International Journal of Pharmacy and Pharmaceutical Sciences

ISSN- 0975-1491 Vol 9, Issue 11, 2017

Original Article

A PROSPECTIVE STUDY: KNOWLEDGE ASSESSMENT AND PATIENT CARE OF DIABETIC FOOT ULCER PATIENTS IN TERTIARY CARE HOSPITAL

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Received: 06 Jul 2017 Revised and Accepted: 21 Sep 2017

ABSTRACT

Objective: To assess the knowledge with a diabetic foot ulcer, to evaluate the severity and grade of diabetic foot ulcer, to study the self-care behaviour and medication adherence in a patient with diabetic foot ulcer and to counsel the patients.

Methods: The KAP, self-care foot behaviour and MMAS-8 questionnaire were given during interview; severity using Wagner's scale was assessed. Knowledge, attitude, self-care foot practice and adherence was measured based on various parameters such as demographic factors, clinical characteristics, and medication taking characteristics. It was measured before and after the patient counselling to see improvement in the quality of life.

Results: In the study period of 6 mo 111 cases were gathered. There were 74 (66%) patients who were illiterate; the patients with low economic status were 63 (56%). Patients who are illiterate have poor knowledge and poor self-care behaviour, in our study 74 (66%) are illiterate which improved after counselling and 59 patients with high knowledge. Medication adherence is also associated with the education of the patient. After counselling and providing knowledge most of the patients are having high KAP scores. Wagner's scale for the study of the severity shows that most of the patients 30 out of 111 are having Grade 4 of the score which shows the need of counselling and education towards foot care. Improvement in the self-care practice and on safety and prevention was seen after counselling.

Conclusion: Knowledge, attitude, self-care practice and adherence of the patient can be improved by establishing a good patient-provider relationship and giving proper patient counselling to the patient or their relatives.

Keywords: Diabetic Foot Ulcer, Patient Counseling, Wagner's scale, Knowledge Assessment and Practice, Self-Care Behavior, Medication Adherence

DOI: http://dx.doi.org/10.22159/ijpps.2017v9i11.21168

INTRODUCTION

Diabetic foot ulcer is defined as a non-healing or poorly healing full thickness wound, through the dermis, below the ankle in an individual with diabetes mellitus. Foot ulcers are a common complication of diabetes and represent a major source of morbidity [1].

One-third of all diabetic patients have significant peripheral neuropathy and/or peripheral vascular disease. In India, the prevalence of foot ulcers in diabetic patients in clinical population is 3%, which is much lower than reported in the western world [2].

The lifetime incidences of foot ulcerations among diabetes patients have been estimated to be as high as 25%. In England, 44.6 per 10,000 persons with diabetes undergo lower extremity amputations (LEAs) in a year, whereas in USA, it was 55 per 10,000 diabetics [3].

Patient education and the self-care practices like maintaining foot hygiene and nail care should be promoted. Skin is kept moisturized with the application of topical moisturizers after washing the feet gently with soap and water. Harsher measures like hot soaks, heating pads and topical agents such as hydrogen peroxide, iodine and astringents should be avoided. Neuropathic feet are warmer and the temperature differences of 2-7 °C have been noted between neuropathic and without neuropathic feet. Therefore, self-monitoring may reduce the risk of ulceration [4].

People with DM who wish to live a normal life, needs to have knowledge about their illness and the management of DM. Knowledge is the greatest weapon to fight against diabetes mellitus. Proper education and guidance of the patients will show significant improvement in the management of diabetes. The education will be effective only if the characteristics of the patients' knowledge, attitude and practices of diabetes are known.

Knowledge refers to the understanding of patients about diabetes mellitus; Attitude refers to their feelings and also any preconceived ideas that they may have towards the disease; Practice refers to the ways in which they demonstrate their knowledge and attitude through their actions [5].

There are seven essential self-care behaviors in the people with diabetes which predicts good outcomes namely healthy eating, being physically active, monitoring of blood sugar, compliant with medications, good problem-solving skills, healthy coping skills and risk-reduction behaviors [6]. All these seven behaviors have been found to be positively correlated with good glycemic control, reduction of complications and improvement in the health quality of life [7].

Adherence to (compliance with) a medication regimen can be defined as the extent to which the patients take medication as given by the care providers or it refers to the willingness and ability of an individual to follow health-related advice properly, to medication as prescribed, to attend scheduled clinic appointments, as well as to complete recommended follow-ups [8]. Medication non-compliance is the failure or discontinuation of proper medication taking without the concern of prescribed physician [9].

According to the International Working Group on the Diabetic Foot, a classification system appropriate for the clinical practice should facilitate communication between healthcare providers, influence daily management, and provide information about the healing potential of an ulcer [10]. In 1976, Meggitt [11] described one of the most commonly cited wound classification systems that were further popularized by Wagner in 1981 [12].

Wagner classification is a system for classifying diabetic, neuropathic, and dysvascular foot lesions [13].

Patient counselling refers to the process of providing information, advice and assistance to help patients to use the medication appropriately. "Counseling is the process of telling people what you found, what it means, and what needs to be done, and doing so with sensitivity [14]". Hence, considering all these factors, we have

included knowledge, attitude, foot care behaviour, medication adherence, risk management using Wagner's severity scale and patient counseling to improve patient education regarding the diabetic foot ulcer in our study.

MATERIALS AND METHODS

This study was a prospective Interventional study done for 6 mo approved (REF. NO: IEC/TOMCHRC/035/15-16) by the Institutional Ethics Committee of The Oxford Medical College Hospital and Research Centre, Attibele, Bangalore.

Hospitalization criteria

In-patients admitted in the general surgery ward during the study period (6 mo) who may or may not be admitted for treatment of diabetic foot ulcer.

Those patients of Age 18 y and above with Type II diabetes mellitus were included in the study. Those who were willing to give written informed consent and those who were diagnosed with diabetic foot ulcer. Our study also included Patients with cellulitis in absence of foot ulceration and Patients with gangrene. Finally, those patients with ulceration which was not improving in diabetic foot e. g poor compliance, social problem, poor glycemic control and severe complication of neuropathy were also included as inclusion crieteria

The study samples were collected from each ward. A total of 111 diabetic patients were interviewed with a pre-designed set of questionnaires (Knowledge, Assessment and Practice, Modified medication adherence scale-8, self-foot care Questionnaire). Subjects who are graded as diabetic foot ulcer patients through Wagner's scale and admitted into the hospital were taken as participants for the study.

The questionnaires were designed and pretested and a small group of 15 patients based on their response the questionnaires were modified and finalized. Participants were chosen voluntarily and a written consent was obtained before the administration of the questionnaire from individual patients. Confidentiality of the participants as maintained. If the participants couldn't understand the questionnaires, due to language problem he/she are questioned in their preferred languages (English, Hindi, and Kannada). The statistical analysis was done using SPSS software using student T-Test.

The study procedure can be mainly classified into the following steps.

STEP 1: Collection of demographics of the patient (Name, Age, Sex, etc.) and the date regarding diagnosis, prescribed drugs, indication and their route of administration through data entry form.

STEP 2: Assessment on knowledge and practice of foot care in diabetes mellitus patient using KAP QUESTIONNAIRE. (Pre-counseling and Post-counseling)

STEP 3: To assess the level of foot self-care and foot condition in diabetic patients using diabetes foot care questionnaire.

STEP 4: To detect the severity and grade of diabetic foot ulcer using Wagner's scale.

STEP 5: To detect medication adherence by MODIFIED MEDICATION ADHERENCE SCALE–8 QUESTIONAIRE. (Pre counseling and post counseling)

STEP 6: To counsel the patients using the pamphlets in Kannada and English and provide knowledge and improve their health care.

RESULTS

In this study, 111 patients were enrolled from the General surgery ward.

Demographic factors

In our study maximum patients were in the age group of 51-60 y with 30 patients and 61-70 y with 31 patients

The patients were categorized based on literacy, which is divided as primary, secondary, graduate and above. Out of 111 patients, 74 patients had a primary level education.

The patients were categorized based on economic status, where 63 patients are of lower status.

KAP Score before and after counseling

Table 1 shows the KAP scores of the patients before and after counseling and it is graphically represented in the fig. 1. Ninety patients had low KAP score which improved after counseling. The confidence interval was 95 % and significance level 0.05. P-value was found to be 0.041. Hence we accept the null hypothesis and reject alternative hypothesis.

Table 1: The knowledge, assessment and practice (KAP) score of the patients before counseling and after counseling

KAP scores	No. of patients		P-value
	Before counseling	After counseling	
Low (0-4)	90 (81.0%)	0 (0%)	0.041
Medium (6-10)	12 (10.2%)	19 (17.1%)	
High (11-15)	9 (8.1%)	92 (82.8%)	

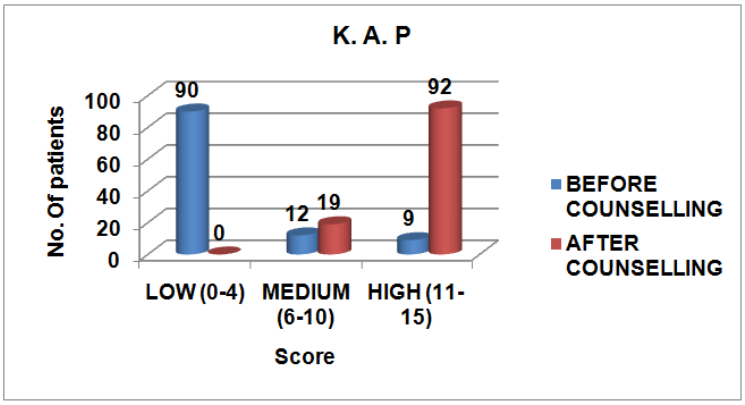

Fig. 1: Knowledge, assessment and practice (KAP) before counselling and after counselling

Table 2 shows the KAP score based on the age groups (before counseling and after counseling). Fig. 2 shows the KAP score before counseling, where maximum patients have low KAP score, 24 patients (22%) in the age group of 61-70 y.

Table 2: Knowledge, assessment and practice KAP scores before and after counseling based on age

KAP scores		No. of patients-age groups					
		30-40	40-50	50-60	60-70	70-80	Above 80
Before Counseling	Low	4	19	2	24	17	4
	Medium	2	2	4	2	2	0
	High	1	4	4	0	0	0
After Counseling	Low	0	0	0	0	0	0
	Medium	0	1	9	6	2	1
	High	7	24	21	20	17	3

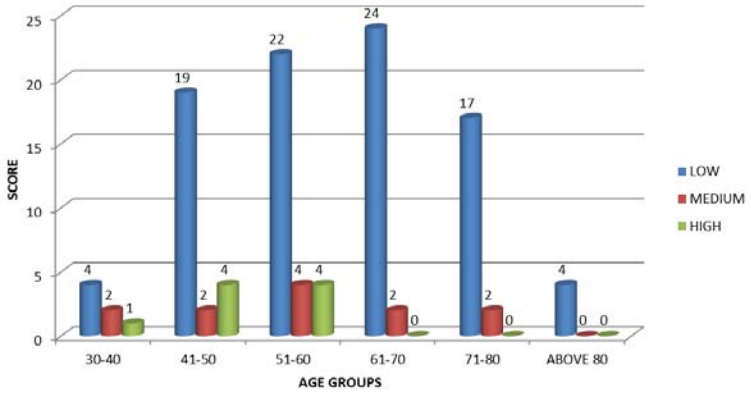

Fig. 2: Knowledge, assessment and practice (KAP) score based on age (before counseling)

Fig. 3 shows the KAP scores after giving counseling, which shows the high KAP score in all age group after education.

Table 3 shows KAP score of patients based on literacy. Fig. 4 shows the KAP scores before and after counseling based on literacy. The graph shows that illiterate patients have low KAP score before counseling compared to educated patients. 74 patients with primary education have low KAP scores before counseling whereas after education patients have improved KAP scores.

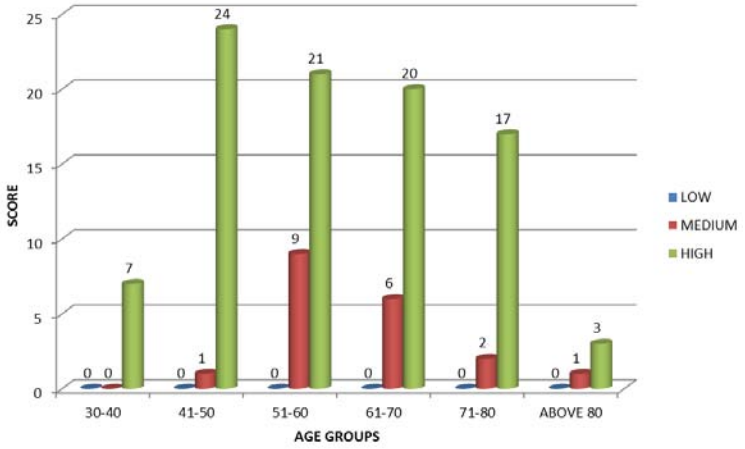

Fig. 3: Knowledge, assessment and practice (KAP) score based on age (After counseling)

Table 3: Knowledge, assessment and practice (KAP) based on literacy

KAP scores		Literacy		
		Primary	Secondary	Graduate
Before counseling	Low	94	15	1
	Medium	0	10	2
	High	0	0	9
After counseling	Low	1	0	0
	Medium	15	4	0
	High	39	11	12

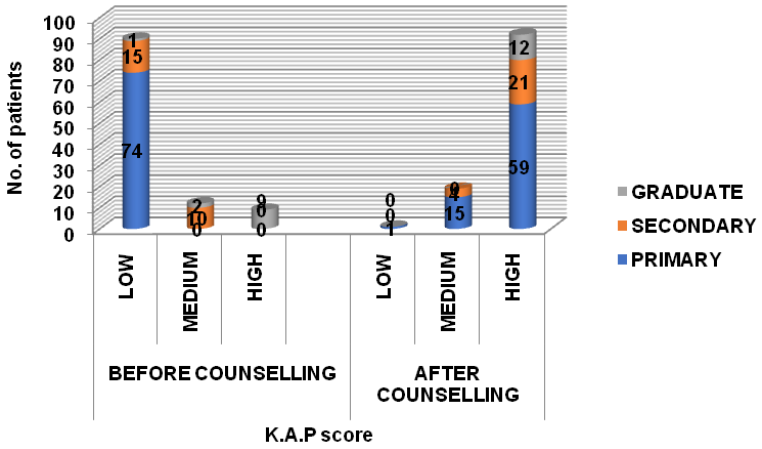

Fig. 4: Knowledge, assessment and practice (KAP) based on literacy

Wagner's severity score

The diabetic foot ulcers were graded according to the Wagner's severity scale.

Table 4 shows the Wagner's severity score, where more number of patients have a score of grade 4 comprising of 30 patients.

It has been represented in fig. 5.

Table 4: Wagner's severity score

Wagner's severity grade	No of patients
Grade 0	10 (9.0 %)
Grade 1	16 (14.4%)
Grade 2	15 (13.5%)
Grade 3	18 (16.2%)
Grade 4	30 (27.0%)
Grade 5	17 (15.3%)

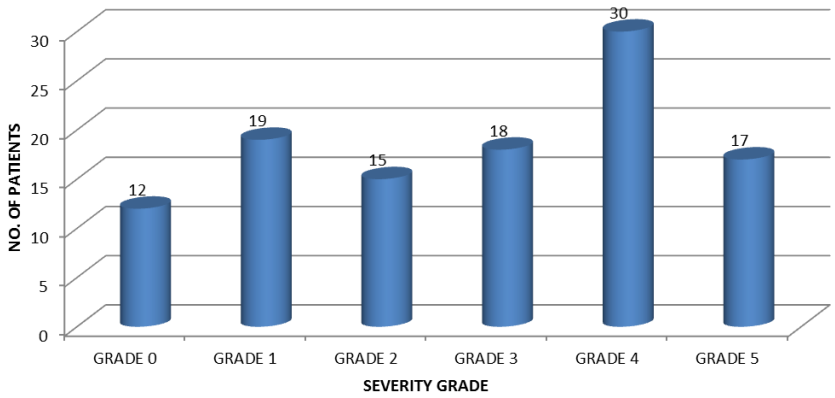

Fig. 5: Wagner's severity scale

Medication adherence

Table 5 summarizes the medication adherence by patients before and after counseling which is represented in fig. 6. Medication adherence was low for 70 patients before counseling which was increased after education/counseling. The confidence interval was 95 % and significance level 0.05. P-value was found to be 0.032.

Hence, we accept the null hypothesis and reject alternative hypothesis.

Table 5: Medication adherence (Before counseling and after counseling)

	Adherence	Number of patients	P-value
Before counseling	Low	90 (81.0%)	0.032
	Medium	25 (22.5%)	
	High	18 (16.2%)	
After counseling	Low	0 (0%)	
	Medium	5 (4.5%)	
	High	106 (95.5%)	

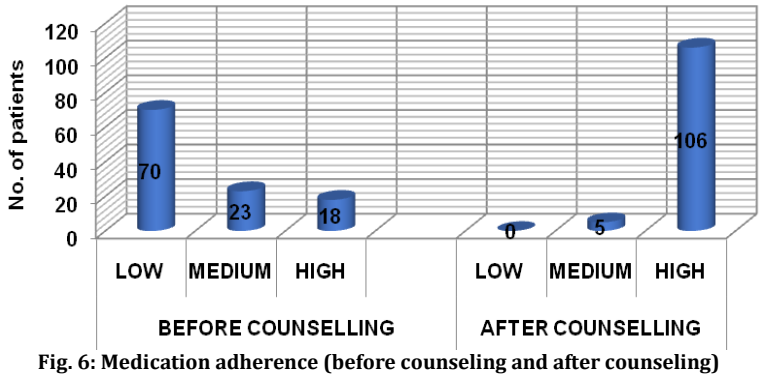

Fig. 6: Medication adherence (before counseling and after counseling)

Self-care behaviour and foot-care practice

Table 6 shows the impact of counseling on self-care practice and table 7 shows the impact of counseling on safety and prevention. The patient's had poor self-care behaviour and poor foot care practice. Most of the patients being poor cannot afford diabetic shoes and socks; hence we provided counseling and preventive measures to develop self-care behaviour. The main counseling points were the hygiene of feet and footwear.

Therefore, there was an increase in the knowledge after educating the patients.

Table 6: Impact of counseling on self-care practice

Parameter	Self-care practice	
	Before counseling (n=111)	After counseling (n=111)
Examination of feet	37 (33.3%)	107 (96.3%)
Washing feet daily	49 (44.1%)	109 (98.1%)
Drying well between toes	23 (20.7%)	104 (93.6%)
Cutting the nails straight	16 (14.4%)	74 (66.6%)
Wearing chappals/shoes	68 (61.2%)	101 (90.9%)

Table 7: Impact of counseling on safety and prevention

Parameter	Foot wear	
	Before counseling (n= 111)	After counseling (n=111)
Testing temperature before soaking feet or washing feet	12 (10.8%)	105 (94.5%)
Walking bare feet	21 (18.9%)	98 (88.2%)
Wearing shoes without socks	56 (50.4%)	92 (82.8%)
Applying moisturizer	7 (6.3%)	87 (78.3%)

DISCUSSION

Diabetes is one of the most preventable diseases of all the non-communicable disease. WHO report predicts that, the main increase in diabetes would be in more than 65 y age group in the developed countries, in India and other developing countries, the highest increase would occur in the age group of 45–64 y Mangaiarkkarasi A *et al.* got the results like majority of the patients (62%) were in the age group of 40–59 y [5]. Our studies also revealed that majority of the patients (about 77%) were in the age group between 40–65 y. These results are consistent with other results; Seema Hasnain *et al.* assessed the results as out of 150 patients majority were males and belong to the age group between 40-60 y. This shows that diabetic foot problem is mainly concentrated on elderly which increases the morbidity in them due to diabetes [19].

Table 7: Number of patients based on age group

Age (in y)	30-40	41-50	51-60	61-70	70-80	Above 80
In numbers	7 (6.3%)	25 (22.5%)	30 (27%)	31 (27.9%)	17 (15.3%)	1 (0.9%)

In our study, from 111 patients, 60 (54.1%) patients were female, whereas 51 (45.95%) were male patients. This result is consistent with the results with Bhuwan sharma *et al.* [17] (182 females and 90 males) and AR Muhammad-Lutfi, *et al.* (85 female and 72 males) [15].

Table 8: Gender versus age

Age group	Males	Females
30-40	4	3
41-50	14	12
51-60	11	19
61-70	11	19
71-80	10	7
Above 80	1	0
Total	51	60

In the study by Seema Hasnain *et al.* there were 34 (46.5%) respondents who were illiterate and they had a score<50% and 21(31.5%) respondents whose educational qualifications were matric and above matric, their score regarding knowledge was>70% [19]. These results are consistent with our study where there were about 37 (33.3%) patients who were literate, that includes secondary education or graduated patients with high knowledge, and remaining 74 (66.6%) patients were illiterate (primary education) with low knowledge. Our results were consistent with study conducted by Bijoy CV *et al.*,among the subjects who were above-matric, 27(64.3%) had good, 10(21.4%) had satisfactory and 5(14.3%) had poor knowledge. In matric subjects, 10(19.2%) had good knowledge, 22(42.3%) had satisfactory and 20(38.5%) had poor knowledge. And 5(8.9%) of under-matric subjects had good, 13(23.2%) had satisfactory and 38(67.9%) had poor knowledge [6]. The table and graph for the above discussion has been mentioned in table 3 and fig. 4.

Medication adherence is also associated with the education of the patient. As per Arulmozhi S *et al.* studies, only 49.3% patients were adhere to their diabetic medications which is consistent with our study where only 16.21 % were adhere to their diabetic medication where low adherence was found [18]. In our study, there was an improvement of medication adherence after counseling the patients which shows that education and counseling is important in the improvement of health care of the patient. The table and graph for the above discussion has been mentioned in table 5 and fig. 6.

Wagner's scale for the study of the severity shows that majority of the patients 30 out of 111 are having Grade 4 of score which shows the need of counseling and education towards foot care. Other studies conducted show the importance of Wagner's classification to know the risk of lower extremity amputations (LEA). As per Jui-Hung Sun *et al.* the study revealed that High grade of Wagner classification (>grades 3) markedly increased the risk of LEA, which was compatible with the clinical observation that more extensive wounding was associated with an increased risk of amputation [17]. The table and graph for the above discussion have been mentioned in table 4 and fig. 5.

Hence by our study, we can say that counseling by a pharmacist has a great impact on the foot care behaviour and knowledge. Education is very important to improve health quality of life.

CONCLUSION

Counseling is the main key for improvement of patients in knowledge, attitude, self-care behaviour and medication adherence in patients with diabetic foot ulcer. The patients in older age got stricter with diet, medication and hygiene after a round of counseling.

Most of the patients being poor and illiterate were unaware about diabetic foot ulcers and about diabetic foot care. They had a drastic improvement in knowledge after they were educated about the disease, their complications and preventive measures. The patients willingly participated in counseling part. There had been an improvement in the practice of foot care like maintaining hygiene, wearing foot wears and not roaming barefoot. Patients were more adhere to medications after the interactions. The reasons for improper footwear and application of lotions were the poverty, as patients couldn't afford proper footwear and lotions to protect the feet's.

The reasons for non-adherence to medicines were old age, forgetfulness, ignorance. The patient can s*et al.* arms, reminder notes, or organize which all drugs are to be taken at which time. The family members can remind the patients.

The reasons for many Wagner low-grade subjects were because the hospital is established in a rural place. People from rural village lack knowledge of diabetic foot ulcer and foot care. Hence more severe cases of foot ulcers were seen in the hospitals. The patients with low grades were counseled well so as to avoid gangrene, amputations in future.

ACKNOWLEDGMENT

We would like to extend our gratitude to doctors of general surgery and general medicine Department and institutional ethics committee of The Oxford Medical College Hospital and Research Centre, Bangalore for providing facility to complete our research and for being a constant support.

LIMITATION

Study become little bit difficult because of incorporation of patients. Language became an important problem while data collection. Study conducted was for shorter duration, so that follow up could not be fulfilled. Larger studies on treatment pattern and outcome involving a larger population are required to validate the outcome of the present study. The sample size was small and the data is inadequate for the finding of the current study, can be overcome if the study sites are more.

AUTHORS' CONTRIBUTION

All authors contributed equally. All authors read and approved the final manuscript.

ABBREVIATION

DM: diabetes mellitus, WHO: world health organization, LEA: lower extremity amputation, No: number, KAP: knowledge, attitude and practice

CONFLICT OF INTERESTS

Declared none

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