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Original Article

Assessment of patient medication adherence among the type 2 diabetes mellitus population with peripheral diabetic neuropathy in South India

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الملخص

أهداف البحث: حاولت هذه الدراسة استقصاء العلاقة بين عدم الالتزام بأخذ الدواء واعتلال الأعصاب الطرفي السكري بين مرضى السكري من النوع ٢ بمستشفى خاص في جنوب الهند.

طرق البحث: أجريت دراسة مستقبلية خلال الفترة من يناير ٢٠١٥م وحتى ديسمبر ٢٠١٥م. شملت الدراسة ٨٦ مريضا بالسكري من النوع ٢ مع وجود اعتلال الأعصاب الطرفي السكري. تمت متابعة المرضى شهريا، ولمدة ثلاثة أشهر. أخذت عينات الدم لفحص مستوى السكر بالدم عند الصوم، وبعد الأكل بالإضافة إلى قياس مستوى الهيموغلوبين السكري. واستخدمت استبانة مقياس موريسكي لتقييم التزام المرضى لأخذ الدواء، ومقياس إدراك الاهتزاز لفحص درجة اعتلال الأعصاب الطرفي السكري. وجرى تقديم المشورة للمرضى أثناء كل متابعة بشأن مرضهم، والحاجة إلى مراقبة نسبة السكر بالدم، وأهمية الالتزام بأخذ الدواء.

النتائج: من بين ١٢٠ مريضا تم فحصهم، شملت هذه الدراسة ٨٦ مريضا. كانت الغالبية (٧٦.٧٪) تعاني من زيادة الوزن، و ٥١٪ منهم لديهم داء السكري منذ ١١-١٥ عاما. استخدمت طريقة أنوفا ذات الاتجاه الواحد لمقارنة وضع نسبة السكر في الدم، وفحص اعتلال الأعصاب الطرفي السكري والالتزام بأخذ الدواء في جميع الزيارات الثلاث. لوحظ تحسن كبير في الالتزام بأخذ الدواء والحد من شدة اعتلال الأعصاب الطرفي السكري من الزيارة الأولى للثالثة.

الاستنتاجات: تعليم المرضى مهم لتحقيق الالتزام بأخذ الدواء ويمكن أن يُعزز مراقبة نسبة السكر الأمثل بالدم، ويقلل من انتشار اعتلال الأعصاب الطرفي

السكري. يلعب ممارسي الرعاية الصحية دورا محوريا في تثقيف مرضى السكري بما يخص الالتزام بأخذ الدواء.

الكلمات المفتاحية: داء السكري؛ الالتزام بأخذ الدواء؛ الاعتلال العصبي الطرفي؛ مراقبة نسبة السكر بالدم؛ تعليم المرضى

Abstract

Objectives: The present study attempted to explore the relationship between non-adherence with medication and diabetic peripheral neuropathy in patients with type 2 diabetes mellitus (DM) in a private hospital located in South India.

Methods: A prospective study was carried out from January 2015 to December 2015. This study included 86 type 2 DM patients with diabetic peripheral neuropathy. The patients were followed-up for three months, once a month. Blood samples were taken to test for fasting blood sugar (FBS), postprandial blood sugar (PPBS) and HbA1c. A Morisky scale questionnaire was used to assess patients' medication adherence and a biothesiometer was used to screen the degree to which patients were affected by diabetic peripheral neuropathy. Patient counselling, which focused on the need for maintaining glycaemic control and the importance of medication adherence, was carried out during each follow-up.

Results: Of the 120 screened subjects, 86 patients were included in the present study. A majority (76.7%) were overweight, and 51% had DM for the past 11—15 years. ANOVA was used to compare patients' glycaemic status, peripheral diabetic neuropathy screening and medication

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adherence in all three follow-up visits, and $p < 0.0001$ was considered as significant. Significant improvement in medication adherence and reduction of the peripheral diabetic neuropathy severity ($p < 0.0001$) were observed from patients' first to third visits.

Conclusions: Patient education is prudent for improving medication adherence, a result that can potentially promote optimal glycaemic control and can reduce the prevalence of diabetic peripheral neuropathy in patients with DM. Health-care practitioners play a pivotal role in educating the diabetic population about medication adherence.

Keywords: Diabetes mellitus; Glycaemic control; Medication adherence; Patient education; Peripheral neuropathy

Introduction

India has more people with diabetes than does any other country in the world, according to the International Diabetes Foundation, although more recent data suggest that China now has more people with diabetes than does India. The disease affects more than 62 million Indians, which is more than 7.1% of India's adult population. An estimate shows that nearly 1 million Indians die every year due to diabetes.[1] The average age of onset is 42.5 years.[2] The high incidence is attributed to the combination of genetic susceptibility and the adoption of a high-calorie, low-activity lifestyle by India's growing middle class.[3,4] Additionally, a study by the American Diabetes Association reports that India will see the greatest increase in people diagnosed with diabetes by 2030.[4]

Diabetes has both macro-vascular complications (ischaemic heart disease, stroke, and peripheral vascular disease) and micro-vascular complications (diabetic neuropathy, diabetic retinopathy, and diabetic nephropathy). Diabetic peripheral neuropathy (DPN) is a frequent complication of diabetes and a leading cause of morbidity and increased mortality; it is associated with the duration that a person is affected by diabetes, hyperlipidaemia, and poor glycaemic control. DPN is typically characterized by significant deficits in tactile sensitivity, vibration sense, lower limb proprioception, and kinaesthesia.[5] Diabetic neuropathy affects all peripheral nerves, including pain fibres, motor neurons and the autonomic nervous system.[6]

Diabetic neuropathy affects up to 50% of patients with diabetes, and new cases occur at an annual incidence of approximately 2%. In absolute numbers, in contrast to the estimated global prevalence of 220 million cases of diabetes by 2010, DPN is likely to affect as many as 110 million people worldwide.[7] In India, studies revealed that diabetic neuropathy occurs in 19%—27.5% of patients with type 2 diabetes.[8] Glycaemic control is crucial for individuals with diabetes to prevent the progression of neuropathy, and

intensive glucose lowering therapy reduces the risk of developing diabetic neuropathy.[9] Glucose management focuses on keeping blood sugar levels as close to normal as possible.[10] Hence, patients' medication adherence is important to the treatment of diabetes.[11]

Medication adherence usually refers to whether patients take their medications as prescribed (e.g., twice daily), as well as whether patients take a prescribed medication. Medication nonadherence is a growing concern to clinicians, healthcare systems, and other stakeholders (e.g., payers) because of the mounting evidence that nonadherence is prevalent and is associated with adverse outcomes and higher costs of care. To date, in routine clinical practice, the measurement of patients' medication adherence and the use of interventions by clinicians to improve adherence are rare.[12]

Worldwide, the medication adherence rate for patients with diabetes varies between 36% and 93%.[13] Adherence to prescribed medication is crucial for attaining metabolic control, and nonadherence with blood glucose lowering and lipid lowering drugs is associated with higher HbA1c and cholesterol levels, respectively.[13]

Nonadherence with medication in patients with diabetes resulted in poor glycaemic control and, hence, an increased risk of developing chronic complications, such as diabetic neuropathy. So medication adherence is necessary for the effective management of diabetes and its complications.[14] The present study is one of a number of worldwide studies that show the significant relationship between medication adherence and diabetic peripheral neuropathy. To our knowledge, no previous study of patients in India has been conducted to understand the relationship between medication adherence and diabetic peripheral neuropathy. Hence, the present study attempted to investigate this relationship in patients with diabetes in a private hospital in Kollam, Kerala.

Materials and Methods

A prospective study was carried out from January 2015 to December 2015 in a private hospital in the city of Kottarakara, Kollam, Kerala, India. Ethical approval was granted by the Institutional Ethics Committee of Swamy Vivekanandha College of Pharmacy, Namakkal, Tamilnadu, India. Type 2 DM patients with diabetic peripheral neuropathy but no other complications from type 2 DM were included in the study; patients were of both genders and were between 45 and 70 years old. Patients who were severely ill or who were not following their prescribed diets or exercise were excluded from the study. The patients in the study population were well informed and were provided with patient information forms in English and the local language (Malayalam) that contained the details of the study, i.e., information about the parameters that would be investigated (FBS, PPBS, and HbA$_1$C level) and about the foot screening process utilizing a biothesiometer.

The study and its importance were explained to the potential participants. After interviewing 120 patients, 86 patients, who responded positively and passed inclusion criteria, were selected for this study. Blood samples were taken on the same day to determine patients' initial FBS, PPBS and HbA1c levels. Glucose levels were determined using the hexokinase method in an Olympus 2700 analyser