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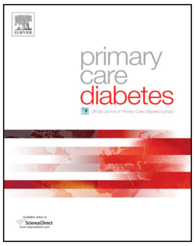

Original research

Does insulin therapy matter? Determinants of diabetes care outcomes

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ABSTRACT

Objective: To evaluate adherence to care standards for people with diabetes (PWDs) on insulin therapy versus PWDs who are not on insulin therapy, controlling for social determinants.
Research design and methods: Utilizing the United States 2015 Behavioral Risk Factor Surveillance System Survey, this study used logistic regression analyses to estimate differences in self-care behaviors, healthcare provider quality of care, and diabetic complications for individuals on insulin therapy and individuals not on insulin therapy.
Results: PWDs on insulin therapy are more likely to adhere to self-care measures (self-glucose checks [OR: 7.57], self-foot checks [OR: 1.27], diabetes class participation [OR: 1.96]), adherence to provider care standards (diabetes-related doctor visits [OR: 1.24], comprehensive foot exam [OR: 1.80], dilated eye exam [OR: 1.34]), and to self-report diabetic complications (retinopathy [OR: 2.77], kidney disease [OR:2.14]), controlling for sociodemographic variables.
Conclusion: PWDs on insulin and their healthcare providers are more likely to meet the treatment goals set by the American Diabetes Association. PWDs on insulin therapy may have better overall relationships with providers due to a reduction in stigmatization based on the social construction of diabetes.

1. Introduction

More than 29 million Americans are living with diabetes, and an additional 89 million are living with prediabetes [1]. Diabetes is the seventh leading cause of death in the United States, and can lead to complications such as kidney failure, diabetic retinopathy, heart disease, and lower-limb amputations [1]. Diabetes care accounts for 20% of the national healthcare spending, a concern as costs to patients and taxpayers increase [1]. Research from the Centers for Disease Control and Prevention (CDC) [1] indicates that if current trends persist, one-third of Americans will develop diabetes in their lifetime and lose, on average, 10–15 years of life. Given these statistics it is important to understand how the social construction of diabetes, treatment types and social determinants affect how patients and their providers care

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for diabetes. From an agency perspective, people/person with diabetes (PWDs) have various daily self-management decisions to make and activities to undertake [2], which may be associated with low adherence to regimen [3]. Generally speaking, self-management of diabetes is a complex and important strategy to improve quality of life, which means taking into account the interactive effects diabetes has on not only health, but also relationships and other socio-psychological factors [4]. While self-management of diabetes is important for healthy lifestyle, the role and relationship between health care professionals are intricately linked in order to achieve quality well-being for PWDs. The American Diabetes Association (ADA) and the European Association for the Study of Diabetes (EASD) articulate this position in which they advocate for a patient-centered approach [5]. Research findings suggest that a positive association exist between patient-doctor communications in diabetes on patient outcomes, for example, good self-management behavior [6–8]. Rubin et al. [8] find that the patient-provider partnership is associated with more positive ratings on patient-reported outcomes including hyperglycemic symptoms, medical regimen adherence, overall wellbeing and perceived diabetes control. Other studies also indicate that patient-provider communication plays a critical factor in medical adherence [9,10]. Although insulin adherence rates among PWDs vary between two-thirds and three-quarters [11], we argue that the role of physicians may impact the overall wellbeing of PWDs based on insulin treatment. Therefore, this research examines the roles of PWDs and doctors in effectively managing diabetes for those on insulin treatment versus who are not on insulin therapy, holding all other factors constant.

1.1. *Treatment guidelines*

Preventing extended high blood sugars is vital to preventing complications in PWDs. Additionally, routine physician visits and bloodwork can identify the beginnings of complications and prevent their worsening. Given this information, it is important to consider how treatment standards may vary based on not only the type of diabetes, but the form of treatment chosen for PWDs [12]. For example, those with type 1 diabetes and those receiving intensive insulin therapy must undergo self-monitoring of blood glucose levels before and after meals, before and after exercise, at bedtime, when low blood sugar is suspected or corrected for, and before activities such as driving. In those PWDs with type 2 diabetes and are not on intensive insulin therapy, the recommendations for self-monitoring blood glucose levels are not clear [12]. The frequency of home glucose testing is left to the discretion of the physician, and indirectly, the PWD's insurance company [12], which may not produce an adequate picture of glycemic control. Self-monitoring blood glucose levels can help to evaluate treatment efficacy and lower average blood sugar levels, leading to better patient outcomes (e.g. lower risk of cardiovascular disease).

1.2. *Obstacles to care*

1.2.1. *Social construction of diabetes*

The social construction of illness is now a major line of research in the medical sociology field. Berger and Luckman [13] defines the phenomenon of social constructionism as individuals and groups examining different ideas based on their social realities and knowledge. Similarly, Eisenberg [14] postulated that a social constructionist perspective explores the dissimilarity between disease, a biological condition and illness, a social condition. We employ this conceptual tool to discuss how the differences in diabetes type can be impacted by its social construction.

The differentiation by type of diabetes (e.g. type 1 vs. type 2) raises concerns about how the disease is socially constructed and how this may affect care outcomes. Because of the associated links of lifestyle (e.g. obesity), those with type 2 diabetes may face higher levels of stigmatization. The feelings of stigmatization noted by those with type 2 diabetes is often due to the widespread belief that type 2 diabetes can be prevented or 'cured' through lifestyle changes [15,16], even though research shows a genetic predisposition [17,18]. The perceived stigma of type 2 diabetes may lead to undesirable outcomes, such as attempted concealment of the disease and suboptimal self-care [15,16]. Moreover, the social construction of type 2 diabetes as a consequence of poor lifestyle can harm relationships with care providers. For example, if the PWD is unable to lower blood glucose levels with physician directed lifestyle changes, the perceived non-compliance of the patient by the medical provider may damage the PWD's trust and ability to communicate with the provider [15,16,19]. There is also evidence that those with type 2 diabetes perceive that medical providers give more help to, and feel more concern for, those with type 1 diabetes [16]. Additionally, the social construction of diabetes is further reinforced by healthcare providers and insurance companies setting different standards for the use of medical devices (e.g., glucose monitoring strips, pumps, continuous glucose monitors) by type of diabetes, rather than for optimal disease management [16].

1.2.2. *Social determinants of diabetes care outcomes*

Diabetes places a good deal of financial pressure on PWDs and their families. Studies have shown that PWDs who come from lower socioeconomic conditions struggle more with food insecurity [20] and lower compliance rates [21]. Even with the Affordable Care Act in place, diabetes care and supplies are expensive and insurance companies do not always provide adequate coverage, even when the technology improves outcomes for PWDs (e.g. continuous glucose monitors) [22–25]. PWDs have reported reducing insulin and medication dosing, as well as reducing the number of physician visits to cut costs [21]. Many physicians and insurance companies believe that insulin therapy requires much more intensive self-management than for those not on insulin therapy, which may reduce referrals to specialists, lead to prescriptions for fewer blood glucose test strips, and a lower number of preventative tests [22–25].

The purpose of the current study is to better understand the impact of insulin therapy on diabetes care outcomes, while controlling for socioeconomic factors, healthcare

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