Turkish Journal of Endocrinology and Metabolism, (1999) 2 : 65-70 **ORIGINAL ARTICLE**

Awareness of Diabetic Foot Disease in a Group of Turkish and English Patients with Type 2 Diabetes Mellitus: Assessment of the Status and the Efficacy of Diabetic Foot Education Programs

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Diabetic patients are at high risk for developing serious foot problems with potential loss of limb. Understanding the risk factors is essential to prevent complications in the diabetic population. In this study we compared awareness of diabetic foot disease and the diabetic education system in a group of Turkish and English patients with Type 2 diabetes. At outpatient clinics, a questionnaire consisting of 7 questions concerning awareness about diabetic foot disease was given to patients. One hundred and fifteen Turkish (79 women, 36 men, mean age 59.0±12.6 years) and 147 English (72 women, 75 men, mean age 62.2±10.1 years) patients completed the questionnaire. In Turkey 56% of the patients and in U.K 76% of the patients had been given education by health care professionals ($p<0.001$). In England diabetic foot education was given mainly by chiropodists (32%) and specialist nurses (22%); in Turkey educators were mainly specialist doctors (58%). Every answer was scored as informed (2), misinterpreted (1), and not informed (0) and a total score was obtained for each patient. Total score was not different between the Turkish and English patients. In the uneducated Turkish patients group, total score was significantly lower than in the educated group ($p<0.01$). That difference was not observed in the English population. When each question was evaluated separately, the English population was found to be more aware of diabetic neuropathy and peripheral vascular disease, but less concerned about the development of diabetic foot complications in themselves. Both groups were equally aware of the danger of diabetic foot lesions.

In conclusion, compared to the Turkish diabetic population, a larger percentage of the diabetic English population received professional education. In the Turkish patients' group, professional education tended to improve consciousness of diabetic foot lesions while this did not influence the awareness of the English patients regarding this complication.

KEY WORDS Diabetic foot, education, education programs

Introduction

Diabetic patients are at high risk for developing long-term medical complications including serious foot problems with potential loss of limb. Foot lesions account for 20 percent of all diabetic hospitalisations (1,2). It is estimated that 20000 to 30.000 amputations are performed per year in the USA for diabetic foot lesions that have progressed to gangrene, constituting 50 to 70 percent of all non-traumatic amputations (3). Diabetic patients have a 10 to 15 times higher risk for lower extremity amputation compared with non-diabetics (4).

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There is a marked correlation between the level of the patient is understanding of the disease and the development of the foot lesions (5). The effectiveness of frequent foot examination among patients coupled with intensive patient education was shown to bring about a sustained decrease of nearly 50 percent in the amputation rate (6) and to significantly lower the rate of hospital admissions for diabetic foot complications (7). Education of the individual patient regarding the methods of foot care and awareness of diabetic foot problems is the mainstay of the prevention of this devastating complication (8-11).

At our diabetes outpatient clinics, we routinely perform foot examinations and give patient education to groups and/or on an individual basis. In this study, we aimed to assess the educational status of our patients on this issue and the effect of diabetes education on the awareness of diabetic foot disease. We compared the results within our own population and with a group of English Type 2 diabetic patients in order to evaluate the status and efficacy of diabetes education programs.

Materials and Methods

At our outpatient clinics, patients who had an established diagnosis of type 2 diabetes mellitus, were asked to fill in a questionnaire regarding their state of diabetic education and awareness of diabetic foot problems. Patients who had had a diabetic foot lesion before were not included in the study.

The questionnaire had two main sections. The first section consisted of questions regarding the demographic data of the patient including age, gender, duration of diabetes, occupation and education. The patients were also questioned about the state of diabetic education, whether they had been given any lectures or recommendations about diabetic foot problems and personal foot care. The patients who had had a professional based education were asked to indicate the source of education as a specialist doctor (internist or diabetologist), general practitioner, specialist nurse, dietician, or chiropodist.

The second section consisted of 7 questions regarding awareness of diabetic foot disease (Table 1), about the probability of developing peripheral vascular disease and diabetic neuropathy, the relation between these disorders and diabetic foot ulcers or gangrene, estimating their personal risk in these situations, and the importance of diabetic foot lesions.

Table 1. Questionnaire containing 7 questions which require answers rating the importance possibility of the following situations from 0 to 6.

1. Is it true that all patients with diabetes develop reduced blood flow in their feet?
2. Is it true that all patients with diabetes develop lack of feeling in their feet?
3. Is it true that all patients with diabetes develop foot ulcers?
4. Is it true that all patients with diabetes develop gangrene?
5. Imagine that you have a lack of feeling in your feet. How likely is it that you will develop a foot ulcer?
6. Imagine that you have reduced blood flow in your feet. How likely is it that you will develop a foot ulcer?
7. Imagine that you have a foot ulcer with infection. How dangerous do you think this situation would be?

Each question consisted of 6 different scores ranging from "never heard" to "not important", "important", or" very serious". Answers for each question were scored between 0 to 2 in order to assess a total score, 0 for not being informed, 1 for wrong information (either underestimation or overestimation of the importance of the disease), and 2 for correct information.

Statistical analysis was performed with an IBM compatible PC by Instat II program. Total scores of the patient groups were compared by Mann Whitney-U test and subgroup scores by Kruskal Wallis ANOVA test. Scores for each question were compared by chi-square test.

Results

The study was performed in a group of Turkish and English type 2 diabetic patients. One hundred and fifteen Turkish (79 women, 36 men, mean age 59.0±12.6 years) and 147 English (72 women, 75 men, mean age 62.2±10.1 years) patients completed the questionnaires.

In the Turkish group (T) 64 of 115 patients (56 %) had had professional diabetic foot education, while

in the English patients' group (E) this was 112 of 147 (76%), being significantly higher than the T group ($p<0.001$).

The main source of education was chiropodists (32%) in the E group, followed by specialist nurses (22%) and specialist doctors (20%). In the T group the main source of education was specialist doctors (58%) followed by general practitioners (18%) (Figure 1).

Total scores of the two groups were similar, 11.3±3.2 in the T group and 11.9±2.5 in the E group. When the groups were compared according to their diabetes educational status, there was no difference between educated (12.1±2.2) and uneducated (11.2±3.0) English patients, while uneducated Turkish patients (10.3±3.4) had a significantly lower score compared with educated Turkish patients (12.1±2.7, $p<0.01$) and educated English patients (12.1±2.2, $p<0..05$). Total scores were not correlated with age, gender, duration of diabetes or general educational status of the patients.

The answers to the first question regarding the development of peripheral vascular disease revealed that 30.4% of the T group were unaware of such a complication, while this was only 4.8% in the E group ($p<0.0001$). Educated T patients (TE) were more aware of this problem compared to the uneducated (TN) group ($p<0.01$), there was no difference between educated (EE) and uneducated (EN) E groups.

The same trend was also observed for the second question: 17.4% of the T group was unaware of diabetic neuropathy while this was only 6.1% in the E group ($p<0.0001$). The TE group was more aware of this problem compared with the TN group ($p<0.005$) but again there was no difference between the EE and the EN groups.

The answers to the third question regarding the development of foot ulcers in the presence of diabetic neuropathy showed a similar degree of unawareness between the T (13.0%) and the E (18.2%) groups. The TE group had a higher score in comparison to the TN group ($p<0.005$) but there was no difference between the EE and the EN groups. The same trend was also observed for the fourth question, 13.0% of the T group and 17.5% of the E group were unaware of the risk of gangrene development. There was no difference between the TE and the TN groups or the EE and the EN groups.

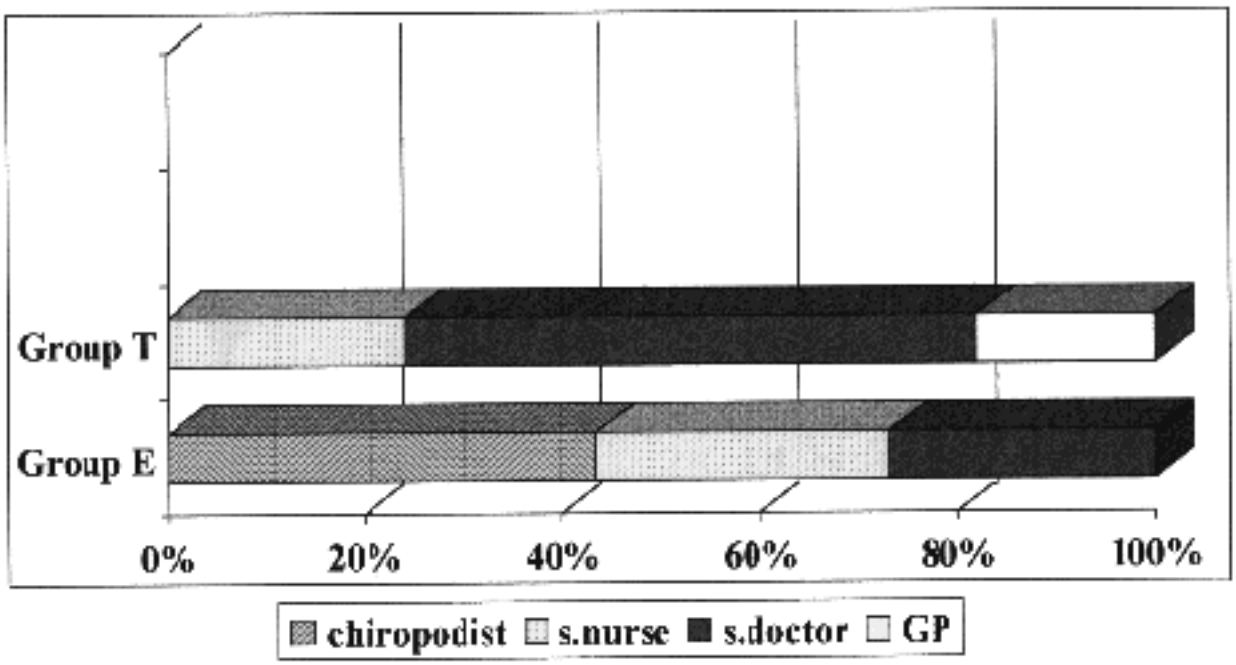

Figure 1. Source of education.

The fifth and the sixth questions were asked to patients in order to make them estimate their own risk in these situations. In the T group 20.9% were unaware of the risk for the development of foot ulcer if they had a lack of sensation in their feet, while this was only 8.2% in the E group. But 36.7% of the E group underestimated the risk and scored this question as unimportant while this was only 11.3% in the T-group. As a result total score was higher in the T group, with 67.8% of the patients having adequate information while this was only 55.1% in the E group ($p<0.0001$). Again the TE group had a higher score compared with the TN group ($p<0.05$) but there was no difference between the EE and the EN groups. The same trend for the fifth question was also observed for the sixth one. In the T group 17.4% were unaware of the risk of developing gangrene if they had reduced blood flow in their feet, while this was only 6.8% in the E group. Again 27.9% of the E group underestimated the risk and scored this question as unimportant while this was only 11.3% in the T group. Total score was therefore higher in the T-group with 71.3% of the patients having adequate information, while this was 65.3% in the E group ($p<0.005$). The TE group had a higher score compared with the TN group ($p<0.05$) but there was no difference between the EE and the EN groups.

The seventh question revealed that all patients knew the danger of foot ulcers with infection; 98.2% of the T-group and 99.3% of the E group were aware of the importance of this problem.

(Results for each question are summarised in Table 2).

Discussion

Although we revealed major differences in educational status and awareness of diabetic foot problems in Turkish and English patients, we have to admit that the results of this study can not be extrapolated to include all Turkish and English patients because they were selected from special clinics in both countries. In particular Turkish patients represented a higher income group from Istanbul, which is an urban area compared with the rest of the country.

The ratio of the patients who had received professional foot care education was higher in the English group as expected. Indeed this result can be explained by the source of education: 70 of 147 English patients (47%) had at least one visit to a chiropodist. Thus chiropodists are the main source of education for the English patients followed by specialist diabetes nurses. In the Turkish group the main source of education were specialist doctors and general practitioners. Specialist doctors carried half of the burden of diabetes education alone, mainly at educational meetings and partly at outpatient visits in a very limited time. Only 1% of the Turkish patients had a chance to have a visit to a chiropodist. This is mainly due to the lack of chiropodists in the hospitals all around Turkey. Specialist diabetes nurses, who are fewer than specialist doctors, can only partially help with this problem, because they are not educated about diabetic foot problems and also do not have enough time to educate the diabetic patients about this subject.

Total scores of the Turkish and the English patient groups were comparable. This result can be

Table 2. Results for each question are shown as percentages.

	Turkish Patients			English Patients		
	informed	not informed	misinformed	informed	not informed	misinformed
Question 1	64.3	30.4	5.2	81.6	4.8	13.6
Question 2	76.5	17.4	6.1	69.4	6.1	24.5
Question 3	87	13	-	81.4	18.2	-
Question 4	87	13	-	82.5	17.5	-
Question 5	67.8	20.9	11.3	55.1	8.2	36.7
Question 6	71.3	17.4	11.3	65.3	6.8	27.9
Question 7	98.2	1.8	-	99.3	0.7	-

explained by the individual analyses of questions. Turkish patients were less aware about the mechanisms leading to diabetic foot problems compared with English patients. A very important part of the group had never heard of neuropathy or peripheral vascular disease, but they were aware of the probable results: diabetic foot ulcers and gangrene. On an individual basis, English patients underestimated their own risk for these complications while Turkish patients tended to overestimate. Again this may be a result of the source of education. Doctors usually have less time for such an educational practice and in lectures they sometimes are direct and perhaps frightening instead of being comprehensive and supportive. This result indicates that the main educator in foot problems should be a specialist such as a chiropodist and may be a specialist nurse.

Another result of this study is the lack of difference between educated and uneducated English patients. Educated Turkish patients had a higher total score and higher scores for many of the questions compared with the uneducated group as we had expected. But neither the total score nor any of the scores for individual questions were different between educated and uneducated English patients. The higher educational level of the English population regarding health problems may explain this. In Turkey, public education programs about general health care and special medical problems are very limited.

Simple efforts on the part of health care providers and patients can reduce the risk of diabetic foot disease (7). But most of these simple procedures are not being systematically applied by health care providers or patients (12). Most of the diabetic patients do not routinely perform simple foot care assessments (13). They may not be aware of foot care procedures or how to do them, or they may not believe that such procedures can make a difference (14). The level of the patient's understanding of the disease and the likelihood of the development of diabetic foot lesions are inversely correlated (questions 5,6,7) (5). On an individual basis, every diabetic patient needs to be informed about the causes, nature, and outcome of diabetic foot disease and about preventive self foot care measures. They have to believe in what they do and should be encouraged by health care providers to continue.

In this study we assessed the educational status and awareness of our patient population and compared it with a group of English diabetic patients. Although a smaller percentage of our group had a professional based education, the total score was not different from the English patients. In our study population, professional education improved the consciousness of diabetic foot disease while the awareness of the English patients regarding this problem did not increase after further education.

Our study showed once again that the more knowledge the fewer complications. Educated diabetic patients develop fewer diabetic foot complications. That is why we should include and insist on a foot care program in diabetic education programs. A Chiropodist can be the main educator about diabetic foot care.

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