Original Research Article

DOI: http://dx.doi.org/10.18203/2394-6040.ijcmph20173816

Assessment of awareness and practice of foot care and physical activity among people with type 2 diabetes attending a tertiary care teaching hospital

Deepa L. N.1*, Pallavi Murty¹, Madhavi Reddy², Muninarayan C.1, Soumya Shetty³

Received: 14 July 2017 Revised: 08 August 2017 Accepted: 09 August 2017

*Correspondence: Dr. Deepa L. N.,

E-mail: deepa.a.patil@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Diabetes Mellitus is one of the leading non communicable diseases in India. Associated complications are also on rise. Knowing about self-care becomes important to prevent these complications in them. This study was done to determine the level of awareness and practice of foot care among type 2 diabetes patients attending a tertiary care center.

Methods: A cross sectional descriptive study done by interviewing 106 diabetic patients attending a teaching hospital in Kolar, using pretested questionnaire.

Results: In the present study the mean (SD) of awareness and practice of foot care were 5.33 (3.09) and 6.54 (2.94) respectively. Low mean scores were significantly associated (p<0.05) with lack of formal education and not receiving advice on foot care by doctors. Only 51.9% of them were educated regarding foot care while 77% of the subjects were advised to do physical activity. Only 8.5% of them had good knowledge, 35.8% had satisfactory level and more than 50% of them had poor or very poor knowledge regarding foot care. On the other hand about 15.1% of the study participants' foot care practice was good, 36.8% were satisfactory and 48.1% were poor or very poor in foot care practice. A strong positive correlation (r=0.85) was observed between level of awareness and practice of foot care which was statistically significant (p<0.001).

Conclusions: Low mean scores of awareness and practice suggests that there is a need for focused educational intervention on foot care to all diabetic patients in order to prevent foot complications in them.

Keywords: Diabetes, Foot care, Awareness, Practice, Physical activity, Patients

INTRODUCTION

Diabetes mellitus is one of the most common chronic diseases across the world and number is on rise all over. But the major increase in people with diabetes is reported to occur in developing countries. WHO estimates 60% of diabetic population will be from developing countries of Asia by 2025. ^{1,2} According to the International Diabetes Federation (IDF), the global diabetes prevalence for the

year 2013 was found to be 8.3%, affecting 382 million adults and it is estimated to increase to 8.8% and 592 million adults by 2035. 2,3

Currently, India is a country with second highest number of people with type 2 DM. With this there is rise in associated complications as well which has increased individual's health expenditure.⁴

¹Department of Community Medicine, ²Department of Medicine, Sri Devraj Urs Medical College, Kolar, Karnataka, India

³Bio Statistician, Center for Health and Development, Mangalore, Karnataka, India

Diet, physical activity and drugs are the key to management of diabetes. Apart from diet and drugs physical activity is very important because it is well documented that it helps insulin work well, keeps weight down and is good for heart blood vessels and lungs. It has been estimated to reduce the risk of coronary heart disease in people with diabetes by 35%-55%, and also protect against the development of the metabolic syndrome. 5,6 The American Heart Association (AHA) and American Diabetic Association (ADA) new guidelines, recommend moderate intensity of physical activity (i.e., 30 minutes of moderate intensive physical activity > or = 5 days/week) for most patients, particularly those with type 2 diabetes.⁷

Diabetes is associated with a wide spectrum of complications involving almost all the major systems of the body. They are coronary artery disease, nephropathy, retinopathy, micro albuminuria and neuropathy. Diabetic neuropathy is one of the most common and serious complications. A rural Indian study cited that the prevalence of diabetic foot ulcer among outpatient and inpatient diabetics was found to be 10.4% and around 8.7% of people suffered from foot ulcer or blisters in diabetes during 1st year of onset.^{5,8}

Unless diabetes is managed well, individuals living with it are at an increased risk of developing complications out of which diabetic peripheral neuropathy is the most common complication especially Indian diabetics.^{6,9} Advanced peripheral neuropathy results in insensitivity facilitating trauma, altered proprioception and small muscle wasting which leads to altered weight loading under the foot on standing and walking and may develop weakness, functional and structural alterations and later foot ulcer or deformity. ^{6,10} It has been observed that about 10% to 15% of people with diabetes will develop a foot ulcer at some point and have shown that about 5-24% of them foot will progress and finally lead to limb amputation.11

It has been shown that people with poor knowledge & practice of foot care had higher incidence of foot ulcers and adoption of foot care practices has shown to reduce foot problems among diabetic patients. 12,13 Good knowledge and practice regarding diabetic foot care will reduce the risk of diabetic foot complications and ultimately amputation. This study is conducted to assess patients' knowledge and practice of diabetic foot care. Also to determine the level of physical activity practiced among diabetic patients in order to plan an intervention strategy.

METHODS

A hospital based cross sectional study was done in a tertiary care hospital in Kolar. It's a 600 hundred bedded hospital with patients coming in from Kolar city and surrounding villages and towns. All known type 2 Diabetic patients who were on treatment for diabetes at

least for last 1yr, aged >20 yrs, who gave consent to participate in the study were included in the study. Newly diagnosed and known diabetic for less than 1 year were excluded from the study. This study was undertaken from July 2015 to October 2015. A total of 106 subjects were included in the study. Sample size was calculated based on the awareness of foot care from a cross-sectional, multi-centric study done in India by Dixit et al using the formula:8

$$n = \frac{z^{2\alpha/2}}{\frac{p(1-p)}{d^2}}$$

where p=0.42, (1-p)=0.58 and $z^{\alpha/2}$ at 95% CI=1.96 with 10% absolute precision (d) at 95% confidence limits, sample size (n) was 94. Expecting 10% non-response, the final sample size of 106 was taken for the study.

The purpose of the study was explained and written informed consent was obtained from the willing subjects. Data was collected by interviewing the eligible consented subjects using a predesigned questionnaire which had questions on demographic details, on diabetes-diagnosis, duration, mode of treatment and self-reported family history. Basic anthropometric measurements to assess the nutritional status such as height, weight and waist circumference were measured using standard methods.

The study participants were asked to list the measures they should take to prevent diabetic foot problems and were encouraged to name as many as possible to know their awareness on foot care. To get the details of foot care practice, a set of twelve measures were read out and asked to say yes or no for each of the measure. Information on practice of physical activity to control diabetes was also collected. Following the interview every patient was educated on correct foot care practices and other self-care practices which help to prevent complications.

Statistical analysis

Data was coded and entered in Microsoft excel spread sheet. The level of awareness and practice of diabetic care were calculated by summing up the scores for awareness and the scores for practice of foot care. It was considered as good, satisfactory, poor or very poor depending on the scores obtained which was more than 75%, between 50%-75%, between 25–50% and <25% respectively. Analysis was done using Open Epi-info software.

The collected data has been summarized and presented as absolute frequencies, proportion, range, mean and standard deviation for demographic data like age, duration and scores on awareness and practice of foot care. The chi square test was applied to find association between level of awareness and practice scores. Scatter plot to show the correlation between practice scores and awareness scores was also used. One way ANOVA was

used to find the statistical significance of the awareness and practice mean scores across demographic variables.

Ethical clearance was obtained from Institutional Ethical Committee of our institution. In addition informed consent was obtained from study participants and right to refuse or terminate at any point of interview was assured.

RESULTS

A total of 106 subjects were interviewed out of which 58 were men and 48 were women with mean age being 56.17±11.16 ranging from 30 yrs to 60 yrs. Majority (62%) were between 45–65 yrs of age.

Table 1: Socio demographic profile of the study participants.

Particulars	Frequency (n=106)		
Age	(11–100)	(%)	
<45 years	19	17.9	
45–65 years	66	62.3	
>65 years	21	19.8	
Gender			
Male	58	54.7	
Female	48	45.3	
Religion			
Hindu	89	84	
Muslim	14	13.2	
Christian	3	2.8	
Education			
Illiterate	32	30.2	
Primary	30	28.3	
High school	22	20.8	
PUC	12	11.3	
Degree and above	10	9.4	
Duration of DM			
<10 years	85	80.2	
10–20 years	14	13.2	
>20 years	7	6.6	
Mode of diagnosis			
Incidental	24	22.6	
Screening	21	19.8	
Symptomatic	61	57.5	
Mode of treatment			
Only OHA	60	56.6	
Insulin	21	19.8	
Insulin+OHA	25	23.6	

A total of 30.2% (32) were illiterate (49% women and 11% men), 84% were Hindu, about 80% were suffering from DM since less than 10yrs (mean and SD of 7.6 and 7.08), ranging from 1 yr to 40 yrs. 60 (56.6%) of the subjects were managed with Oral Hypoglycemic Agents (OHAs) alone, 25 (23.6%) were managed with both insulin and OHAs. Out of the total 106 subjects, only

19.8% were diagnosed to be diabetic by screening, rest all were diagnosed either with symptoms (57.5%) or incidental (22.6%) when they came for other health problems (Table 1).

Physical activity

In this study, about 11% of diabetic patients were obese and 32% were pre obese (based on BMI). It was also observed that around 6 subjects were under weight.

77% of the subjects were advised to do physical activity and majority (70.8%) of them got this education by treating doctor, 7.5% by counselor. Out of them only 27 (25.5%) of them perceived their physical activity to be increased after diagnosis of diabetes, 38.7% said it has remained the same and 16% of them that it has decreased compared to pre diabetic state mainly due to tiredness.

Table 2: Practice of physical activity among study subjects.

Particulars	Frequency	Percentage				
1 at ticulars	(n=106)	(%)				
Practice physical activity						
Yes	54	50.9				
No	52	49.1				
Frequency of physical activity						
Zero	52	49.1				
Less than 5 days a week	35	33				
Daily/5 days a week	19	17.9				
Duration of physical activity						
Zero	52	49.1				
<30 minutes	28	26.4				
>30 minutes	26	25.5				
Advised regular physical	Advised regular physical activity					
No	28	22.6				
Yes	82	77.4				
Advised by whom*						
Doctor	75	70.8				
Health worker or	8	7.5				
counsellor	O	1.5				
Others	31	29.8				

(* multiple answers)

Only 50.9% of the diabetics said that they practiced some form of physical activity. Out of them 19 (17.9) of them said they practice it daily or 5 days a week, rest of them (35) practice for less than the recommended 5 days a week. Only 25% (26) of them practiced it for 30 mins and above each time (Table 2).

Awareness and practice of foot care

Mean scores and standard deviation of awareness on and practice of foot care among the diabetic patients was 5.33±3.09 and 6.54±2.94 respectively. Only 51.9% of them were educated regarding foot care by treating doctors and about 6.6% by diabetic counselor. Rest of

them came to know about foot care through family members, relatives, friends and media. Higher level of education, longer duration of diabetes and having received information on foot care by doctors were associated with higher mean scores (Table 3).

Table 3: Mean scores of knowledge and practice of foot care among diabetic patients.

Characteristics	Total population N=106	Mean (SD) awareness	P value	Mean (SD) Practice	P value
Age (in years)					
< 55	53	5.21 (3.3)	0.68	5.92 (3.05)	0.57
>55	53	5.45 (2.9)	0.08	5.6 (2.8)	0.57
Gender					
Female	58	5.31 (3.18)	0.94	5.81 (2.81)	0.95
Male	48	5.35 (3.02)	0.54	5.71 (3.04)	0.85
Education level					
No formal education	32	5 (2.71)	_	5.03 (2.70)	
Primary education	30	4.33 (3.14)	0.02 *	4.83 (2.74)	
High school	22	6.14 (2.93)	0.02	6.73 (2.86)	0.004 *
PUC	12	5.25 (3.49)		6.25 (2.86)	
Degree and above	10	7.7 (2.86)		8.24 (2.48)	_
Duration of T2DM (years)					
< 5	55	5.45 (3.01)	_	6.00 (2.80)	
5–10	30	4.33 (3.01)	0.053	4.73 (2.99)	0.05
>10	21	6.43 (3.15)		6.62 (2.78)	
Received advice on foot care					
None	27	3.52 (3.74)	<0.001 *	4.30 (3.24)	
Doctor/health personnel	54	6.39 (2.52)		6.69 (2.47)	0.001 *
Others	25	5.00 (2.53)		5.36 (2.76)	

^{*}p<0.05.

Table 4: Association between awareness and practice.

A recommended document	Practice scores	Practice scores		Chi square/p value	
Awareness scores	Not satisfactory (%)	Satisfactory (%)	Total (%)		
Not satisfactory	55 (94.8)	4 (8.3)	59 (55.7)	- 79.616/<0.001	
Satisfactory	3 (5.2)	44 (91.7)	47 (44.3)		
Total	58 (100)	48 (100)	106 (100)		

There was a statistically significant association between awareness and practice (p<0.001).

Around 90% of them were aware not to walk barefoot, 76% knew to wear only comfortable fit foot wear and 69% knew that they have to change ill-fitting foot wear. Only around 18% of them knew that they have to check feet daily, examine toe space and 13% were aware to apply moisturizer to keep feet smooth. More than 50% were aware that they have to trim their nails carefully and make an effort to avoid injuries.

About 89.6% of the study subjects practiced use of foot ware outdoors, 85% wear only comfortable fit foot ware and another 64.2% practice daily washing of feet. Only 13.2% apply moisturizer and 27.4% examine toe space. Trimming nails carefully and consciously avoid injuries is practiced by 55.5% and 53.8% respectively.

A total of 12 aspects of diabetic foot care considered. Each foot care measure was given a score of 1 maximum

score was 12. Each participants' level of awareness and practice of foot care was grouped based on their scores, into 4 quartiles as good, satisfactory, poor and very poor levels. Overall only about 9 (8.5) of them had good knowledge, about 38 (35.8%) had satisfactory knowledge and more than 50% (59) of them had poor or very poor knowledge on foot care. On the other hand about 15.1% of the study participants' foot care practice was good, 36.8% were satisfactory and 48.1% were poor or very poor in foot care practice. It was further regrouped into those scored above 6 as satisfactory and scores less than 6 as not satisfactory for both awareness and practice.

We found a statistically significant association between level of awareness and practice of foot care (p<0.001) (Table 4). Further there was a strong positive correlation (r=0.85) between practice and awareness scores which was found to be statistically significant (p<0.001) (Figure 1).

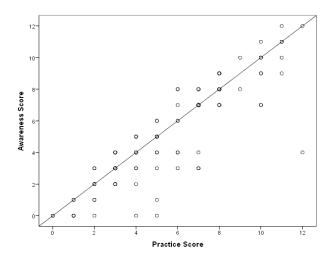


Figure 1: Scatter plot of correlation between practice score and awareness score.

DISCUSSION

This study was done to assess the knowledge and practice of foot care among type 2 diabetic patients in order to design a regular educational program for diabetic patient visiting the hospital for various reasons. It was found that the mean score of knowledge as well as practice was below satisfactory level. Also found a significant association between level of foot care knowledge and practice which showed positive correlation (r=0.87, p \leq 0.001)

Daily foot care is one of the important aspects of self care in diabetes. It is very essential for preventing diabetic foot problems. In the present study only 51.9% (55) of them were educated regarding foot care by treating doctors which was similar to the findings in study done by Dixit et al.⁸ Whereas 56.4% of the population in urban area and 46.6% of the population in the rural area were educated on foot care and is better than what was found in Nigerian study where only 8% were educated. But overall when compared to physicians giving education on doing regular physical activity (75%), less number (only 50.9%) were educated on foot care.

Of the foot care measures that were known, around 90% of them were aware not to walk barefoot, to wear only comfortable fit foot wear. Only around 18% of them knew that they have to check feet daily, examine toe space and apply moisturizer to keep foot smooth. More than 50% were aware that they have to trim their nails carefully and make an effort to avoid injuries. Awareness level on these measures is better than the findings in Nigerian study. Leven the practice of foot care is better in our study where 95 subjects practiced use of foot ware outdoors, 13.2% apply moisturizer and 27.4% examine toe space and 57.5% trimmed nails carefully, 53.8% consciously avoid injuries, while in the other study only 8 (5.8%) consciously made an effort to avoid injuries to their feet and 4 (2.9%) clipped their toenails with care.

This study revealed that the mean score on awareness of foot care (5.33±3.09) is not at satisfactory level which is similar to the findings in other studies done worldwide. ¹⁴ Mean knowledge score was influenced by level of education, duration of DM and advice on foot care. Patients who were illiterate had lower mean score, as did those with DM duration less than 5 yrs and those who had not received advice on foot care. Khamesh et al and Faraja et al also found that low knowledge score were attributed to low level of education and to not receiving advice on foot care which was similar to our study, where we found higher education and receiving advice from doctors was associated with higher mean scores of knowledge and practice of foot care; which was statistically significant (Table 3). ^{20,21}

Educated people are more likely to read and get information regarding foot care in addition to information received at hospitals.

CONCLUSION

From this study we can conclude that awareness on foot care as well as practice of foot care among known diabetic patients attending this hospital is not at satisfactory level. It is an eye opener for the health care providers to change their approach in giving care to diabetic patients. The treating doctor should routinely educate diabetic patients on foot care measures to be adopted to prevent diabetic foot problems. The institution also can think of having a system and separate team for providing health education to diabetic patients, on all aspects of self-care including foot care; so that, many complications can be prevented.

ACKNOWLEDGEMENTS

This study was supported by ICMR. Authors are thankful to our institution for allowing us to take up the project.

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

REFERENCES

- Kasinathan D, Girijakumari NR, Marimuthu PN, Ramar M, Muthusamy K. Awareness on Type II Diabetes and Its Complication among Sivaganga District Population in Tamilnadu: A Cross Section Survey. J Adv Sci Res. 2013;4(1):38-42.
- Mohan V, Mathur P, Deepa R, Deepa M, Shukla DK, Menon GR, et al. Urban rural differences in prevalence of self-reported diabetes in India—The WHO–ICMR Indian NCD risk factor surveillance. Diabetes research and clinical practice. 2008;80(1):159-68.
- IDF Diabetes Atlas, Executive Summary, International Diabetes Federation, 6th edition, 2013.

- Available at: file:///C:/Users/comp/Downloads/english-6th.pdf. Accessed on June 2017.
- 4. Saurabh S, Sarkar S, Selvaraj K, Kar SS, Kumar SG, Roy G. Effectiveness of foot care education among people with type 2 diabetes in rural Puducherry, India. Indian J Endocrinol Metabol. 2014;18(1):106.
- 5. Al-Kaabi J, Al-Maskari F, Afandi B, Parkar H, Nagelkerke N. Physical activity and reported barriers to activity among type 2 diabetic patients in the United Arab Emirates. RDS. 2009;6(4):271.
- 6. Dixit S, Kumar S. Awareness of Diabetic Foot complications in Type 2 Diabetes Populations in Rural India: Are we doing enough? Diabetes Metabol. 2014;5:363.
- 7. Mehra BR, Thawait AP, Karandikar SS, Gupta DO, Narang RR. Evaluation of foot problems among diabetics in rural population. Indian J Surg. 2008;70(4):175-80.
- 8. Dixit S, Maiya A, Khetrapal H, Agrawal B, Vidyasagar S, Umakanth S. A questionnaire based survey on awareness of diabetic foot care in Indian population with diabetes: A cross-sectional multicentre study. Indian J Med Sci. 2011;65(10):411-23.
- 9. Potluri R, Purmah Y, Dowlut M, Sewpaul N, Lavu D. Microvascular diabetic complications are more prevalent in India compared to Mauritius and the UK due to poorer diabetic control. Diabetes Res Clin Pract. 2009;86(2):39-40.
- Lipsky BA. A current approach to diabetic foot infections. Current infectious disease reports. 1999;1(3):253-60.
- 11. Seid A, Tsige Y. Knowledge, practice, and barriers of foot care among diabetic patients attending Felege Hiwot Referral Hospital, Bahir Dar, Northwest Ethiopia. Advances in Nursing. 2015;2015:934623.
- 12. Chellan G, Srikumar S, Varma AK, Mangalanandan TS, Sundaram KR, Jayakumar RV, et al. Foot care practice—The key to prevent diabetic foot ulcers in India. Foot. 2012;22(4):298-302.
- 13. Bader MS. Diabetic foot infection. Am Fam Physician. 2008;78(1):71-9.

- 14. Ekore RI, Ajayi IO, Arije A, Ekore JO. Knowledge of and attitude to foot care amongst Type 2 diabetes patients attending a university-based primary care clinic in Nigeria. Afr J Primary Health Care Family Med. 2010;2(1):1-3.
- 15. Desalu OO, Salawu FK, Jimoh AK, Adekoya AO, Busari OA, Olokoba AB. Diabetic foot care: self reported knowledge and practice among patients attending three tertiary hospital in Nigeria. Ghana Med J. 2011;45(2):60-5.
- 16. Pollock RD, Unwin NC, Connolly V. Knowledge and practice of foot care in people with diabetes. Diabetes Res Clin Practice. 2004;64(2):117-22.
- 17. Khamseh ME, Vatankhah N, Baradaran HR. Knowledge and practice of foot care in Iranian people with type 2 diabetes. Int Wound J. 2007;4(4):298-302.
- 18. Hasnain S, Sheikh NH. Knowledge and practices regarding foot care in diabetic patients visiting diabetic clinic in Jinnah Hospital, Lahore. JPMA. J Pakistan Med Assoc. 2009;59(10):687.
- 19. Viswanathan V, Shobhana R, Snehalatha C, Seena R, Ramachandran A. Need for education on footcare in diabetic patients in India. J Associat Phys India. 1999;47(11):1083-5.
- 20. Khamseh ME, Vatankhah N, Baradaran HR. Knowledge and practice of foot care in Iranian people with type 2 diabetes. Int Wound J. 2007;4(4):298-302.
- 21. Chiwanga FS, Njelekela MA. Diabetic foot: prevalence, knowledge, and foot self-care practices among diabetic patients in Dar es Salaam, Tanzania—a cross-sectional study. J Foot Ankle Res. 2015;8(1):20.

Cite this article as: Deepa LN, Murty P, Reddy M, Muninarayan C, Shetty S. Assessment of awareness and practice of foot care and physical activity among people with type 2 diabetes attending a tertiary care teaching hospital. Int J Community Med Public Health 2017;4:3218-23.