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Original Research

Use of electronic medical records for clinical research in the management of type 2 diabetes

Khalid M. Kamal, Ph.D. *, Ishveen Chopra, M.S.,
Jennifer P. Elliott, Pharm.D., Thomas J. Mattei, B.S., Pharm.D.

Division of Clinical, Social and Administrative Sciences, Duquesne University, Mylan School of Pharmacy, 600 Forbes Avenue, Pittsburgh, PA 15282, USA

Abstract

Background: Essential to optimal diabetes care is the organization and management of complex clinical data. An EMR system can facilitate better management of clinical and clinical-related information by standardizing care and increasing the efficiency of delivering quality care to patients. However, studies have not described clinical characteristics of patients with type 2 diabetes in a primary practice setting that utilizes an EMR system.

Objective: To describe the demographic characteristics, clinical measures, and resource utilization of patients with type 2 diabetes in a primary care setting that employs an EMR system.

Methods: Patients ≥ 18 years of age, having two or more visits with their physicians (January 1, 2012 to December 31, 2012), and with a recorded diagnosis of diabetes (ICD-9-CM: 250.xx) were retrospectively identified from the GE Centricity[®] EMR database of a primary care physician group. Demographic characteristics, clinical measures, and resource utilization were evaluated. Descriptive statistics were conducted using frequencies and proportions for categorical data and means and standard deviations for continuous variables.

Results: 5170 patients with type 2 diabetes were identified for year 2012. Majority of patients with type 2 diabetes were males (53.38%), whites (86.63%), and obese (62.19%); had HbA1c levels $< 7\%$ (51.72%), LDL-C levels < 100 mg/dL (59.09%), HDL-C levels ≥ 40 (56.25%); and had never smoked (54.89%). Compared to patients with HbA1c $< 7\%$ and $7\%–9\%$, those with HbA1c $> 9\%$ were the youngest, had higher average office visits/patient, and had a higher prevalence of depression, obesity, elevated LDL-C and lower HDL-C levels.

Conclusions: This study provides insight into the potential risk factors for diabetes such as the presence of obesity, dyslipidemia, and depression, specifically in patients with HbA1c levels above 9%. Physicians

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* Corresponding author. Division of Clinical, Social and Administrative Sciences, Duquesne University, Mylan School of Pharmacy, 418 B Mellon, 600 Forbes Avenue, Pittsburgh, PA 15282, USA. Tel.: +1 412 396 1926; fax: +1 412 396 5130.

E-mail address: kamalk@duq.edu (K.M. Kamal).

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should use evidence-based benchmarks in the development of EMR disease management programs to improve patient outcomes and quality of care.

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Keywords: Type 2 diabetes; Electronic medical record; HbA1c; Retrospective study

Introduction

The use of electronic medical records (EMR) by health care organizations promotes improved quality and efficiency of patient care and serves as a valuable resource for outcomes research.¹ The term EMR is generally defined as a standardized electronic database for health care; with data recorded, developed, maintained, and/or provided by clinicians and providers in direct patient care.^{1,2} The EMR database allows for the capture of important demographic information, clinical data, and resource utilization from patient records. Since data are captured at each visit and stored in the EMR, measurement of clinical outcomes and resource utilization is possible for each patient. Several integrated health providers in the United States (US), such as Kaiser Permanente, Harvard Pilgrim Health System, and the Department of Veterans Affairs, have been leaders in EMR adoption.^{1,3}

The appropriate use of EMR offers various potential benefits to clinical practice.^{4–6} These can include improved quality of patient care, decreased health care costs, and ease at which key clinical information is exchanged among providers.^{2,3} Several government initiatives have supported the development and utilization of EMR systems in the US. The American Recovery and Reinvestment Act of 2009 has provisions designed to advance the use of health information technology, including \$19 billion to incentivize the adoption of certified EMR technology.¹ Despite the various benefits and government incentives, adoption of such systems has been slow. According to the National Center for Health Statistics Physician Workflow study report, only 55% of physicians had adopted an EMR system in 2011; of which three quarters met federal “meaningful use” criteria.⁷ Some of the barriers to EMR adoption in practice settings include high implementation costs, concerns about privacy, lack of standardization, and a disagreement on who pays for and who profits from these systems.^{1,8}

Continued adoption of EMR is important for health outcomes researchers, as it is a valuable tool in accessing community-based data. Retrospective

data (medical charts, administrative claims) and primary data (surveys, clinical trials) are contemporary data sources utilized in outcomes research. These data sources, however, have inherent limitations. Data is limited to patient claims and there are significant sample selection issues (e.g., sicker or possibly more motivated population).^{1,9} Clinical outcomes such as blood pressure and cholesterol levels can be extracted from a patient’s paper medical charts, however, the process is time and resource intensive and sometimes a large sample size may not be feasible.¹ An EMR system can facilitate better management of clinical and clinical-related information by standardizing care and increasing the efficiency of delivering quality care to patients. From a health outcomes perspective, it can serve as a potential data source containing clinical and clinical-related information on access to community-based clinical measures, offers real time data retrieval from large sample sizes, and can be electronically linked to medical and pharmacy claims data, thus, enabling its use for a broad array of outcomes research.^{1,3}

Diabetes is one chronic condition that has realized the benefit of an EMR enhanced disease management program.¹⁰ According to the Centers for Disease Control and Prevention report, 8.3% of the US population had diabetes in 2010, making it the sixth leading cause of death.¹¹ Further, the estimated medical costs and reduced work productivity associated with diabetes accounted for \$245 billion in 2012, a 41% increase from the previous estimate in 2007 (\$174 billion).¹² The management of diabetes requires coordinated medical care coupled with patient self-management to decrease the risk of serious complications such as vascular, renal, and ophthalmologic morbidities.¹³ The need to provide optimal diabetes care at reduced costs has led several health care organizations to measure and improve the quality of care in diabetes through the use of EMRs.¹³ An EMR system can facilitate better management of patients by organizing complex clinical information, coordinating tasks among the health care team, and reducing inaccurate or incomplete information.

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