Contemporary Clinical Trials 46 (2016) 30–38

Contents lists available at ScienceDirect

Contemporary Clinical Trials

journal homepage: www.elsevier.com/locate/conclintrial

Using electronic health record data for substance use Screening, Brief Intervention, and Referral to Treatment among adults with type 2 diabetes: Design of a National Drug Abuse Treatment Clinical Trials Network study

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ARTICLE INFO

Article history:
Received 11 September 2015
Received in revised form 31 October 2015
Accepted 7 November 2015
Available online 10 November 2015

Keywords:
Diabetes
Home-based primary care
Medical comorbidity
Referral to treatment
Substance use disorder
Substance use screening

ABSTRACT

Background: The Affordable Care Act encourages healthcare systems to integrate behavioral and medical healthcare, as well as to employ electronic health records (EHRs) for health information exchange and quality improvement. Pragmatic research paradigms that employ EHRs in research are needed to produce clinical evidence in real-world medical settings for informing learning healthcare systems. Adults with comorbid diabetes and substance use disorders (SUDs) tend to use costly inpatient treatments; however, there is a lack of empirical data on implementing behavioral healthcare to reduce health risk in adults with high-risk diabetes. Given the complexity of high-risk patients' medical problems and the cost of conducting randomized trials, a feasibility project is warranted to guide practical study designs.

Methods: We describe the study design, which explores the feasibility of implementing substance use Screening, Brief Intervention, and Referral to Treatment (SBIRT) among adults with high-risk type 2 diabetes mellitus (T2DM) within a home-based primary care setting. Our study includes the development of an integrated EHR datamart to identify eligible patients and collect diabetes healthcare data, and the use of a geographic health information system to understand the social context in patients' communities. Analysis will examine recruitment, proportion of patients receiving brief intervention and/or referrals, substance use, SUD treatment use, diabetes outcomes, and retention.

Discussion: By capitalizing on an existing T2DM project that uses home-based primary care, our study results will provide timely clinical information to inform the designs and implementation of future SBIRT studies among adults with multiple medical conditions.

1. Introduction

The Affordable Care Act encourages healthcare systems to integrate behavioral and medical healthcare and use electronic health records (EHRs) for health information exchange and quality improvement [1,2]. Developing integrated systems in primary care to facilitate management of substance use disorders (SUDs: tobacco, alcohol, or drug) by using the EHR to streamline the workflow for substance use Screening, Brief Intervention, and Referral to Treatment (SBIRT) has become a priority [2,3]. SBIRT provides an office-based framework that may enhance the identification of patients with substance misuse or SUD and facilitate treatment and coordinated care [4,5]. In line with the Triple-Aim reform, the United States (U.S.) is shifting away from fee-for-service medical care to a value-based model that seeks not

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http://dx.doi.org/10.1016/j.cct.2015.11.009

only to improve healthcare and outcomes, but to lower costs [6,7]. A value-based care system emphasizes the need to effectively identify people with multiple comorbidities in order to engage them in a coordinated chronic care model for outcome improvement [7–9]. For example, the most costly 10% of the U.S. patient population (e.g., adults with multiple chronic diagnoses such as diabetes and SUD) account for 66% of total care expenditures [10]. Early detection of high-risk patients is necessary to implement targeted interventions that will reduce avoidable hospitalizations and lower costs [9,10]. In keeping with the value-based purchasing, home-based primary care is considered by Institute of Medicine to be a promising care delivery model with long-term cost-savings for those with complex health needs [7].

Diabetes is a leading cause of death and a commonly encountered chronic disease in primary care [11,12]. As many as one in three U.S. adults will have diabetes by 2050 [13]. About 90–95% of individuals with diabetes have T2DM [14]. Diabetes is associated with severe, but preventable, complications (e.g., limb amputations). Individuals with diagnosed diabetes have medical expenditures estimated to be 2.3 times higher than those without diabetes [15]. Approximately 20% of adults with diabetes are current cigarette smokers, and 50–60% are current alcohol users [16]. Cigarette smoking, binge/heavy alcohol use, and alcohol/drug use disorder interfere with diabetes self-care or increase diabetes complications [17–20]. Diabetes complications and SUDs are among the leading contributors to hospital admissions [21,22]. Therefore, integrated care for diabetes and SUDs is critically needed to minimize health risk. SBIRT should address all categories of SUDs.

There is a lack of data to inform implementation of SBIRT for adults with T2DM. Recent data suggest that "brief intervention" is ineffective among adult patients with severe drug use problems who have high rates of poverty and/or psychiatric comorbidity [23,24]. Hence, an SBIRT framework should take into account patients' substance use risk level and incorporate referral to treatment to facilitate linkage to SUD treatment. To inform the design of larger studies of an integrated home-based practice model [7], we describe a prospective design to assess the feasibility of implementing SBIRT among patients with high-risk T2DM. This design considers substance use levels, includes referral to SUD treatment, and leverages EHR in recruitment and data collection to inform healthcare utilization.

2. Methods

2.1. Study aims

This National Drug Abuse Treatment Clinical Trials Network (CTN) study assesses the feasibility of implementing SBIRT in patients with high-risk T2DM within a home-based practice model, describes the substance use status of participating patients over time, and explores associations between substance use and healthcare utilization.

2.2. Study area and setting

The diabetes epidemic is growing in North Carolina. In 1999, an estimated 366,000 residents were living with diagnosed diabetes; ten years later, the prevalence of diagnosed cases had increased to approximately 659,000 [25]. North Carolina is one of the southern states with the highest prevalence (11.7%) of diagnosed diabetes in the nation [26,27]. Compared with the overall U.S. population, Durham County has a much higher proportion of Black/African American residents (13.2% vs. 38.7%) [28]. Compared with Whites, Blacks/African Americans have a higher prevalence of T2DM, poor quality of care, and diabetes related complications and disability [29]. A multifactorial, community-based approach has been recommended to improve patient outcomes via targeting multiple diabetic risk factors [29]. We analyzed the EHR data from over 170,000 adults aged ≥18 years in Durham County who received care at one or more of the Duke University Health System clinics during 2007–2011. We found that 17% of patients with T2DM had an alcohol, tobacco, or drug use diagnosis documented in their EHR compared with 8% of patients without T2DM [30]. Because SUDs have not been systematically evaluated, the actual prevalence of SUD may be higher than the documented prevalence.

The Duke University Health System serves as Durham County's primary hospital and emergency medicine system. The Durham Diabetes Coalition (DDC) is part of the Southeastern Diabetes Initiative (SEDI; Duke University IRB Pro00043463 funded by the Centers for Medicare & Medicaid Services and the Bristol-Myers Squibb Foundation). The DDC was established in response to the escalating prevalence of disability and death related to T2DM, particularly among racial/ethnic minorities and adults of low socioeconomic status in Durham County [31]. The DDC is a joint effort of Duke University and external partners (e.g., Durham County Department of Public Health, CAARE, Lincoln Community Health Center). SEDI augments the existing standard of care in an effort to improve population-level diabetes management, reduce disparities in management and outcomes in underserved communities, and lower healthcare costs for adults living with T2DM. To contain study costs, our SBIRT study uses the existing SEDI infrastructure to recruit patients who are SEDI participants in Durham County.

2.3. Study designs

Our current study uses a prospective design, nested within the larger SEDI study, to explore the feasibility of implementing SBIRT among adults with high-risk T2DM. We have employed the SEDI clinical team to implement SBIRT in order to reduce costs and examine the feasibility of conducting SBIRT in a real-world setting. Using EHR data, we identify eligible patients for recruitment and prospectively track diabetes care (medication adherence), health related quality of life, and healthcare utilization (e.g., SUD treatment, emergency department or inpatient hospitalization admissions). Our goal is not to test the efficacy or effectiveness of SBIRT, but to generate empirical data that will inform the design, conduct, and implementation of EHR-enabled SBIRT among diabetes patients with multiple comorbidities within a chronic care model [16,32]. Randomization and blinding are not part of the study design.

Specifically, due to a lack of substance use prevalence data in the adult population with high-risk T2DM, we collect substance use prevalence and severity data to guide the planning of future trials. We collect recruitment, follow-up rates, as well as receipt of Brief Intervention (BI) and Referral to Treatment (RT) to understand the feasibility of implementing SBIRT and to inform power analysis for randomized trials. Additionally, we assess the diabetic medication adherence prevalence, health related quality of life, emergency department encounters, inpatient admissions, and diabetes related medical complications to explore their associations with substance use. The latter information about substance use and diabetes related healthcare utilization is relevant to informing the potential effect of SBIRT on clinical practices and the designs of pragmatic randomized trials.

2.4. SEDI inclusion and exclusion criteria

Our study includes eligible patients with T2DM who are screened for and identified as high-risk adults (described below) enrolled in the SEDI home-based clinical intervention in Durham County, North Carolina [31].

2.4.1. Inclusion criteria

To be included in the study, one must: 1) be ≥18 years; 2) have a diagnosis of T2DM as defined by one or more of the following: prior diagnosis as designated by a clinician, glucose ≥126 mg/dl at fasting and ≥200 mg/dl on random sample, or a glycated hemoglobin (HbA1c) ≥6.5%; 3) be a resident of Durham County, North Carolina or the neighboring areas, and receive the majority of their healthcare