants. The interviews were conducted in the local language (Tamil) and each interview took 10–15 minutes of duration. The participants were informed of the purpose of the study. Qualitative data were collected by the principal investigator and notes were taken. The recruitment of participants was continued until saturation was achieved.

Data analysis

Data thus collected was entered into Epi_info (3.5.3) software package. The entered data were transferred and analysed using IBM SPSS Statistics for windows, version 24 (IBM Corp, Armonk, NY, USA) software. Mean, standard deviation, and proportions were calculated for the variables. Chi‑square test was used for proportions as a test of significance. Multivariate analysis using logistic regression was used to identify the combination of variables that predict the risk for peripheral neuropathy. The barriers for poor foot care practices listed by the patients was manually coded and analysis was done for calculating Smith's S value using Anthropac software (4.98.1/x) (Analytic Technologies, Lexington, KY, USA).

Ethical consideration

The study was carried out after obtaining approval from Research Committee and the Institutional Ethics Committee (IEC code no -32/2017). Informed consent was obtained from the individual respondents and patient's information sheet was kept confidentially and privacy of the individuals was maintained.

RESULTS

In the present study, almost 65% of the participants reported they examine their feet daily and 99 (51.8%) said they examine the shoes or slippers before wearing it daily. The practice of applying oil or moisturizing cream was present in 31 (16.2%) and 101 (52.9%) were wearing slippers without any fastening. Around 75% of study participants reported barefoot walking in and around their house and 54 (28.3%) reported bare foot walking outside their home also (Table 1).

Table 1: Foot care practices of the study participants.

Questions	Yes (n=190)	Percentage (%)
Do you examine your feet daily?	123	64.3
Do you check your shoes or slippers before you put them on?	99	51.8
Do you wash your feet daily?	104	54.5
Do you check your feet are dry after washing?	62	32.5
Do you dry between your toes after washing?	63	33
Do you use a moisturizing cream or oil daily on your feet?	31	16.2
Do you wear slippers with no fastening?	101	52.9
Do you walk in and around the house in barefoot?	143	74.9
Do you walk outside in bare feet	54	28.3

Table 2: Perceived barriers for diabetes foot care by the patients.

Item	Frequency (%)	Average rank	Salience
Lack of knowledge	80.0	1.13	0.780
Lack of knowledge about complications	45.0	2.11	0.303
Nobody taught us	40.0	1.75	0.275
Cultural reasons	45.0	2.67	0.192
Inconvenience	25.0	2.20	0.133
Own myths	15.0	2.67	0.067
Difficult to do it daily	20.0	3.50	0.060

The free listing of patients explored the various reasons for poor foot care practices are poor knowledge about foot care, lack of knowledge about complications, health care provider did not teach them, wearing slippers is not culturally appropriate in some places, inconvenience to do foot care, own myths and difficult to do foot care daily (Table 2).

Table 3: Bi-variate analysis of various factors associated with peripheral neuropathy.

Variables	Peripheral neuropathy n=190		χ^2, df, p value
	Yes (%) n=101	**No (%) n=90**	
Age group			
Less than 60 years	56 (47.9)	61 (52.1)	3.05, 1, 0.1
More than 60 years	45 (60.8)	29 (39.2)	
Gender			
Male	62 (62.6)	37 (37.4)	7.8, 1, 0.006
Female	39 (42.4)	53 (57.6)	
Occupation			
House work	34 (40.9)	49 (59.1)	8.3, 1, 0.003
Other work	67 (56.7)	41 (43.3)	
Education			
Illiterate	35 (59.3)	24 (40.7)	1.4, 1, 0.2
Literate	66 (50)	66 (50)	
Smoking			
Yes	18 (78.3)	5 (21.7)	6.7, 1, 0.013
No	83 (49.4)	85 (50.6)	
Alcohol			
Yes	18 (58.1)	13 (41.9)	0.39, 1, 0.56
No	83 (51.9)	77 (48.1)	
Any other chronic illness			
Yes	44 (53.7)	38 (46.3)	0.035,1, 0.88
No	57 (52.3)	52 (47.7)	
Place of treatment			
Government	34 (45.3)	41 (54.7)	5.9, 2, 0.052
Private	62 (60.8)	40 (39.2)	
Both	5 (35.7)	9 (64.3)	

Continued.

Variables	Peripheral neuropathy n=190		χ^2, df, p value
	Yes (%) n=101	No (%) n=90	
Number of medications			
Less than 2	80 (55.2)	60 (44.8)	1.2,1,0.31
More than 2	21 (45.7)	25 (54.3)	
Duration of disease			
Less than 5 years	45 (45.5)	54 (54.5)	4.5,1,0.04
More than 5 years	56 (60.9)	36 (39.1)	

Table 4: Multivariate regression factors predicting peripheral neuropathy.

Variables	Adjusted OR (95% CI)	P value
Non smoker	0.3 (0.9-0.97)	0.046
Increasing duration of diabetes	1.06 (1.01-1.1)	0.015
Agricultural laborer	2.3 (1.2-4.6)	0.013
Alcoholic	0.41 (0.15-1.1)	0.08
Number of medications consumed	0.78 (0.53-1.1)	0.20

The prevalence of peripheral neuropathy among the study participants was 52.9%. Around 61% of the persons more than 60 years were found have peripheral neuropathy. It was more common among males (62, 62.6%), Illiterate (66, 59.3%) and people involved in labourer and agriculture works (67, 56.7%). It was more common alcoholics (18, 51.8%) and smokers (18, 78.3%) and people having disease more than 5 years (56, 60.9%). Statistically Significant association was found between peripheral neuropathy and male sex (p=0.006), occupation (p=0.003), smoking status (p=0.013) and longer duration of disease (p=0.04) (Table 3).

Multiple logistic regression analysis showed that after adjusting for other variables, non smoker (Adjusted OR 0.3, 95% CI-0.9-0.97), increasing duration of diabetes (Adjusted OR 1.06, 95% CI-1.01-1.1), agricultural labourer (Adjusted OR 2.3, 95% CI-1.2-4.6) showed significant association with peripheral neuropathy. The Naegelkerke's R square for this model is 16.1% (Table 4).

DISCUSSION

The present cross sectional study was conducted among diabetic patients to find the foot care practices, its barriers and risk factors for peripheral neuropathy. Foot care practices shows that 65% of the study participants examine their feet daily. Barefoot walking was present among 28.4% study participants outside their home. Lack of knowledge about disease and foot care is the common barriers to practices of foot care. Overall, the prevalence of peripheral neuropathy was around 52.9%. It was significantly associated with male sex, occupation, smoking status and longer duration of disease. Multiple variate analysis shows the significant predictors for peripheral neuropathy were duration of disease, smoking status and occupation.

The present study is a hospital based study in a rural area conducted among good sample of 191 diabetic patients. It highlights prevalence of peripheral neuropathy among diabetics in a rural area and possible reasons for it. It also highlights foot care practices and barriers to it.

Around 65% of the study participants examined their feet daily but almost 75% of them reported barefoot walking in and around their house and 28.3% reported bare foot walking outside their home also. A study from Vellore reported that 87% of their study participants walked barefoot in the house and 10.4% outside their home.[4] A study from Nigeria reported 62% of diabetics attending their tertiary centre have reported bare foot walking.[5]

In the present study the prevalence of peripheral neuropathy was 52.9%. In a similar study from Tamil Nadu reported 47% of peripheral neuropathy among the study participants. In a hospital study from Mangalore reported 29.2% of their study population had a peripheral neuropathy.[6] A hospital study from Karnataka shows the prevalence was found 24.5% of the study participants.[7] The prevalence of peripheral neuropathy varied from 15% to 60% in different studies done in India.[8,9] The variations could be because of the variations in the instruments used to detect peripheral neuropathy and in the present study Michigan Neuropathy Screening Instrument was used.

The significant predictors for peripheral neuropathy found in the present study were smoking status, duration of diabetes and occupation. In a study from Chandigarh reported age, duration of disease, dyslipidaemia, glycated haemoglobin and micro vascular complications were the predictors for peripheral neuropathy.[10]

This study highlights some areas of foot care practices that are deficient in the rural population with diabetes.

These findings can be used to guide a health education program on foot care for people with diabetes. Emphasis should be laid on these deficient areas during health education and misconceptions should be cleared. With the presence of high prevalence of peripheral neuropathy in the population, screening for neuropathy and foot complications is recommended in all patients on a regular basis. Periodic examination of the foot is a must in all patients with diabetes.

CONCLUSION

The prevalence of peripheral neuropathy is common among diabetic patients and most of them are having poor foot care practices so there is need in the community to lay emphasis on health education program to improve foot care practices and regular screening for peripheral neuropathy to reduce complications and to improve health care outcomes.

ACKNOWLEDGEMENTS

We are thankful to Indian council of Medical Research, New Delhi for accepting this work under Short Term Studentship program and the management of Sri Manakula Vinayagar Medical College and Hospital (SMVMCH), Pondicherry for supporting this study.

Funding: ICMR STS
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Begum S, Venkatesan M, Ganapathy K. Foot care practices, its barriers and risk for peripheral neuropathy among diabetic patients attending medical college in rural Puducherry. Int J Community Med Public Health 2019;6:203-7.