EVALUATION OF FOOT CARE KNOWLEDGE AND PRACTICES AMONG DIABETIC PATIENTS ATTENDING TERTIARY CARE HOSPITAL

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ABSTRACT

Objective: To determine foot care knowledge and practices among diabetic patients.

Materials and methods: In this cross-sectional study, using non-probability convenience sampling, conducted in the last quarter of 2013, 132 diabetic patients fulfilling the inclusion criteria were assessed by a modified pre-test two questionnaires consisted of 11 questions each were adopted to assess the foot care knowledge and practices. Knowledge and practices regarding foot-care were classified as good, satisfactory and poor depending upon the score. Each question was assigned one mark. A score ≥70% (8-11) was regarded as good, 50-69% (6-7) was regarded as satisfactory and a score ≤50% (≤6) was regarded as poor both for knowledge and practice of foot-care.

Results: There were 103 (78.0 %) male and 29 (22.0 %) female patients with mean age of 51.97 years ± 9.2195 SD. Mean score of knowledge about foot care was 8.37 ± 3.106 SD and median score was 10.0 while the mean score of practices about foot care were 8.14 ± 2.518 SD with median score of 8.0. There was a positive correlation between the knowledge scores and the practice score ($p < 0.001$). Education has statistically significant impact on the knowledge ($p=0.001$) and practices ($p=0.001$) regarding foot care. Socioeconomic status had significant impact on knowledge and practices regarding foot care with p value of < 0.05.

Conclusion: This observational study revealed that many diabetics had negative behaviors towards foot-care. This simple quality initiative concludes the notion that patients with diabetes should receive ongoing foot-specific education to prevent foot problems and complications.

KEY WORDS: Diabetes Mellitus, Foot Care, Knowledge, Practice.

INTRODUCTION

Diabetes Mellitus (DM) is one of the most challenging health problems in both developing and developed world.[1] Worldwide the prevalence of DM is nearly 3%, with an expected increase to more than 4% in 2030.[2] In the western world approximately 10% have Type 1 and 90% have Type 2 DM.[3] Globally, foot problems account for more hospital admissions than any of the other long-term complications among patients with diabetes. It has been shown that up to 50% of amputations and foot ulcers in diabetes can be prevented by effective identification and education.[4]

Foot disease is frequently a slow-to-develop, painless surprise and is the most devastating among all chronic complications affecting a person with diabetes that may lead to long hospital stay, disabilities and burden both on the health care system and families. As the prevalence of diabetes especially type 2 diabetes increases globally, and increasing more rapidly in the developing world, primarily owing to marked demographic and socioeconomic changes, the more diabetic foot disease may be expected.

The prevalence of foot ulceration among patients with diabetes mellitus ranges from 1.3% to 4.8% in the community, to as high as 12% in hospital.[5]

Diabetes is recognized as the most common cause of non-traumatic lower limb amputation in the western world, with individuals over 20 times more likely to undergo an amputation compared to the rest of the population.[6]

Realizing the importance of diabetic foot problems, IDF also chose the theme of World Diabetes Day in 2005 "Put Feet First, Prevent Amputations"[7]

Complications that occur in the foot other than all other complications of diabetes are considered the most preventable. Poor knowledge of foot care and poor foot care practices were identified as important risk factors for foot problems in diabetes.[8]

Better understanding the knowledge and practices regarding foot care of our patients as foot care knowledge and practices are different in different com-

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munities, would increase our existing knowledge about the issue and would help us as health care provider to refine our existing knowledge on management and to adopt foot-specific patient education, thus managing our patients in a better way that may help to reduce mortality, morbidity, long hospital stay and burden both on health care system and families

MATERIAL AND METHODS

Hospital based descriptive, cross-sectional study with non-probability convenience sampling at Lady Reading Hospital Peshawar.

Known cases of Type 1 and Type 2 diabetes aged between 25 to 65 years who had the disease for at least six months duration.

Sample size was 132 cases. Sample size was calculated Known cases of Type 1 and Type 2 diabetes aged between 25 to 65 years who had the disease for at least six months duration attending LRH were eligible to be included as participants in this study.

Informed written or verbal consent was taken from all the participants of the study with after approval from the ethical committee

All type 1 and type 2 diabetic Patients fulfilling the inclusion and exclusion criteria attending the diabetic clinic of HMC for routine follow-up were enrolled in the study. The outcomes variables of this study were knowledge and practices regarding foot care in diabetic patients. Approval from ethical committee of the hospital was obtained prior to initiation of the study and only those participants who could give written or verbal consent were enrolled.

Collected data after a detailed history, included participants demographic characteristics as age (years), gender, education level and details of disease and treatment among the study participants such as age at first diagnosis of diabetes, duration of DM in years, medication and glycaemic control.

The questionnaires applied in the study included the participants demographic details (Appendix 1), the foot care knowledge (Appendix 2) and Practices questionnaire (Appendix 3) adapted to the local socio-cultural context, and prepared. Strictly exclusion criteria were followed to control confounders and bias in the study results. The participant score regarding foot care knowledge and practices as assessed by pre-tested questionnaire were graded as good, satisfactory and poor if score was (9-11), (6-8) and (<5) respectively.

Data were entered and analyzed by using SPSS version 16.0 using descriptive statistics, Frequencies / Percentages were calculated for qualitative variables, while Mean+ standard deviation were calculated for quantitative variables. Chi-square, student t test and spearman rank correlation test were applied when necessary. P-value of 0.05 or less than 0.05 was considered as test of significant. Results are presented as tables / charts.

RESULTS

The study was conducted in Lady Reading Hospital Peshawar. There were 132 patients in the study. The study population consisted of 103 (78.0 %) male and 29 (22.0 %) female patients with male to female ratio of 3.55 (Table 1).

Mean age of the whole sample was 51.97 years ± 9.2195 SD. Age ranged from 25 to 65 years. In male the mean age was 51.16 while in female age ranged from 34 to 64 with mean age of 55.86 years (Table 2).

Socio-demographic and some other important characteristics of the patients are shown in Table 3. This table shows that most patients were male with predominant type II DM and age more than 45 years at first diagnosis. Most of the patients had normal body mass index, were educated, employed and with income of more than Rs. 3000, using oral hypoglycemic medications and most had adequately controlled diabetes (Table 3).

Questions determining the knowledge and practices about foot care are shown in table 5 and 6. The knowledge and practices regarding foot care is approximately the same for most of the questions asked. However there were some differences for about the use of oil and lotion to keep the foot soft, drying foot after washing, wearing of comfortable and open shoes and

Table 1: Gender of Participants (n=132)

Gender of participant			Total
	Male	Female	
	103(78.0 %)	29(22.0 %)	132(100 %)

Table 2: Age Wise Distribution of Participants (n=132)

Gender	No. of patients	Min. age	Max. age	Mean age	Std. deviation
Male	103	25	65	51.16	9.1513
Female	29	34	64	54.86	9.0306
Total	132	25	65	51.97	9.2195

Table 4: Scoring of Knowledge and Practices About Foot Care Among the Respondents (n=132)

Statistics	Foot Care Knowledge (Score)			Foot Care Practice (Score)		
	Male	Female	Total	Male	Female	Total
Mean	8.89	6.89	8.37	8.63	6.44	8.14
Median	10	7	10	9	6	8
Std. Deviation	2.66	3.12	3.106	2.3	2.19	2.518
Minimum	3	3	2	2	2	2
Maximum	11	11	11	11	11	11
p-value	0.011			0.003		

Table-8: Relationship of Knowledge and Practices about Foot Care with Different age Groups (n=132)

Age groups	Score of Knowledge			Score of Practice		
	Good:	Satisfactory:	Poor:	Good:	Satisfactory:	Poor:
	(8-11)	(5-7)	4 or Less	(8-11)	(5-7)	4 or Less
25-35	8 (80.0 %)	2 (20.0%)	0 (0.0%)	7 (70.0 %)	2 (20.0%)	1 (10.0%)
36-45	19(63.3 %)	7 (23.3 %)	4 (13.3%)	19 (63.3%)	8 (26.7%)	3 (10.0%)
46-55	25 (64.1 %)	4 (10.3 %)	10 (25.6 %)	24(61.5 %)	12 (30.8 %)	3 (7.7 %)
56-65	32 (60.4 %)	12 (22.6 %)	9 (17.0 %)	21 (43.4%)	20 (37.7 %)	10 (18.9 %)
Total	84 (63.6)	24 (18.9)	24 (17.4)	73 (55.3 %)	42 (31.8 %)	17 (12.9 %)
Chi-square=6.307, P-value=0.390				Chi-square=6.188, P-value=0.402		

Table-9: Relationship of Knowledge and Practices About Foot Care With Educational Status (n=132)

Education Level	Score of Knowledge			Score of Practice		
	Good:	Satisfactory:	Poor:	Good:	Satisfactory:	Poor:
	(8-11)	(5-7)	4 or Less	(8-11)	(5-7)	4 or Less
Illiterate	3 (17.6 %)	7 (41.2%)	7 (41.2%)	2 (11.8%)	8 (47.1%)	7 (41.2%)
Under Matric	4 (18.2%)	9 (40.9%)	9 (40.9%)	2 (9.1%)	14 (63.6%)	6 (27.3%)
Matric	6 (42.9 %)	3 (21.4%)	5 (35.7%)	6 (42.9%)	7 (50.0%)	1 (7.1%)
Higher	71 (89.9%)	6 (7.6 %)	2 (2.5 %)	63 (79.7%)	13 (16.5%)	3 (3.8%)
Total	84 (63.6)	25 (18.9)	23 (17.4)	73 (55.3%)	42 (31.8%)	17 (12.9%)

Table-10: Relationship of Knowledge and Practices about Foot Care with Gender (n=132)

Age groups	Score of Knowledge			Score of Practice		
	Good:	Satisfactory:	Poor:	Good:	Satisfactory:	Poor:
	(8-11)	(5-7)	4 or Less	(8-11)	(5-7)	4 or Less
Male	71 (68.9 %)	18 (17.5 %)	14 (13.6%)	65 (63.1 %)	30 (29.1%)	8 (7.8 %)
36-45	13 44.86%)	7 (24.1 %)	9 (31.0 %)	8 (27.6 %)	12 (41.4 %)	9 (31.0 %)
Total	84 (63.6 %)	25 (18.9)	23 (17.4)	73 (55.3 %)	42 (31.8 %)	17 (12.9 %)
Chi-square=6.548, P-value=0.0386				Chi-square=15.741, P-value=0.001		

Table-11:Relationship of Knowledge and Practices about Foot Care with Income Per Capita (n=132)

Participant income (Pk Rs)	Score of Knowledge			Score of Practice		
	Good:	Satisfactory:	Poor:	Good:	Satisfactory:	Poor:
	(8-11)	(5-7)	4 or Less	(8-11)	(5-7)	4 or Less
1000 or less	6 (45.5 %)	6 (27.3%)	6 (27.3 %)	6 (27.3 %)	12 (54.5%)	4 (18.2%)
1001-2000	15(48.4 %)	8 (25.8%)	8 (25.8%)	9 (29.0%)	12 (38.7 %)	10 (32.3 %)
2001-3000	19(49.4 %)	6 (18.8 %)	7 (21.9%)	21 (85.6%)	8 (25.0%)	3 (9.4%)
>3000	40 (85.1%)	5 (10.6 %)	2 (4.3 %)	37 (78.7 %)	10 (21.3 %)	0 (0.0 %)
Total	84 (63.6)	25 (18.9)	23 (17.4)	73 (55.3 %)	42 (31.8 %)	17 (12.9 %)
Chi-square=16.577, P-value=0.011				Chi-square=34.294, P-value=0.001		

Table-12: Relationship of Knowledge and Practices About Foot Care with Occupation (n=132)

Participant occupation	Score of Knowledge			Score of Practice		
	Good:	Satisfactory:	Poor:	Good:	Satisfactory:	Poor:
	(8-11)	(5-7)	4 or Less	(8-11)	(5-7)	4 or Less
Student	1 (100 %)	0	0	0 (%)	1 (%)	0 (%)
Unemployed	6 (31.6 %)	3 (15.8 %)	10 (52.6 %)	7 (36.8 %)	9 (47.4 %)	3 (15.8 %)
Employed	44 (78.6v%)	9 (16.1 %)	3 (5.4 %)	41(73.2 %)	12 (21.4%)	3 (5.4 %)
Retired	11 (100 %)	0 (0)	0 (0)	9 (81.8 %)	1 (9.1%)	1 (9.1 %)
Unable to work	18 (60 %)	8 (26.7 %)	4 (13.3 %)	14 (46.7 %)	10 (33.3%)	6 (20.0 %)
House wife	4 (26.7 %)	5 (33.3 %)	6 (40.0 %)	2 (13.3 %)	9 (60.0 %)	4 (26.7 %)
Total	84 (63.6)	25 (18.9)	23 (17.4)	73 (55.3 %)	42 (31.8 %)	17 (12.9 %)
Chi-square=40.971, P-value=0.001				Chi-square=28.1410, P-value=0.002		

walking bare foot (Table-5, 6).

Mean score of knowledge about care was 8.37 + 3.106 SD and median score was 10.0 while the mean score of practices about foot care were 8.14 + 2.518 SD with median score of 8.0. Mean scores of knowledge and foot care practices were significantly low in female as compared to males with $p < 0.05$ (Table 4).

Percentage scoring of knowledge and practices about foot care among the respondents are given in table 7 showing that most respondents had good knowledge and practices about foot care (scores 9-11) (Table 7). There was a positive correlation between the knowledge scores and the practice score, as Spearman's rank correlation coefficient (Spearman's rho) revealed, statistically significant correlation ($p < 0.001$) with coefficient accounted for 0.822 (Fig. 2).

Knowledge and practices about foot care were stratified against age, education, income and gender to see the effect modification. The effect of age on foot care knowledge and practices was not significant. However the role of education has shown statistically significant impact on the knowledge ($p=0.001$) and practices ($p=0.001$) regarding foot care. Similarly occupation has a statistically significant effect on the foot care knowledge (0.006) and practices ($p=0.008$). Gender of patients was also significantly associated in relation to knowledge ($p=0.038$) and practices ($p=0.005$) regarding foot care. Similarly income per capita and occupation has shown significant association with the knowledge and practices regarding foot care with p value of < 0.05 in each case (Table 8-12).

DISCUSSION

In the tertiary care hospitals, there is a diabetes and hypertension clinic in every center. The patient is usually given the education awareness while seen in the clinic and in some centers the health educator will also educate some patients. However, there is lack of well-structured educational programs which will improve the foot care knowledge and practice of the patients.

Only knowledge and awareness are not enough in preventing diabetic foot complications until it is translated to daily health practices. In our study median scores of the foot-care practice were low as 8 and 6 of 11 in male and female respectively, although somewhat higher as compared to previously reported scores, this still indicates the great need for further improvement. Our findings are in agreement with other researchers even in developed countries.[9]

The results of the questions about the need for special characteristics of the shoes are interesting and of special importance. For example only 66 % of the respondents knew the importance of shoes for foot health. Of special importance was the practice related to the shoes as more than 98 % of the study sample constantly does not wear the fully covered shoes and more than 90 % of the respondents regularly walk bare foot indoors and in near surroundings. Neil (2002) in his study of 61 diabetic patients in the rural area in USA, noticed the problem of walking barefoot in many patients, especially inside their homes.[10] A study in India found that 0.6% of the 300 diabetic patients in their study walked barefoot outdoors and 45% walked barefoot indoors.[8] The practice of wearing foot wares relates to the culture of this nation as most people do not wear the covered shoes and prefer to walk bare foot. This is due to hot climate of the country and most people live in closed home. Although these practices have been adopted slowly over hundreds of years but for the sake of healthy foot practices this need to change. Comparing this result with the study from Pakistan, which is a relatively of similar culture in certain aspects; patients have a higher percentage of wearing uncovered shoes as they found that only (22.2%) of males and (43.8%) of females patients were using open shoes.[11] Another study of similar nature from patients reported that (49.8%) of the respondents did not wear the fully covered shoes.[12]

Furthermore, 40.0 % of the patients do not inspect the inside of their shoes before wearing. Schmidt et al in Germany also found deficits regarding self-control of shoes and socks in her study and recommended the need for more frequent education, especially for patients with a foot art risk.[13] In our study 55.0 % of the respondents did not dry their feet after washing them and 34.0 % do not use skin lotion or olive oil to keep their feet soft. Similarly 43 % of the patients do not examine their feet and do not check their feet daily for the presence of any ulcer. This is in contrast to the foot care practices in western world as Pollock et al.(2004) reported in their study which they found that only 18.0 % of the patients failed to inspect their feet (Pollock et al., 2004). However, this is slightly better than the previous reports in the same country.[12] Similarly in Pakistan only 34% inspect their feet daily.[11] This result indicates that physicians need to concentrate more on education of this behavior, especially in low socio-economic areas.

Washing feet daily was very good in this study as 97.7 % of the patients washed their feet daily. This behavior is most probably related to the religious action of ablution, which is performed by Muslims religiously without knowing that this activity is a part of good foot care practices. In Neil's study, 79.2% of those with foot ulcers and 80.6% of those without foot ulcers wash their feet once a day.[10] Hasnain and Sheikh in their study from Pakistan, also found a big percentage of diabetic patients (88.7%) wash their feet daily.[14]

Another striking feature which is revealed in this study is that 18 % of the respondents had satisfactory knowledge (score 8-11) whereas 31 % of the respondents had satisfactory practices regarding foot care. This 13% increase in practices with less knowledge indicates that people are doing good practices without knowing that they are good for health. This may be explained on the basis of Islamic rituals which they are performing religiously without knowing that some of these activities are a part of good foot care practices e.g. washing of the feet as they did ablution before offering prayers. The possible reason for this difference in knowledge and practice could be our religious principles**.**

The statistically significant relationship of knowledge and practices with occupation and income of the patients and the significant positive relationship between the educational level and foot care practices, indicates that the lower socio-economic status is a risk factor for having patients with inadequate foot-care knowledge and practice; therefore, putting them at a higher risk for having diabetic's foot complication. Tseng (2003), in his study about prevalence and risk factors of diabetic foot problems in Taiwan also concluded that particular attention should be focused on patients with a lower education level and those who use insulin.[15] De Berardis et al.(2005), in their study of diabetic foot care in Italy, also advised to give more attention on patients with low socioeconomic level as they found the diabetic foot complications were more in patients with lower income and with lower education.[16]

Relationship of the knowledge and the practice scores with the duration of diabetes in this study was not statistically significant. This may indicate the need for more efforts to improve the foot-care knowledge and practice in our diabetic patients, particularly on those with longer history. Bell et al.(2005), in their study about foot self-care practices, found that the practice was better in patients with diabetes duration >10 years compared to those with diabetes duration < 10 years.[17]

However the most important aspect of the study is the positive correlation between the foot-care knowledge scores and practice score and this reinforce the need for good education to enhance the foot care knowledge and thus improving foot-care practice in our patients to prevent diabetic foot complications. Although a Cochrane review about patient education for preventing diabetic foot ulceration concluded that foot care knowledge and behavior of patients to be positively influenced by patient education in the short term and that there is weak evidence suggesting that patient education may reduce foot ulceration and amputations, especially in high-risk patients.[18] However, this should not under-estimate the importance of foot care education as the reviewer mentioned that it could be the weakness in the methodology of the reviewed intervention which affected the results.

The effect of good education and educational programs about foot-care in decreasing the diabetic foot complications was addressed by many studies and articles and the researchers have concluded in their studies the persistent need for foot care education programs and improving the way of delivering it. Though this study was not intended to evaluate the foot care education given by the primary health care centers, but as to understand the level of foot care knowledge and practice of the study sample. But this can also be related to the efforts done by the primary health care centers and the care provided by other places where the patients may go for follow-up of their diabetes, such as secondary hospitals. This fact is supported in a study by Alfadda and Bin Abdulrahman in their assessment of care for Type 2 diabetic patients at the primary care clinics of a referral hospital concluded that the care was not adherent to American Diabetes Association guidelines and suggested that suitable measures must be introduced in order to improve it.[19]

In summary the results of this study has shown a marked gap in the knowledge and practices of the diabetic patients regarding foot care in a diabetic clinic of a secondary level hospital and reflects indirectly even a disturbing situation in the primary care facilities. Foot related complications of Diabetes and finally leg amputations in most of the cases have a high socioeconomic impact. Improvement in foot care knowledge by proper education is the most crucial tool for preventing lower leg amputation. Thus low cost, low technology evaluation and preventive processes are enough to substantially reduce the rates of risk. Also there is a need to motivate health personnel in educating diabetic patients about self-care and also practicing by themselves proper foot examination when and where required. Print and electronic media may play a role and must be engaged in order to enhance the public awareness of diabetes and its complications. Strategies must be planned to develop and implementation of primary prevention programs in all diabetes centers regarding foot care.

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