



Original Research

Predictors of medication adherence and persistence in Medicaid enrollees with developmental disabilities and type 2 diabetes

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Abstract

Background: The prevalence of diabetes mellitus is high among patients with developmental disabilities (cerebral palsy, autism, Down's syndrome and cognitive disabilities).

Objectives: The purpose of this study was to examine the racial health disparities in medication adherence and medication persistence in developmentally disabled adults with type 2 diabetes enrolled in Medicaid.

Methods: This was a retrospective cohort study using the MarketScan[®] Multi-State Medicaid Database. Adults aged 18–64 years with a prior diagnosis of a developmental disability (cerebral palsy/autism/down's/cognitive disabilities) and a new diagnosis of type 2 diabetes enrolled in Medicaid from January 1, 2004 and December 31, 2006, were included. Adults were included if they had a continuous enrollment for at least 12 months and were excluded if they were dual eligible. Anti-diabetes medication adherence and diabetes medication persistence were measured using multivariate logistic regression and the Cox-proportional hazard regression, respectively.

Results: The study population comprised of 1529 patients. Although overall diabetes medication adherence in this population was optimal, African Americans had significantly lower odds (25%) of adhering to anti-diabetes medications compared to Caucasians (OR = 0.75, 95% CI = 0.58–0.97, $P < 0.05$). Also, after controlling for other covariates, the rate of discontinuation was higher in African Americans compared to Caucasians (hazard ratio = 1.03, 95% CI = 0.91–1.18, $P < 0.629$).

Conclusion: In this study, racial disparities were found in anti-diabetes medication adherence among Medicaid enrollees with developmental disabilities (DD). Studies conducted in the future should examine predictors that impact access to care, availability of primary and specialized care, social support as well as beliefs of racial minority populations with developmental disabilities and chronic conditions like diabetes

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to optimize medication use outcomes in this especially vulnerable population.
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Developmental disabilities (DD) are a group of conditions that begin during the developmental period, and may result in physical, learning, language, or behavioral impairments. These conditions, affecting around one in six children in U.S., may impact everyday functioning, and usually last through a person's lifetime.¹ According to recent estimates, approximately 15% of children aged 3 through 17 years have one or more DD. These disabilities include ADHD, autism, cerebral palsy, Down's syndrome, hearing loss, intellectual disability, learning disability, vision impairment and other developmental delays.¹ Research shows that adults with developmental disabilities (DD) tend to have a more sedentary lifestyle, do not exercise often, and tend to consume high-calorie diets.^{2–4} These practices can lead to obesity, which is a risk factor for type 2 diabetes. Type 2 diabetes is a leading cause of morbidity, mortality, functional disability, reduced quality of life and several micro and macrovascular complications such as cardiovascular illnesses and blindness.^{5,6}

According to the 2011 Centers for Disease Control and Prevention estimates, 25.8 million children and adults out of 311 million have diabetes and out of these 25.8 million, there are about 7 million people who have undiagnosed diabetes. In 2009, the number of people with diabetes was 23.6 million so in just 2 years, this number has increased by 2.2 million.^{7,8} Adults older than 65 years have a seven times higher risk of developing type 2 diabetes compared to adults aged 20–44 years old.⁹ In 2007–2009, the age estimated numbers stated that adults aged 20 years or more who were diagnosed with diabetes constituted 16.1% American Indians and Alaskan Natives, 12.6% non-Hispanic African Americans, 11.8% Hispanics, 8.4% Asian Americans, and 7.1% non-Hispanic Caucasians respectively.⁷ Medicaid enrollees have twice the prevalence of diabetes compared to the general US population.^{10,11} Debilitating comorbidities in patients with diabetes can make the process of medication adherence challenging since more the number of conditions the patient has, more are the medications and more complex is managing several conditions at the same time. About 40% patients

with diabetes have as many as three comorbidities.¹² Medication therapy in type 2 diabetes helps in achieving optimum glycemic control^{13–19} controlling the related micro and macrovascular complications^{20–22} and reducing mortality.¹⁴ The National Diabetes Statistics estimated by the 2007–2009 National Health Interview Survey show that among US based adults with either type 1 or type 2 diabetes, 58% consume only oral medications, 14% take both insulin and oral medications, 12% take only insulin and the remaining 16% do not take either of the two respectively.²³ In a study by¹⁵ Krepek (2004), higher adherence levels were associated with a 10% reduction in HbA1c (Krapek 2004).¹⁵

According to Adams et al (2005),²⁴ African Americans were more likely to display increased HbA1c in an HMO setting after adjusting for baseline HbA1c, Body Mass Index (BMI), age, annual measures of type of diabetes medications, diabetes-related hospitalization, number of HbA1c tests, physician visits, and non-diabetes medications. Minority patients with DD face cultural and language barriers in accessing health care and therefore have poor health outcomes.²⁵ In studies conducted in US and Australia, mortality rate was higher among African Americans with Down syndrome compared to Caucasians and among aboriginal adults with DD respectively.²⁶

Diabetes is seen in 10.4% patients with DD.²⁷ Another study using the 2006 Medical Expenditures Panel Survey (MEPS) showed that the prevalence of diabetes was higher in adults with cognitive disabilities (19.4%) compared to adults without cognitive disabilities (3.8%).²⁸ Adults with DD experience disparity in receipt of health care due to their physical and mental chronic comorbidities.^{29–32} Limited information exists about the prevalence and management of type 2 diabetes in adults with DD. The management of diagnosed chronic disease conditions in DD patients is poor.³³ Adults with cognitive disabilities are more likely to have four or more chronic disease conditions.²⁸

One study conducted in the Kansas Medicaid population showed that DD patients with diabetes had lower quality of care compared to the

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