

# Type ii Diabetes Mellitus Related Foot Problems And Knowledge, Practices Related To Foot Care Among Type ii Diabetes Mellitus Patients Who Attend To Diabetes Clinics In General Hospital Kurunegala

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**Abstract:** **Introduction:** Diabetic foot problems account for many hospital admissions and if they are not treated properly can lead to life threatening amputations. Moreover they are preventable by self-care practices, early diagnosis and proper management. Therefore, patient's knowledge and practice regarding foot care remains a mainstay of management. **Objective:** To describe the level of knowledge and practice of foot care among patients with Type ii diabetes. **Methodology:** A group of Patients having diagnosed with Type Ii diabetes (N=384) were selected from diabetic clinics of General Hospital Kurunegala for this descriptive cross sectional study. Data were collected by interviewer administered questionnaire and check list. Patient's knowledge and practice on diabetic foot care were inquired. A scoring system ranging from 0-36 was utilized to analyze the responses given for level of knowledge and practice. **Results:** Mean age was 58.2 years (SD ±10) and male to female ratio was 1:3. Diabetes was diagnosed >11 years among 37.8%. Majority (72%) of study sample have not undergone foot examination at the clinic during previous year. 74.4% had diabetes related foot problems. There were 72.4% presented with neuropathic signs and symptoms and 27.6% presented with ischemic signs and symptoms. Regarding foot care knowledge, the mean score was 14.6, 42% had scored above >50% of total knowledge score. Regarding foot care practices, the mean score was 12.5, 89.8% participants had scored <50% of total practice score. A Statistically significant association exists between the foot care knowledge and practice scores ( $p < 0.05$ ,  $\chi^2 = 15.9$ ). **Conclusion:** According to results, knowledge on diabetic foot care was not up to the standard; however their practices of foot care were further unsatisfactory. Therefore patient education on self-care management of foot should be incorporated into the routine care of patients with diabetes both in the clinic and in the community. Examination of foot by clinic team, counseling, providing information and education during clinic sessions would help to improve this situation.

**Keywords:** Type ii, Diabetes, Foot, Care, Knowledge, Practice

## Introduction

Diabetes has been becoming a rising major cause of morbidity and premature death worldwide [1]. Cost of affected countries includes both recorded expenditures by health services and unrecorded cost on patients and their families [2]. According to International diabetes federation [3] the prevalence of diabetes was 8.3% among the adult population by 2014 in Sri Lanka. Frequency of hospitalization and deaths due to diabetes was also increasing in the country throughout the past decade [4]. The 'diabetic foot' term describes any pathology results directly from diabetes mellitus or its long term complications [5]. Neuropathy and ischemia are the major contributors of diabetic foot [6]. The risk of lower limb amputation is a life-long threat to all diabetic patients [7]. In Sri Lanka one third of (Type ii diabetes) DT2 patients have a lifetime risk of foot ulceration with some may develop in to limb amputations [8]. Self-care practices are the most important measure of preventing diabetic foot problems. Most of the foot care strategies should be practiced by the patient rather than clinician or medical care team. Therefore current knowledge and awareness on diabetes and foot care of the diabetic patients are crucial in order to improve self-management and hence to prevent complications due to diabetic neuropathy and ischemia affecting foot.

## Objective

To describe foot problems related to type ii diabetes mellitus and knowledge, practices related to foot care of type ii diabetes mellitus patients who are attending diabetes clinics in General Hospital Kurunegala

## Methodology

This study was a Hospital based descriptive cross sectional study. The study was conducted at Diabetes clinics in provincial General Hospital Kurunegala (GHK), situated in North Western Province, Sri Lanka. This is a tertiary care, referral level hospital with various subspecialties including endocrinology. The study was started at March of 2015 and it was continued up to January 2016. Data collection was done at August 2015. A sample was obtained from diagnosed patients with DT2, attending to diabetes clinics in GHK during period of data collection. Patients aged more than 18 years, diagnosed with DT2 (Diagnosis need to be documented by the clinician) and followed up in diabetes clinics for more than one month in GHK were included in to study. Staff members of the hospital were excluded as they may be having knowledge and practices different from other patients. Those who were not having ability to express their views and ideas rationally and those who were having any other pathology causing foot problems similar to diabetic foot were also excluded. Sample size was calculated using the slandered formula [9]. The prevalence of foot problems among DT2 clinic patients was 10.2% [10]. But, to take maximum sample size, prevalence was taken as 50%. Therefore the size of the final sample was 384. Systematic random sampling method was utilized to select the 384 study participants. Complete sampling frame

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was unable to construct due to unavailability of complete list of diabetes patients attending throughout the data collection period. Therefore available daily clinic register was used as a sampling frame. Averages of 60 diabetic patients were attending the daily clinics for 5 days of the week. Total number of diabetic patients who attend the clinic for 20 working days was calculated as 1200. Then, total number of clinic patients divided by total sample size and the sampling interval was calculated as 3. First study participant was selected in between 1 and 60 by using a random table manually. Then from the selected clinic number, every 3<sup>rd</sup> clinic number was selected according to inclusion and exclusion criteria. If selected participant was not fulfilled the inclusion and exclusion criteria or refused to participate, moved on to the next participant. Therefore about 20 participants were selected daily. This was continued daily until the required sample size obtained. Sinhala and Tamil pretested interviewer administered questionnaires with 3 components and checklist were used as study instruments. The first component consisted of socio-demographic data, information regarding diabetes status, clinic attendance, mode of treatment and details on foot examination at the clinic by medical officer. The second component consisted of questions regarding knowledge of diabetes foot care. The third component targeted on identifying practices regarding foot care. Modified Nottingham assessment of functional foot care questionnaire [11] which was a validated instrument for foot care practice used to assess the foot care practices. Check list was used to collect data on co-morbidities and signs and symptoms due to diabetic foot problems. Part of Michigan Neuropathy Screening Instrument [12] (MNSI) has been taken in to consideration with experts opinion to develop this. Information was collected by history taking, referring clinic books and brief examination of feet.

**Good Knowledge of Foot Care:** This was included for participants who scored  $\geq 50\%$ , out of total knowledge scores. **Poor Knowledge of Foot Care:** This was included for participants who scored  $< 50\%$ , out of total knowledge scores [13]. **Good Foot Care Practice:** This was included participants who scored  $\geq 50\%$  of total practice scores. **Poor Foot Care Practice:** This was included participants who scored  $< 50\%$  of total practice scores [13].

Preceding analysis, frequency distributions and cross tabulations were made according to the specific objectives of the study. The chi-square ( $\chi^2$ ) test was used to assess the associations of categorical variables. The mean, standard deviation (SD), standard error and confidence interval (CI) were used to assess some quantitative variables. The level of significance was taken as 0.05. The ethical clearance for the study was obtained from the Ethical review committee of the post graduate institute of medicine, University of Colombo.

## Results

Foot problems are disabling complications and common among people with diabetes mellitus. Knowledge and awareness on diabetes and foot care of the diabetes patients is crucial in order to improve self-management and therefore to prevent complications of the foot [5]. Therefore, the current study was conducted to determine knowledge and practice regarding foot care among DT2 patients.

## Socio-demographic data and diabetic related foot problems

Study sample was comprised of patients coming from different social and demographic settings. Their knowledge and practice of foot care can vary with socio-demographic status.

**Table 1:** Distribution of sex and age of the sample

Characteristic	No (%) N=384
<b>Sex (Male : Female)</b>	98:286 (1:3)
<b>Age (Years)</b>	
18 – 30	01 (0.3)
31 – 40	14 (3.6)
41 - 50	61 (15.9)
51 -60	134 (34.9)
>60	174 (45.3)
<b>Total</b>	<b>384 (100)</b>

## Mean age Minimum/Maximum age Standard deviation (SD)

58.2 years      23/86 years      10 years

Male to female ratio of the study participants was 1:3. Ages varied from minimum 23 years to maximum 86 years with a mean age 58.2 years and SD = 10 years. Majority (54.6%) were belong to  $< 60$  years age group. Of them 45.3% were belonged to  $> 60$  years age group.

**Table 2:** Distribution of marital status and educational status of sample

Characteristic	No (%) N=384
<b>Marital status</b>	
Unmarried	17 (4.4)
Married	321 (83.6)
Living together	05 (1.3)
Separated	04 (01)
Widowed	37 (09)
<b>Total</b>	<b>384 (100)</b>
<b>Educational status</b>	
Not attended school	20 (5.2)
Grade 1-5	75 (19.5)
Grade 6-9	102 (26.6)
Ordinary level	132 (34.4)
Advanced level	51 (13.3)
Diploma	03 (0.8)
University degree	01 (0.3)
<b>Total</b>	<b>384 (100)</b>

Majority (83.6%) of the sample were married. Though majority of the participants (34.4%) were educated up to the ordinary level, 5.2% were not attended to school.

**Table 3:** Distribution of the duration of diabetes, clinic attendance and details of foot examination at clinic.

Characteristic	No (%)
<b>Duration of diabetes since diagnosis</b>	<b>(N=384)</b>
<1 year	30 (7.8)
2 – 5 year	107 (27.9)
6 -10 year	102 (26.6)
>11 year	145 (37.8)
<b>Total</b>	<b>384 (100)</b>
<b>Duration of attending to clinic</b>	<b>(N=384)</b>
<1 year	54 (14.1)
2 – 5 year	135 (35.2)
6 -10 year	66 (17.2)
>11 year	129 (33.6)
<b>Total</b>	<b>384 (100)</b>
<b>Frequency of clinic attendance</b>	<b>(N=384)</b>
Twice per month	06 (1.6)
Once a month	377 (98.2)
Once in three months	01 (0.3)
<b>Total</b>	<b>384 (100)</b>
<b>Examination of foot during last year</b>	<b>(N=384)</b>
Yes	107 (27.9)
No	277 (72.1)
<b>Total</b>	<b>384 (100)</b>
<b>Examination of foot at clinic</b>	<b>(n=107)</b>
Every clinic visit	30 (28)
Once in few clinic visit	16 (15)
Rarely	61 (57)
<b>Total</b>	<b>107 (100)</b>

Diabetes was diagnosed more than 11 years among 37.9%. Another 35.6 % diagnosed to having diabetes less than 5 year. According to study results 35.2% were attending the clinic since 2 to 5 years. Majority (98.2%) were attending clinic once a month. Medical officer examined the foot at least once during last year of 27.9%. Most (57%) of them were examined rarely at the clinic. There was 74.4% study subjects presented with diabetes related foot problems. Signs and symptom due to neuropathy had among 72.4%. Ischemic signs and symptoms had among 27.6%. Other foot complications had among 30.7%.

### Foot care Knowledge

According to study results mean knowledge score of participants was  $14.64 \pm 0.26$ . SD = 4.96. 95% CI 14.14 – 15.14. While minimum score received 3, maximum score received 26. There were 42% had more than 50% of total knowledge score. There were 58% had less than 50% of total knowledge score. There is a significant association between foot care knowledge with educational status ( $\chi^2 = 18.87$ , Degree of freedom (df)= 2,  $P < 0.05$ ), duration of diabetes ( $\chi^2 = 8.17$ , df=2,  $p=0.02$ ) duration of attending clinic ( $\chi^2 = 8.73$ , df=3,  $p=0.03$ ) and presence of neuropathic foot signs and symptoms ( $\chi^2 = 11.16$ , df=1,  $p<0.05$ ). But there is no significant association between foot care knowledge and age ( $\chi^2 = 0.37$ , df=1,  $p=0.54$ ), sex ( $\chi^2 = 0.48$ , df=1,  $p=0.42$ ) and average monthly family income ( $\chi^2 = 0.45$ , df=1,  $p=0.05$ ).

### Foot care practice

Mean practice score was  $12.5 \pm 0.19$ . SD = 3.57. 95% CI 12.22 - 12.94. The minimum and maximum practice scores were taken 05 and 23 respectively. Thirty nine (10.1%) took the

practice score more than 50% of total practice score. Majority (89.8%) scored less than 50% of total practice score. There were no significant association between foot care practice with age ( $\chi^2 = 0.32$ , df=1,  $p=0.57$ ), sex ( $\chi^2 = 1.4$ , df=1,  $p=0.24$ ), educational status ( $\chi^2 = 3.85$ , df=2,  $p=0.15$ ), average monthly family income ( $\chi^2 = 0.04$ , df=1,  $p=0.86$ ), duration of diabetes ( $\chi^2 = 0.96$ , df=2,  $p=0.63$ ), duration of attending clinic ( $\chi^2 = 3.85$ , df=3,  $p=0.28$ ), neuropathic foot problems ( $\chi^2 = 3.25$ , df=1,  $p=0.05$ ) and foot ulcers ( $\chi^2 = 0.85$ , df=1,  $p=0.36$ ). There were significant association between foot care practice with cellulites ( $\chi^2 = 12.06$ , df=1,  $p=0.001$ ) and fungal infections ( $\chi^2 = 6.35$ , df=1,  $p=0.01$ ). There was a significant association between foot care knowledge with foot care practice ( $\chi^2 = 15.9$ , df=1,  $p<0.05$ ).

### Discussion

The aim of conducting the current study was to find out the knowledge and practices regarding foot care among DT2 patients. There were 384 diabetic patients from diabetes clinics in General Hospital Kurunegala were included into this hospital based descriptive cross sectional study. The important findings of the current study are as follows. Mean age of participants was 58.2 years (SD  $\pm 10$ ) and male to female ratio was 1:3. Diabetes was diagnosed >11 years among 37.8%. Majority (72%) of study sample were not undergone to foot examination at the clinic during last year. Diabetes related foot problems had among 74.4%. There were 72.4% presented with neuropathic signs and symptoms and 27.6% presented with ischemic signs and symptoms. Regarding foot care knowledge, the mean score was 14.6, 42% had scored above >50% of total knowledge score and 52.7%. Regarding foot care practices, the mean score was 12.5, 89.8% participants had scored <50% of total practice score. A Statistically significant association exists between the foot care knowledge and practice scores ( $p<0.05$ ,  $\chi^2 = 15.9$ ). According to available literature, most of the study designs in this regard were hospital based cross sectional studies [13], [14], [15], [16] worldwide. Not only that some studies adopted systematic sampling method for the data collection [13]. These features are consistent with current study. Some other similar studies have been used interviewer administered questionnaires as study instruments in the world as well as in Sri Lanka [13], [14], [15], [16]. This is also consistent with current study methodology. According to current study results, Male to female ratio was 1: 3; mean age of study participants was 58.2 years. Majority of them were belong to >51 years age group. According to another study conducted in Sri Lanka, mean age of participants was 58.4 years and 70% of participants were belong to >50 years age group [16]. These findings are consistent with current study. Another study conducted in Sri Lanka revealed that male to female ratio was 1:9 which is not consistent with current study findings [17]. These high female ratios in this study population may be due to clinics were conducted on weekdays, while more male patients at work compared to females. Current study revealed that 83.6% of study population was married. This high percentage of married sample is important in regard to foot care practice, because of someone is in the home to help them. Though majority of the participants (34.4%) were educated up to the ordinary level, 5.2% were not attended to school. These findings were further strengthened by observations that has been made by Perera et al. [17], which showed 96% of study sample married, 8% not attended school, 49.3% received secondary education.

According to current study 27.9% diabetics have been diagnosed disease between 2-5 years back. This is not compatible with George et al. [13] (diabetes diagnosed less than 5 years of 54.7%) or Jinadasa and Jeewantha [16] (diagnosed diabetes less than 5 years of 30.6%). In addition to that Jinadasa and Jeewantha [16] found that diabetes have been diagnosed >11 years of 32.2% of diabetics. This finding is agrees with current study findings, which was found that diabetes diagnosed >11 years of 37.8%. According to study results, about seventy percent study subjects were not undergone to foot examination by medical officer during last year. In addition to that majority (n=107, 57%) of foot examinations carried out during last year was happened rarely in the clinic. This practice is not satisfactory. Lack of counseling and time allocation by the doctors and nurses as a result of busy clinic schedule may be the reason for this. To overcome this time must be allotted to foot care examination during clinic sessions. The result of this study showed that a greater proportion of diabetic patients had a poor knowledge of diabetic foot care. According to study results mean knowledge score was 14.6. Only 41.9% study subjects had good foot care knowledge. In a study done in Sri Lanka, about 75% of the patients obtained good scores (>50%) on knowledge regarding foot care [16]. Various studies from other countries like India [13] and Ethiopia [18] also showed that good knowledge regarding foot care. This is disagrees with current study findings. Some studies from other countries like Nigeria [19], Pakistan [20] and India [13] have shown poor educational status significantly associated with poor knowledge of foot care. This finding is consisting with current study ( $p<0.05$ ). Greater duration of diabetes ( $p=0.01$ ) and greater duration of attending clinic ( $p=0.03$ ) were associated with good knowledge on foot care. This can be attributed to multiple visits to the health care facility by people with longer duration of diabetics which have exposed to more patient education. Similarly presence of neuropathic signs and symptoms ( $p<0.05$ ) of foot was significantly associated with good foot care knowledge. This also can be attributed to multiple visits to the health care facility by diseased persons and exposed to more patient education after developing signs and symptoms. There was no significant association of sex and age with foot care knowledge. This can be attributed to high literacy rate (more or less equal) both among males and females in the country [4]. In compare to foot care knowledge, overall foot care practice principles were further unsatisfactory in current study sample. The mean practice score was 12.5. Majority of study sample (89%) had poor foot care practice. Study findings of Desalu et al. [19] also revealed that 89.8% of study sample had poor foot care practice, which is consistent with current study findings. On analysis of foot care practices presence of cellulites ( $p=0.001$ ) and fungal infections ( $p=0.01$ ) of foot were significantly associated with poor foot care practices. Sex, educational status, duration of diabetes and duration of attending clinic were not significantly associated with foot care practices. Desalu et al. [19] found that poor educational status significantly associated with practice of foot care. This is disagreeing with current study findings. In addition to that there was a significant association between foot care knowledge and practice.

## Conclusions

This study was conducted on 384 DT2 clinic patients at Provincial General Hospital, Kurunegala. Of the study sample, majority was in >60 years age category. There was a female predominance. There was no significant association between sex and age with foot care knowledge ( $p>0.05$ ). The majority of them were married (83.6%). About 24.7% educated up to grade 5. Another 5.2% were not attended school. Low educational level was significantly associated with poor knowledge of foot care ( $p<0.05$ ) but not significantly associated with practice ( $p>0.05$ ). Knowledge or practices were not significantly associated with monthly family income ( $p>0.05$ ). Diabetes was diagnosed for >11 years in 37.8%. Another 7.8% diagnosed to having diabetes <1 year. Lesser duration of diabetes significantly associated with poor knowledge ( $p=0.01$ ) but not significantly associated with foot care practice. About 35% of study sample have been attending clinic since 2-5 years. Lesser duration of clinic attendance significantly associated with poor foot care knowledge ( $p=0.01$ ), but not significantly associated with foot care practice. Majority (98.2%) were attending clinic once a month. Majority (72%) of study sample were not undergone to foot examination at the clinic during previous year. Diabetes related foot problems existed among 74.4%. Neuropathic signs and symptoms existed among 72.4%, ischemic signs and symptoms existed among 27.6% and other foot problems existed among 30.7%. Neuropathic signs and symptoms significantly associated with knowledge of foot care ( $p<0.05$ ) but not significantly associated with foot care practice. Presence of cellulites and fungal infections was significantly associated with foot care practice, but foot care practice was not significantly associated with foot ulcers. Mean knowledge score of participants was  $14.64 \pm 0.26$ , SD = 4.96, 95% CI 14.14 – 15.14. While minimum score was 3, maximum score was 26. There were 42% who scored more than 50% of total knowledge score. Mean practice score was  $12.5 \pm 0.19$ , SD = 3.57, 95% CI 12.22 - 12.94. The minimum and maximum practice scores were taken 05 and 23 respectively. Thirty nine (10.1%) had a practice score of more than 50% of total practice score.

## Recommendations

With the understanding of the present study, the following recommendations could be made.

1. The lack of proper foot care knowledge and practice may be due to poor communication between the healthcare professionals and the patients. Lack of counseling and time allocation by the doctors and nurses as a result of busy clinic schedule may be the reason for this. Thus, patient education on self-care management of foot is important and should be incorporated into the routine care of patients with diabetes both in the clinic and in the community. Time must be allotted to counseling, providing information and education during clinic sessions.
2. Current study shows knowledge and practice regarding foot care are poor in most of the study areas in the clinic patients. These findings can be used as guidelines for health education program on foot care for people with diabetes. Emphasis should be paid on these deficient areas during health education programs.
3. Some factors elicited in this study could influence knowledge and practices. For example, lower educational status, lesser duration of diabetes, lesser duration of

attending clinic and presence of neuropathic foot signs and symptoms were shown to have significantly associated with poor knowledge regarding foot care and health education programs should be conducted on targeting them.

4. Periodic examination for neuropathy is recommended in all patients attending clinics due to presence of high proportion of signs and symptoms due to neuropathy. This should be included as comprehensive neuropathy screening with validated tool.
5. The present study gives a basis for future researches in this area. It is better to conduct studies with larger sample size with comparative groups to compare this group with the normal population or another vulnerable group. Directions for future research include validating the instruments used in this study against target population.

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