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Research Article

Infection and Foot Care in Diabetics Seeking Treatment in a Tertiary Care Hospital, Bhubaneswar, Odisha State, India

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Diabetes mellitus is a major public health problem that can cause a number of serious complications. Foot ulceration is one of its most common complications. Poor foot care knowledge and practices are important risk factors for foot problems among diabetics. The present study was undertaken in the diabetes outpatient department of a tertiary care hospital to assess the practices regarding foot care in diabetes, find out the determinants of foot ulcer in diabetics, and offer suggestions to improve care. After informed consent, a total of 124 diabetics were interviewed to collect all relevant information. The diabetic foot care practice responses were converted into scores and for the sake of analysis were inferred as poor (0–5), fair (6-7), and good (>7) practices. Of the study population, 68.5% (85/124) consisted of men. The disease was diagnosed within the last 5 years for 66% (81/124) of the study participants. Of the study subjects, 83% (103/124) were on oral hypoglycemic agents (OHAs), 15.3% (19) on insulin, and 2 on diet control only. Among them about 18.5% had a history of foot ulcer. 37.9% reported using special slippers, 12% diabetics used slippers indoors, and 66.9% used slippers while using toilet. Of the study subjects, 67.8% said that feet should be inspected daily. 27.4% said they regularly applied oil/moisturizer on their feet. There is a need on part of the primary or secondary physician and an active participation of the patient to receive education about foot care as well as awareness regarding risk factors, recognition, clinical evaluation, and thus prevention of the complications of diabetes.

1. Introduction

Diabetes mellitus (DM) is a major public health problem depicting a rising prevalence worldwide. Currently, there are an estimated 366 million people affected with diabetes mellitus globally. India is estimated to have 61.3 million diabetics, which is projected to cross 100 million by the year 2030 [1]. Diabetes mellitus is a multifaceted disease and foot ulceration is one of its most common complications. Foot ulcers can cause severe disability and hospitalization to patients and considerable economic burden to families and health systems [1, 2]. Infection occurring in about half of the diabetic foot ulcers is a further complication. Of all the complications of diabetes, those that occur in the foot are considered the most preventable [3]. Poor knowledge of foot care and poor foot care practices were identified as important risk factors for foot problems in diabetes. Evidence suggests that consistent patient education with prophylactic foot care for those judged to be at high risk may reduce foot ulceration and amputations.

State of Odisha in India has a remarkable prevalence of diabetes with urban prevalence of 15.7% [4]. The capital of the state, that is, Bhubaneswar, has four tertiary care hospitals, with one being government and the remaining three private. Kalinga Institute of Medical Sciences (KIMS) is a state-of-the-art private center which harbors a medical college along with facilities for super specialist care. It has an actively functional diabetic clinic with a trained diabetologist. There is a dearth of studies in Odisha, which assessed the diabetic foot care practice of patients, especially in tertiary care setting. With this background the current study was planned in the Diabetes OPD of tertiary care hospital KIMS.

2. Methodology

The study was a hospital based study conducted as a part of a bigger study on skin infections wherein diabetic foot care assessment was undertaken among the attendees of the diabetes OPD of KIMS (conducted in October–December 2014, i.e., one quarter of a year). As specified the assessment aimed at knowing the current foot care practices among the diabetics attending the clinic and through a detailed questionnaire also finds out the determinants of foot ulcer in this population. Ethical clearance was sought from the Institutional Ethics and Research Committee to undertake the study.

The inclusion criteria were set as known cases of type 2 diabetes aged 30 years and above, diagnosed with the disease since at least one-year duration and visiting the diabetic outpatient clinic. Those with cognitive impairment and disability that could affect the functions of the nervous system affect independent self-care behavior, and those who had amputations of the lower limbs [4] and not willing to participate were excluded from the study. All such eligible patients were taken as the study subjects after due informed consent till the desired sample size was achieved. Assuming that 50% of the diabetics had reasonable knowledge about various factors associated with the disease and that we require a precision of 10%, the sample size is calculated as

$$N = \frac{4pq}{d^2} = \frac{(4 * 0.5 * 0.5)}{(0.1 * 0.1)} = 100. \quad (1)$$

Considering 10% as nonresponse rate, total study subjects interviewed were 124.

A predesigned pretested semistructured questionnaire certified by the diabetologist at KIMS and translated in local languages like Oriya and Hindi was used, which consisted of sections pertaining to socioeconomic details, awareness regarding diabetes, treatment modalities and compliance, practice of self-care of feet, and feet examination details. Survey instrument regarding diabetic foot care practices was modified and adapted from questionnaire used in previous studies [4–8].

The operational definition of foot ulcer for this study was taken as "a breakdown in the skin below the ankle that may extend to involve the subcutaneous tissue or even to the level of muscle or bone which is non-healing or poorly healing" [9, 10].

The diabetic foot care practice responses were converted into scores and for the sake of analysis were inferred as poor (0–5), fair (6-7), and good (>7) practices. Association between poor diabetic foot care practices, knowledge and health seeking behavior, and history of foot ulcer was explored. Patients were asked if they were ever counseled by doctor regarding footcare and use of educational charts for the same by the health provider was also explored. Data was collated and subsequently analyzed using Epi info 7.

3. Results

Table 1 depicts the mean age of the study participants was 60.6 ± 9.13 years, with nearly 58% of them having a higher secondary level education and above. Of the study population, 68.5% consisted of male participants, hinting at a male predominance of the disease, though the underreporting among females or hesitance to seek health care on their behalf cannot be ruled out. Of the study participants, 5.6% had not received any formal education. Housewives accounted for 56.4% (22/39) of the female study participants, unskilled workers 10.4%, and farmers, shop owners, and clerical job holders 9.6% of study participants.

Table 2 shows that the disease was diagnosed within the last five years for 66% of study population. Of the study

Table 1: Sociodemographic profile of the respondent diabetics (n = 124).

Parameters	Number	Percentage/mean ± sd
Age in years	124	60.6 ± 9.13
Gender		
Male	85	68.5
Female	39	31.4
Education		
Illiterate	07	5.6
Primary	43	34.6
Secondary	2	1.6
Higher secondary	54	43.5
Graduate and above	18	14.5
Occupation		
Unemployed	2	1.6
Unskilled	13	10.4
Semiskilled and skilled	35	28.2
Clerical, shop owner, and farmer	12	9.6
Semiprofessional	12	9.6
Housewife	22	17.7 (56.4% of female subjects)
Retired	28	22.5

Table 2: Details of disease and treatment among study subjects.

Demographic details	Categories	Number (n = 124)	Percentage
Duration of illness (diabetes)	<5 years	82	66.1
	>5 years	42	33.8
Age at diagnosis	<50 years	84	67.7
	>50 years	40	32.2
Treatment	Diet control	2	1.6
	Drugs	103	83
	Insulin	19	15.3
Treatment regularity	Regular	90	72.5
	Irregular	34	27.4
Foot ulcer (past/present)	Yes	23	18.5
	No	101	81.4
Physical activity/exercise	Yes	52	41.9
	No	72	58.1

Table 3: Possible determinants of foot ulcer in diabetics.

Determinants of foot care in diabetics	Hx of foot ulcer/current ulcer	No foot ulcer	Odds ratio (95% CI)
Duration of diabetes			
<5 years	12	70	0.48 (0.19–1.21)
>5 years	11	31	
Treatment compliance			
Yes	8	82	0.12* (0.04–0.33)
No	15	19	
Foot care practice			
Poor (0–5)	19	58	
Fair and above (6–10)	04	43	3.52* (1.11–11.1)
Counseling on foot care			
Received	9	76	0.21* (0.08–0.54)
Not received	14	25	

*Significant odds ratio.

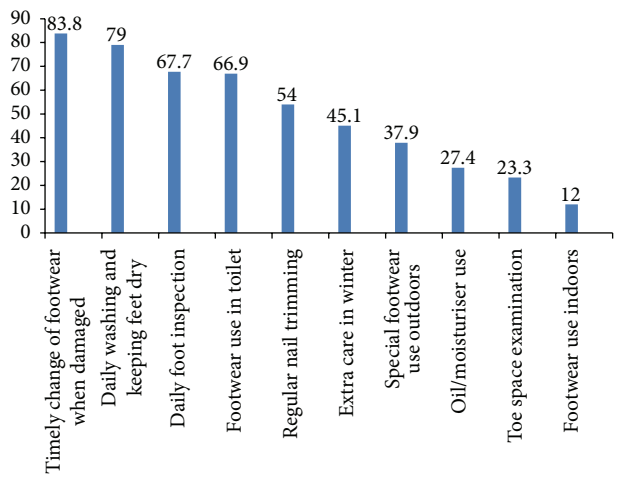

Figure 1: Foot care practices among study subjects.

subjects, 83% (103/124) were on oral hypoglycemic agents (OHAs), 15.3% (19) were on insulin, only 41.9% of the study subjects were involved in regular exercise or physical activity, and 72.5% of the diabetics were having good treatment compliance. Among the study subjects 18.5% (23/124) had a history/current foot ulcer.

Figure 1 shows that, out of the total study population, only 37.9% reported using special slippers (extra cushioned, thick soled) outdoors, and only 12% diabetics used footwear indoors though 66.9% used slippers while using toilet. Of the study subjects, 67.7% said that feet should be inspected daily. 27.4% said they regularly applied oil/moisturizer on their feet. Among them, 83.8% reported change of footwear when damaged or ill-fitted and 45.1% reported taking extra care in winter. 54% and 23.3% of subjects reported regular nail trimming and toe space examination regularly, respectively. However 79% of the subjects reported daily washing and drying of feet.

After cumulative scoring, 61.6%, 32%, and only 5.6% of the patients had a poor, fair, and good diabetic foot care practice.

Table 3 shows that poor foot care practice (OR 3.52, 95% CI 1.11–11.1), treatment noncompliance (OR 0.12, 95% CI 0.04–0.33), and absence of counseling regarding foot care (OR 0.21, 95% CI 0.08–0.54) in diabetes were significantly associated with occurrence of foot ulcer in diabetics.

4. Discussion and Conclusion

The important findings of the study are that the majority of the participants were males (68.5%). This could be attributed to the fact that perhaps males have a comparatively better health seeking behavior as compared to females. Nearly 58% participants were with higher secondary level education and above and this could be explained as the study was undertaken in a tertiary care centre in a city. Nearly 18.5% of the study subjects reported having foot ulcer. 67.7% reported daily foot inspection and 37.9% reported using special slippers outdoors. However, only 12% of the participants used slippers indoors which could be because of cultural practices. The deficiency in foot care practices in the present study is comparable to similar studies in India and other developing countries where daily inspection of the feet is reported by less than 70% and special care in winters is taken by less than 50% of patients [4–6]. In our study, absence of counseling and poor foot care practices were significant determinants of presence of foot ulcer

Regular blood glucose monitoring and compliance to diet and life-style advice were found to be comparatively better in the present study. This is in line with an earlier finding that foot care and health education were least suggested by doctors [11]. This suggests a tip of the iceberg as the study is being undertaken in a city based tertiary care center and now India has become the largest diabetic load country in the world where nearly 70% of the population are from the rural background.

Findings can be used to guide a health education program on foot care for diabetics. Emphasis should be laid on such deficient areas by health education and misconceptions should be cleared. This study has few limitations. This is a hospital based study, the results of which do not reflect the awareness and practices in the community. There is a need on part of the doctor and an active participation of the patient to receive education about foot care as well as awareness regarding risk factor recognition, clinical evaluation, and prevention of complications of diabetes.

Conflict of Interests

The authors declare that there is no conflict of interests regarding the publication of this paper.

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