Foot Self-Check and Diabetes Awareness

Fadia T. Shaya, PhD, MPH, Nneka Onwudiwe, PharmD, Navendu Samant, MA, Reed Winston, MD, PhD, Wallace Johnson, MD, Aurelia Laird, RN, Faye Larkins, RN, MPH, and Gabriel E. Shaya

ABSTRACT

Purpose. We conducted a study to assess the prevalence of foot self-check performed by diabetic patients in an urban minority population. To achieve that goal, we used a Diabetes Knowledge Test (DKT) and a Self-Care Activity Assessment questionnaire.

Methods. During the period of enrollment from April 1, 2005, to August 31, 2006, the research nurse administered the Diabetes Knowledge Test and the Self-Care Activity Assessment questionnaire to 463 subjects. Patients who completed a questionnaire also provided a self-report of their sociodemographics and their living status, and their medical information was reviewed. The 23-item Diabetes Knowledge Test included 14 multiple-choice questions pertaining to diabetic health such as diet, exercise, diabetes-related medical conditions, and insulin. Besides questions on diabetes knowledge, some questions also pertained to self-care. The test score was calculated as the sum of correct answers to the multiple-choice test items that assessed diabetes-related knowledge.

Results. The sample scored an average of 5.74 on the general Diabetes Knowledge Test. The score was based on the sum of correct answers to the 14 multiple-choice questions. The maximum score was 14. Women’s scores were statistically significantly higher (5.93) than those of the men (5.37) at alpha 0.05, and Caucasians’ scores (6.03) were higher than those of African-Americans (5.72). When patients were asked how many times in the last seven days they had checked their feet, 89% responded they had checked at least once. Patients who reported at least one day of foot care within the previous seven days had higher scores on the Diabetes Knowledge Test than patients who reported no foot care. Diabetes knowledge was positively correlated with the frequency of foot care. African-Americans were 7% less likely than Caucasians (significant at alpha 0.05) to engage frequently in foot care activities after we controlled for patients’ age, sex, and smoking.

Conclusion. The frequency of foot self-check, a strong predictor of optimal diabetes outcomes, is highly associated with general diabetes awareness. Foot self-check is less prevalent among men and African-Americans. It seems apparent that the medical community could assist in modifying health behavior for populations at risk. It is important for patients to engage in their own foot self-check, perhaps with the assistance of intensive educational programs or other ways of care, including follow-up interventions that target high-risk patients.

INTRODUCTION

Between the years 1990 and 1998, the prevalence of diabetes increased by 33%; this increase was observed across different sex, age, and ethnic groups. Diabetes is a high-morbidity chronic illness in which patients require continuous medical care and education in self-management to prevent acute complications and to reduce the risk of associated comorbidities and even mortality.

A number of disease-management programs have been implemented to control diabetes. Diabetes Self-Management Education (DSME) is considered the cornerstone of care for all persons with diabetes who want to achieve successful health-related outcomes. The National Standards for DSME recommend an individualized assessment, the development of an educational plan, and periodic reassessments by participants and instructors in order to select appropriate educational materials and interventions. However, it is a continuous challenge to keep patients motivated and in compliance with guidelines.

For example, in our study, patients were likely to skip individual self-care elements; 37.9% reported no foot care, 37.7% reported no exercise, and 54.4% reported no time for food shopping or preparation. These findings may be attributed to the low rate of cooperation between patients and physicians in terms of setting treatment goals and strategies in the primary care setting.

Foot care programs do not preclude the risk of developing foot ulcers, but they do decrease the risk by about 13-fold. Specific self-care behaviors are associated with diabetes outcomes, but almost 33% of patients do not perform foot self-examination. Even with intensive therapy, the prevalence of lower-extremity disease is high in diabetic patients; this includes peripheral arterial disease, peripheral neuropathy, foot ulceration, and lower-extremity amputations. In adults over 40 years of age in the U.S., that prevalence is approximately 4.5%. Prevalence rates are twice as high for individuals with a diagnosis of diabetes, and they are even higher for those with other risk factors such as peripheral neuropathy and peripheral vascular disease. Foot ulcers are a major cause of morbidity and mortality for patients with diabetes.

From the viewpoint of disease management, the economic burden of morbidity is also considerable; direct medical and...
Foot Self-Check and Diabetes Awareness

indirect expenditures attributable to diabetes in 2002 were estimated at $132 billion;12 the estimated cost of treating a diabetic foot for two years from a diagnosis of diabetes is approximately $28,000.10

Thus, preventive foot care, starting with foot self-check in patients with diabetes, is critical to mitigating diabetes complications and subsequent morbidity.13

This study aims to assess the correlation between patient knowledge of diabetes and foot self-check.

METHODS

Data for this study were extracted from a subset of the participants with diabetes whose glycosylated hemoglobin (HbA1c) concentration exceeded 6.5%. Participants were enrolled in the Baltimore Cardiovascular Partnership study, which tests the effect of patient education on diabetes control. The period of enrollment spanned from April 1, 2005, to August 31, 2006.

For this substudy, we selected all those subjects (n = 463) who completed the Diabetes Knowledge Test (DKT) and the Self-Care Activity Assessment; who provided a self-report of their sociodemographics; who were living in the community; and whose medical charts were reviewed.

Study Measures

We used the Diabetes Knowledge Test. The test score was calculated as the sum of correct answers on 14 multiple-choice test questions that assessed diabetes-related knowledge.

To assess the subjects’ awareness of the importance of foot care, we posed this question: “On how many of the last seven days did you check your feet?”

The test contains 23 items. The first 14 items are appropriate for people who do not use insulin. All 23 questions can be administered to people who do use insulin. The 23-item test takes approximately 15 minutes to complete. The test comprises multiple-choice questions pertaining to diabetic health such as diet, exercise, diabetes-related medical conditions, and insulin.

Besides questions about diabetes, patients are also asked questions about self-care in relation to their behavior in the previous seven days at the time of enrollment on the topics of diet, exercise, blood sugar testing, foot care, and cigarette smoking.

Data Analysis

A Microsoft Office Access database was created to facilitate data management, and trained personnel (our colleagues N. Onwudiwe and N. Samant) entered the information into the database. Forms within the database included information that we had collected about patients’ demographics and their responses to the Diabetes Knowledge Test. Bivariate and multivariate analyses were performed to assess the predictors of the study measures. Multiple regression models were used to perform multivariate analysis. SAS version 8.2 (Cary, NC) was used to analyze all data.

RESULTS

Of the 463 patients, 434 (94%) were African-American and 29 (6%) were Caucasian. Other races comprised only a small number of patients and were excluded from our analysis. The sample consisted of 307 women (67%).

The general subscale of the Diabetes Knowledge Test was used to assess patients’ understanding of diabetes. The score was calculated as the sum of correct answers on 14 multiple-choice test items. The overall mean score on the general Diabetes Knowledge Test was 5.74 with a standard deviation (SD) of 2.67. Women’s scores (mean 5.93, SD 2.68) were relatively higher than those of the men (mean 5.37, SD 2.38). Scores of Caucasians (mean 6.03, SD 2.15) were higher than those of African-Americans (mean 5.72, SD 2.68).

When asked how many times within the last seven days patients had checked their feet, 89% responded that they had done so at least once during that period. When patients were asked how many times within the last seven days they had followed a healthful eating plan, 77% responded that they had done so at least once. Patients reporting at least one day of foot care in the previous seven days had higher diabetes knowledge scores (mean 5.77, SD 2.68) than patients who reported no foot care (5.60, SD 2.68) in the same period.

Multivariate regression models were used to assess the predictors of diabetes knowledge (Table 1). Age, race, smoking, and foot care, which were used as covariates, were associated with diabetes knowledge (significant at alpha 0.05). Interestingly, diabetes knowledge seemed to decrease with increasing age (P < 0.0001) and men had lower scores than women (P < 0.03). Smokers had significantly lower diabetes knowledge scores than their non-smoking counterparts (P < 0.03). The frequency of foot care was significantly associated with higher diabetes knowledge scores (P < 0.02). The variable of race was not significantly associated with diabetes knowledge scores.

Multivariate regression models (Table 2) were used to assess the predictors of foot care, and age, race, smoking, and diabetes knowledge were used as covariates. Race (P < 0.03) and diabetes knowledge (P < 0.02) were significantly associated with foot care activity; men were less likely than women to engage in self-care activity.

Consistent with the first model, diabetes knowledge was positively related to the frequency of foot care (P < 0.02). African-American patients were 7% less likely than Caucasian patients to engage in frequent foot care activities.

DISCUSSION

Patients with diabetes require continuous comprehensive medical care and self-management education to prevent acute complications. Of all the complications of diabetes, damage to

continued on page 620
the extremities that necessitates successive amputations emerged as a high predictor of morbidity and mortality. Studies have shown that when patients are passive about appropriate foot self-check, the incidence of foot ulcers and amputations is likely to rise.6,7 Gaps in the delivery and coordination of health care still exist among people with different socioeconomic status, such as those with low incomes and less education; however, differences in sex also exist across racial and ethnic groups in diabetes care.14

Our results showed significant differences in the likelihood of patients performing a proper foot self-check. Patients who had better general awareness of diabetes tended to check their feet more often. This specific finding, however, may provide an opportunity for diabetes-management programs to fully engage patients in their own care, perhaps through intensive education programs or close coordination with nurses or allied health care workers.

Also, regardless of how well aware African-American and male diabetic patients were of their condition, they tended to perform foot self-check less frequently. Again, this particular finding may give direction to disease-management programs or clinical interventions, perhaps with a targeted approach to these subgroups.

Patients who were older, who were African-American, and who smoked were generally less aware of their diabetes condition. This information is valuable in guiding education programs to address specific at-risk populations.

STUDY LIMITATIONS

Some limitations to this study should be noted. It is possible that using a single variable as a measure of diabetes foot self-check might result in bias. However, given that the goal was to obtain a general indication of the presence of foot self-check, we believe that the measure we used was an appropriate approximation.

The nature of self-reported data calls for potential concerns about overreporting as a consequence of the “Hawthorne effect.” Patients may overreport twice as frequently as they underreport; thus, the information collected on foot self-check is likely to be an overestimate of the true behavior.15

Patients who were included in this study on the basis of their having uncontrolled diabetes; therefore, they were not representative of the overall population of at-risk patients. It is possible that selection bias resulted in excluding all those who performed more regular foot self-checks and who were more likely to keep their diabetes under control.

CONCLUSION

Our ultimate aim in publishing this article is to draw the attention of the medical and health care community to the frequency and importance of foot check self-management among diabetic patients and the risk factors associated with poor self-management. The results of our study might be helpful if they are used to inform education programs and foot self-check follow-up interventions targeted to high-risk patients.

REFERENCES