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Corresponding Author
J. Gurukartick,
Department of Community Medicine, Government Mohan Kumaramangalam Medical College and Hospital, Salem, Tamil Nadu, India

Author Designation
[1,2,4,5,6] Assistant Professor
[3]Senior resident
[7]Research Scientist
[8,9]Professor

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Knowledge and Practices Regarding Foot-Care among Diabetic Patients in Tertiary Care Hospitals in Tamil Nadu

[1]S. Dhanalakshmi, [2]S. Vaishnavi, [3]A. Muralitharan, [4]S. Rajesh Kanna, [5]S. Ramya, [6]J. Gurukartick, [7]R. Dinesh Babu, [8]M. Durai Murugan and [9]K. Chellavel Ganapathi

[1,4,5,6,8,9]Department of Community Medicine, Government Mohan Kumaramangalam Medical College and Hospital, Salem, Tamil Nadu
[2]Department of Obstetrics and Gynaecology, Government Medical College and Hospital, Virudhunagar
[3]Department of General Medicine, Government Medical College and Hospital, Karur
[7]Multi-disciplinary Research Unit, Government Mohan Kumaramangalam Medical College and Hospital, Salem, Tamil Nadu

Abstract
Diabetes mellitus is a major public health problem in India. The life time risk of developing a foot ulcer in DM is estimated to be 15%. The patients with foot problem spend 32.3% of the total income towards treatment. The objective of the study was to assess the knowledge and practices regarding foot care among diabetic and to estimate the association of the factors with knowledge and practices of foot care. This cross-sectional study was conducted among Diabetic mellitus with more than 5 years. Convenient sampling was followed. The result of our study showed that the mean knowledge among the various components was 38.4%. Only 27.7% of patients followed good foot care practices. Majority of the study participants nearly 75% of them were above 50 years of age. About 33.9% were illiterate and 65.8% belonged to upper lower and lower middle socio-economic class in this study. The duration of diabetes improved the knowledge of the patients. The foot care practices was more in male. The foot care practices were more in upper and middle social classes as compared to the lower socio-economic status. The above-mentioned association is statistically significant. Foot care advice received previously had a significant increase in practices, so that health education regarding diabetic foot care knowledge should be improved to prevent the diabetic foot ulcer morbidities

INTRODUCTION

Diabetes mellitus (DM) is a major public health problem with rising prevalence worldwide. Globally, in 2021 about 537 million people were known to have diabetes. About I in 10 people have diabetes. This estimate is expected to increase to 643 million by 2030 and to 784 million by 2045. This implies a 46% increase in disease burden. Similarly, the projected score implies a 68% increase in disease burden for the south east Asian region[1].Among diabetes mellitus, the lifetime risk of developing a foot ulcer is estimated to be 15%[2]. Diabetes mellitus contributes up to 8 of 10 non-traumatic amputations of which 85% follow a foot ulcer[3].The costliest and feared consequence of a foot ulcer is limb amputation, which occurs 10-30 times more often in diabetic persons than in general population[4]. Prevention of diabetic foot ulceration is critical in order to reduce the associated high morbidity and mortality rates. The contributory factorslike peripheral neuropathy, mechanical stress and peripheral vascular diseases work together to cause foot ulceration in patients with diabetes. The lack of protective sensation from sensory neuropathy leads to repeated trauma in an area of high pressure that result in ulceration. Although the end results of diabetic foot ulceration may be devastating, though the development of ulceration is preventable. Patient education regarding foot hygiene, skin care, nail care, preventive footwear and appropriate foot care administered by qualified professionals can reduce injuries that may lead to foot ulceration. In a South Indian study, it was found that patients without foot problems spent 9.3% of total income while those with foot problem had to spend 32.3% of their total income towards treatment[5]. The cost burden is so high that this will lead to treatment non-adherence and financial burden[6]. The GDP (%) spent on medical care is so high[7].It is also reported that every 30 seconds, one lower limb amputation in diabetes patients is occurring around the world[1].

The specific objectives were

- to assess the knowledge and practices regarding footcare among DM patients and
- to estimate the association of various diabetes related factors with knowledge and practices of foot care

MATERIALS AND METHODS

This cross-sectional study was conducted at Salem, Tamil Nadu during February to April 2023. The respondents were 780 diabetic patients with more than 5 years duration. The exclusion criteria of this study were seriously ill and diabetic ketoacidosis patients. We used convenient sampling. This is a multi-centric study with patients recruited from Virudhunagar (n=120), Salem (n=540) and Karur (n=120). The patients attending the diabetes out-patient clinic of the respective Government Medical College Hospitals were recruited. The respective authors did the data collection in Epicollect 5, which is a mobile platform to ensure accuracy and avoid errors in data entry. The pre-structured questionnaire contains socio-demographic details, other factors and questions regarding knowledge and practices of foot care. The socioeconomic status was based on modified Kuppusamy classification.

Ethics Approval: The Data collection was done after getting approval from the Institutional Ethics committee by using pre-structured questionnaire. Love, beneficence and justice were followed in the conduct of the study.

Data Analysis: Number and proportion was used for categorical variables. The Dataanalysis was done using SPSS 12.0.1 software (SPSS Inc., Chicago, Illinois, USA) package. The association of various factors for diabetic foot care knowledge and practice was done using univariate logistic regression analysis. The alpha error was set at 0.05. The $p<0.05$ was considered as statistically significant.

RESULTS AND DISCUSSIONS

Nearly half of the patients were above 60 years of age (n = 383). Gender distribution shows more male (420, 53.8%) as compared to female. Nearly 72% (565) of them live as nuclear families. About 33.9% (264) are illiterate. About 65.8% (514) of patients belonged to lower middle and upper lower socio-economic class. About 70.3% (548) have 5-10 years duration of diabetes. (Table 1)

About 44% (343) were aware of the importance of daily inspection of foot but only 38.1% (297) practiced it. Unfortunately, inspection of feet with mirror was known by 4.9% (38) and practised by 2.8% (22) only. Washing the feet with lukewarm water was known by 26.9% (210) and only 18.6% (145) practised. Drying the skin between toes was known to 63.7% (497) and only 17.4% (136) followed the same in practice. About ninety percent of the diabetes patients were aware and practised wearing footwear when they were outside the house. About 66.7% (520) had a good knowledge related to cutting of nails straight with sharp instruments and filing the corners with a nail file but only 16.6% (129) followed it. The habit of applying oil or lotions to feet was little known and only 28.6% (223) knew it and even lesser proportion about 12.1% (94) followed it. Changing slippers every year was also

Table 1: The socio demographic characteristics of diabetic patients in our study done in tertiary care hospitals, tamil nadu.

Variables	Frequency (N)	Percentage (%)
Age in years (n = 780)		
<40	40	5.1
40-50	142	18.2
51-60	215	27.6
>60	383	49.1
Gender		
Male	420	53.8
Female	360	46.2
Marital status		
Married	764	97.9
Unmarried	11	1.4
Divorced	5	0.7
Type of family		
Nuclear family	565	72.4
Joint family	167	21.4
Three generation family	48	6.2
Education of the patient		
Illiterate	264	33.9
Primary school	182	23.3
Middle school	128	16.4
High school	119	15.3
Higher secondary	32	4.1
Graduate degree	24	3.1
PG / professional degree	30	3.9
Socioeconomic status		
Upper class	13	1.7
Upper middle	133	17.1
Lower middle	243	31.1
Upper lower	271	34.7
Lower class	120	15.4
Duration of Diabetes Mellitus in years		
5-10	548	70.3
11-20	192	24.6
≥20	40	5.1

Table 2: Awareness and knowledge of the respondents about foot care of diabetic patients in our study done in tertiary care Hospitals in Tamil Nadu.

Variables related to foot care	Knowledge score		Practice score	
Awareness (n = 780)	**Good n (%)**	**Poor n (%)**	**Good n (%)**	**Poor n (%)**
Daily feet inspection	343 (44)	437 (56)	297 (38.1)	483 (61.9)
Daily inspection with mirror	38 (4.9)	742 (95.1)	22 (2.8)	758 (97.2)
Daily washing of feet	610 (78.2)	170 (21.8)	466 (59.7)	314 (40.3)
Washing with lukewarm water	210 (26.9)	570 (73.1)	145 (18.6)	635 (81.4)
After washing, drying the skin between toes	497 (63.7)	283 (36.3)	136 (17.4)	644 (82.6)
Application of powder to interdigital spaces	115 (14.8)	665 (85.2)	29 (3.7)	751 (96.3)
Foot-wear usage outside the house	725 (92.9)	55 (7.1)	704 (90.2)	76 (9.8)
Wiggling of toes while sitting	64 (8.2)	716 (91.8)	51 (6.6)	729 (93.4)
Foot-end elevation while sitting	37 (4.7)	743 (95.3)	37 (5)	743 ()95
using sharp instruments to cut nails straight and trim the corners	520 (66.7)	260 (33.3)	480 (61.5)	300 (38.5)
Changing slippers every year	213 (27.3)	567 (72.7)	129 (16.6)	651 (83.4)
Applying oil or lotions to feet	223 (28.6)	557 (71.4)	94 (12.1)	686 (87.9)

Table 3: Univariate logistic regression on knowledge regarding diabetic foot care and associated factors in Tertiary care Hospitals in Tamil Nadu.

Factors related to foot-care	Knowledge score		Unadjusted odds ratio	Confidence interval	p-value
	Good n (%)	**Poor (%)**			
Duration of diabetes mellitus in years					
< 10 years	346 (44.4)	202 (25.9)	1.46*	1.05 – 2.05	0.02
> 105 years	166 (21.3)	66 (8.4)			
Sex					
Male	199 (47.4)	221 (52.6)	0.82	0.62 – 1.09	0.17
Female	188 (52.1)	172 (47.9)			
Socio-economic status					
Lower	148	233	0.95	0.72 – 1.27	0.73
Upper and middle	156	233			
Education					
Illiterate	89	175	1.02	0.75 – 1.4	0.87
Literate	171	345			

*p value <0.05 is considered statistically significant

Table 4: Univariate logistic regression onpractices regarding diabetic foot care and associated factors in Tertiary care Hospitals in Tamil Nadu.

Factors related to foot-care	Practice score		Unadjusted odds ratio	Confidence interval	p-value
	Good n (%)	Poor (%)			
Duration of diabetes mellitus in years					
< 10 years	289	259	1.35	0.99 – 1.84	0.06
> 10 years	105	127			
Sex					
Female	171	189	1.38*	1.04 – 1.84	0.03
Male	166	254			
Socio-economic status					
Lower	139	250	1.64*	1.2 – 2.23	0.001
Upper and middle	99	292			
Education					
Illiterate	89	175	0.86	0.61 – 1.2	0.39
Literate	171	345			

less known. Only 27.3% (213) knew it and 16,6% (129) practised it. (Table 2) As seen in (Table 3), those with diabetes for more than 10 years are 1.46 times more knowledgeable than those with <10 years duration and this is statistically significant. Diabetic foot care practices are 1.38 times more in male as compared to female and this association is statistically significant. Diabetic foot care practices are 1.64 times more in upper and middle class as compared to lower class which is statistically significant. (Table 4).

The result of our study showed that the mean knowledge among the various components was38.4%. Only 27.7% of patients followed good foot care practices. Majority of the study participants nearly 75% of them were above 50 years of age. About 33.9% were illiterate and 65.8% belonged to upper lower and lower middle socio-economic class in this study. The duration of diabetes improved the knowledge of the patients. The foot care practices was more in male. About 33.9% (264) are illiterate. About 65.8% (514) of patients belonged to lower middle and upper lower socio-economic class. About 70.3% (548) have 5-10 years duration of diabetes. The foot care practices were more in upper and middle social classes as compared to the lower socio-economic status. The above-mentioned association is statistically significant. In Hasnain *et al* study only 15% had good knowledge and 15% had good foot care practices[8]. In Sutariya PK *et al* study only 23% patients had good knowledge, 50% patients had satisfactory knowledge and 27% had poor knowledge about diabetic foot care[9]. About half of the patients had poor practice. Similar to the above two studies, the knowledge and practice components differ in our study too. An educative module with regular emphasis will bring about a behaviour change communication and improve the scores in both the components. A qualitative in-depth interview would guide us in understanding the difference better and generating newer hypothesis.

Sutariya PK *et al* study showed that 61.1% of patients belonged to the age group of 51-70 years[9].This is similar to L.N.D, Murty P study with more male (Male 54.7%)[10]. Our study also shows a male preponderance as explained by other studies. In our study, 3/4th had 5-10yrs of DM. In Sutariya PK *et al* study, 53.4 % had more than 10 years duration[9]. The association between knowledge and practice score was significant in Sutariya PK *et al* study who had a lower sample size but we could not establish the same with a comparatively higher sample size. This could probably be attributed to the greater experience gained by the patients having the illness for a longer duration. Secondly, the educational status among our respondents was poor as 75% of them were illiterate, completed primary and middle school education only. Thus, patient education on the prevention of foot ulceration is imperative and should be incorporated into the routine care of patients with diabetes both in the hospital and community. Time must be allotted to communicate information and education during working sessions[12]. Furthermore, the education of the physician is highly imperative to complement and reinforce the behaviours of the patient with regards of foot care, they need to learn and imbibe the skills about risk assessment[11].

The results of the study are a wakeup call on the physician and nurses to establish a patient and physician friendly educational programme that will enhance and sustain the good knowledge of foot care[12].Strategies to disseminate foot care knowledge when not formulated in time, it may lead to many non-preventable diabetic feet complication[13].

CONCLUSION

Nearly fifty percent of the patients with diabetes foot ulcer were more than 60 years old. About 44% were aware of the importance of daily inspection of foot but only 38% practiced it. Drying the skin between toes was known to 63.7% and 17.4% followedit in practice. Ninety percent of the diabetes patients were aware of wearing footwear when they were outside the house and practised it. About 66.7% had a good knowledge related to cutting of nails regularly. Nearly, 92% of those who were aware followed it. Regular screening for sugar and other systemic screening for illnesses is associated with foot care knowledge among patients.

Recommendation: Patient education in the form of posters, power point presentation regarding foot care practices and IEC materials will remain a cornerstone in the development of knowledge and practices regarding foot care. A continuous systematic approach to constantly remind them about foot care will bring about a behavior change in them and in turn reduce foot ulcer complications in diabetes.

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