Patient and Provider Factors Affecting Clinical Inertia in Patients With Type 2 Diabetes on Metformin Monotherapy

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ABSTRACT

Purpose: Our aim was to determine the extent of clinical inertia and the associated patient and provider factors in patients with type 2 diabetes on metformin monotherapy (MM) at a large integrated health care system in the United States.

Methods: The study cohort included patients with type 2 diabetes aged 18 to 85 years, on MM between January 2009 and September 2013, who experienced MM failure (had an uncontrolled glycosylated hemoglobin [HbA_{1c}] reading ($\geq$8.0% [64 mmol/mol]) after at least 90 days of MM). Clinical inertia was defined as absence of treatment intensification with an add-on therapy within 180 days after the MM failure (index date). The impact of patient and provider factors on clinical inertia was determined using generalized estimating equations.

Findings: The study cohort consisted of 996 patients; 58% were men and 59% were white, with a mean age of 53 (11.8) years. Of these, 49.8% experienced clinical inertia. Lower HbA_{1c} at index date, absence of liver diseases, absence of renal diseases, and greater provider age were associated with clinical inertia. The clinical inertia rate in a secondary analysis considering HbA_{1c} <7.0% (53 mmol/mol) as glycemic control was 67.9%. Greater patient age, lower HbA_{1c} at index date, greater provider age, and being a primary care physician were associated with clinical inertia.

Implications: Considerable clinical inertia rates were observed in our real-world patient population, suggesting the need of interventions to reduce clinical inertia in clinical practice. Information about patient and provider factors affecting clinical inertia provided by this study could help healthcare policymakers plan and implement such interventions. (*Clin Ther.* 2017;39:1658–1670) © 2017 Elsevier HS Journals, Inc. All rights reserved.

Key words: clinical inertia, factors, metformin, predictors, treatment intensification, type 2 diabetes, United States.

INTRODUCTION

Despite the clinical advances in the management of type 2 diabetes over the past few decades, nearly 48% of the patients with type 2 diabetes do not achieve the American Diabetes Association (ADA)-recommended glycemic goal of glycated hemoglobin (HbA_{1c}) <7.0% (53 mmol/mol) in the United States.[1] Clinical inertia, or the delay of treatment intensification, has been reported to be a main cause of inadequate blood glucose control in patients with type 2 diabetes.[2] Clinical inertia has been defined as failure by health care providers to initiate or intensify treatment when glycemic targets have not been met.[2] The ADA guidelines recommend addition of a second oral or injectable medication if metformin monotherapy (MM) fails to achieve/sustain the desired glycemic goals after 2 to 3 months. It has been reported that clinical inertia occurs in >50% of patients with type 2 diabetes in the United States.[3–5]

An understanding of factors affecting clinical inertia in patients with type 2 diabetes is necessary to plan strategies aimed at reducing clinical inertia in these patients. Several studies have identified factors

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affecting clinical inertia in type 2 diabetes.[3–10] For example, McEwen et al[3] analyzed data from Translating Research into Action for Diabetes, a study involving ~180,000 adults with diabetes spread across 10 health plans in the United States. Nearly 52% experienced clinical inertia, with older patients and patients with lower HbA_{1c} at highest risk of clinical inertia.[3] In their study of patients with type 2 diabetes in Maryland, Bolen et al[9] found that providers were less likely to intensify treatment in a timely manner in patients having lower HbA_{1c}, taking less than 2 oral medications, having a higher number of previous physician visits, and having shorter intervals between physician visits.

Although these studies provide useful information, they had significant limitations. Most of the studies involved certain specific patient populations (patients with a specific type of health insurance coverage,[4,5,9,10] patients enrolled in trials,[3] and non-United States patient populations,[6,8] which limited their generalizability to patients with type 2 diabetes in the United States). In addition, most of the studies did not examine the impact of provider factors on clinical inertia. The only exception is the study by Shah et al,[6] which examined the impact of provider specialty on clinical inertia. The lack of information on provider factors and clinical inertia is striking considering the high accountability of providers in type 2 diabetes management. Finally, most of these studies involved data that are now more than a decade old. Awareness about clinical inertia and importance of treatment intensification has increased over the years[11]; therefore, it is possible that trends and patterns in the existence of clinical inertia have changed. Updated information about clinical inertia and the associated factors could help policymakers in streamlining their strategies aimed at reducing clinical inertia. The objective of this study was to determine the extent of clinical inertia and the impact of patient and provider factors on clinical inertia, using recent real-world data on patients with type 2 diabetes on MM at a large, integrated health care system in the Southeastern United States.

METHODS

Data Source

This retrospective cohort study used data primarily from Carolinas HealthCare System's electronic medical records (EMRs). Carolinas HealthCare System is the second largest integrated health care system in the United States. It has >900 care locations across North Carolina, South Carolina, and Georgia, including hospitals, health care pavilions, physician practices, destination centers, surgical and rehabilitation centers, home health agencies, nursing homes, and hospice and palliative care centers. The EMRs at Carolinas HealthCare System capture data on >10 million patient visits annually. They contain a wide range of data on (1) patient background information, including age, race/ethnicity, sex, and health insurance status; (2) information about visits to healthcare locations, including admission and discharge dates and times, the *International Classification of Diseases, Ninth and Tenth Revision, Clinical Modification* (ICD-9-CM and ICD-10-CM) diagnosis and procedure codes, and results of clinical tests performed during the visit; and (3) medication order data, including active ingredients, days of supply, dosage, brand name, and generic name. This study also used data from the Carolinas HealthCare System provider database, which has information about health care providers, including provider specialty, length of employment, demographic characteristics, and department of employment. Data from January 1, 2008 to December 31, 2014 were used in this study. The study protocol was approved by the Institutional Review Board at Carolinas HealthCare System.

Study Population

The study cohort consisted of patients between 18 and 85 years of age who experienced failure of MM (ie, had an uncontrolled HbA_{1c} reading after at least 90 days of metformin) between April 1, 2009, and December 31, 2013. We used 2 HbA_{1c} cutoffs (<8.0% [64 mmol/mol] in the primary analysis and <7.0% in the secondary analysis) to define glycemic control, considering the diabetes management guidelines from the ADA. The ADA recommends transitioning the HbA_{1c} target to ≥8.0% based on factors such as age, limited life expectancy, complications, history of hypoglycemia, and comorbidities, whereas the usually ADA-recommended HbA_{1c} target is <7.0%.[12] Only patients with uncontrolled type 2 diabetes (ICD-9-CM codes of 250.x0 and 250.x2 and an HbA_{1c} reading of ≥8.0% [7.0% in the secondary analysis] before the first metformin order) were included. The patients also had to average at least two ambulatory encounters per year during the study