Impacts of Diabetes Stigma on Acute Healthcare Engagement among Adults with Type 2 Diabetes

Kate Camillo
University of Mississippi

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IMPACTS OF DIABETES STIGMA ON ACUTE HEALTHCARE ENGAGEMENT AMONG ADULTS WITH TYPE 2 DIABETES

by
Kate L. Camillo

A thesis submitted to the faculty of The University of Mississippi in partial fulfillment of the requirements of the Sally McDonnell Barksdale Honors College.

Oxford
April 2022

Approved By

______________________________
Advisor: Dr. Aaron Lee

______________________________
Reader: Dr. Joseph Wellman

______________________________
Reader: Dr. Marilyn Mendolia
ACKNOWLEDGEMENTS

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Last, but certainly not least, I would like to thank my friends and family for supporting me through this time. I would not have been able to do this without them. Hotty Toddy!
ABSTRACT

KATE L. CAMILLO: Impacts of Diabetes Stigma on Acute Healthcare Engagement among Adults with Type 2 Diabetes
(Under the direction of Dr. Aaron Lee)

Introduction: Individuals frequently experience public and self-stigma stemming from type 2 diabetes. Prior studies have linked stigma with higher levels of poorer diabetes outcomes such as greater disease-related distress and worse glycemic control. However, few if any studies have examined the association between diabetes-related stigma and healthcare utilization. This gap in the literature is critically important given the importance of proactive disease management and preventive care as well the high costs of acute service use in this population. Therefore, the purpose of the present study was to examine the relationship between type 2 diabetes stigma, patient activation, and acute medical service use.

Methods: The study sample ($N = 373$) was recruited from a web-based panel of U.S. adults with type 2 diabetes. The mean age was 55.9 years ($SD=15.67$), approximately half female (57%), and primarily white (78.6%). Diabetes stigma was measured using the 19-item Type 2 Diabetes Stigma Assessment Scale (DSAS-2) which included 3 subscales: Self-Stigma, Perceived Blame and Shame, and Discrimination. Patient activation was measured using the 13-item Patient Activation Measure (PAM-13). We assessed two indicators of self-reported acute healthcare use: diabetes related emergency department visits and hospitalizations during the past 12 months. Hierarchical linear and logistic regressions were used to test our hypotheses.

Results: Self-stigma was significantly associated with lower levels of patient activation, ($B = -.55$, 95%CI: [-0.99, -0.11], $p = .014$) while perceived blame and shame and discrimination were not ($p > .05$). Diabetes-related discrimination was significantly associated with greater risk of hospitalizations ($OR = 1.14$, 95%CI: [1.01, 1.28], $p = .031$), and emergency department visits ($OR = 1.21$, 95%CI: [1.08, 1.34], $p < .001$), while self-stigma and perceived blame and shame were not associated with either indicator of acute healthcare use.

Discussion: These results suggest that Diabetes Self-Stigma is associated with low levels of patient activation, while diabetes discrimination is related to increased use of acute medical care. Future studies should examine different avenues to reduce diabetes-related stigma and their effect on patient activation and acute healthcare utilization.
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INTRODUCTION

An estimated 13% of all U.S. adults have diabetes (Centers for Disease Control and Prevention, 2020). Of these cases, 90-95% are type 2 diabetes (Centers for Disease Control and Prevention, 2020). The rate of type 2 diabetes diagnoses is rapidly increasing, with an estimated 1.5 million new cases in 2018 (Centers for Disease Control and Prevention, 2020). The prevalence among U.S. adults is projected to grow to 39.7 million by 2030, and nearly double to 60.6 million by 2060 (Lin et al., 2018).

Patients with type 2 diabetes are at risk for debilitating irreversible complications such as myocardial infarction, vascular diseases (e.g., hypertension, hyperlipidemia), stroke, nephropathy, lower extremity amputation, and blindness (Coffey et al., 2002; Hurtado & Vella, 2019). Type 2 diabetes is associated with an approximate two-fold increase in mortality, with macrovascular disease as the principal cause of death (Nwaneri et al., 2013). Diabetes ranked as the seventh-leading cause of death in the United States in 2019 (Kochanek et al., 2020). More than 80% of adults with type 2 diabetes are overweight or obese (Daousi, 2006; Hurtado & Vella, 2019). One study found that adults with type 2 diabetes who were also obese were more likely to have high blood pressure and poor glycemic control (Daousi, 2006).

In 2017, the estimated total of direct and indirect costs of diagnosed diabetes in the U.S. was $327 billion, and is increasing (Centers for Disease Control and Prevention, 2020). Direct costs of diabetes include the utilization of acute medical care, such as emergency department visits and hospitalizations, as well as other healthcare costs. Inpatient healthcare accounts for the largest proportion of total diabetes costs with approximately 30% of all direct costs being due to inpatient hospital care (American Diabetes Association, 2018). The cost of caring for type 2
diabetes increases as complications increase. For the typical person with type 2 diabetes, medical treatment for complications of diabetes account for 48%-64% of the lifetime healthcare costs (Centers for Disease Control and Prevention, 2021). These direct medical costs include higher out of pocket cost for patients. For example, adults with diabetes spend approximately 2.3 times more on healthcare costs compared to adults without diabetes. The lifetime cost of treating type 2 diabetes ranging from $50,000 to $130,000 in the U.S. (American Diabetes Association, 2018; Zhuo et al., 2013). Importantly, diabetes related costs appear to be increasing. From 2012 to 2017, total diabetes related healthcare costs among all U.S. adults increased by 11% due to an increase in prevalence. During the same period, individual diabetes costs increased by 13% (Riddle & Herman, 2018).

Diabetes is also associated with major indirect costs such as work-related absenteeism and presenteeism (i.e., lost productivity while at work) (American Diabetes Association, 2013). (Breton et al., 2013) Among adults with diabetes, presenteeism is associated with higher levels of diabetes related distress, a history of neuropathy, poor mental health, and poor quality of life (Zaghloul et al., 2018). In 2017, the total estimated indirect cost of diagnosed diabetes via reduced productivity was $90 billion. Absenteeism accounted for approximately $3.3 billion in reduced productivity, while presenteeism accounted for $26.9 billion. (American Diabetes Association, 2018) Work-related disability among individuals with diabetes accounted for $37.5 billion in indirect costs (American Diabetes Association, 2018). Work-disability unemployment status is associated with depressive illness, chronic disease comorbidity, presence of diabetes symptoms, and diabetes complications (Von Korff et al., 2005).

Adult with diabetes often experience diabetes complications such as vascular disease, obesity, and insulin use, all of which are associated with lower quality of life (Coffey et al.,
2002; Thommasen & Zhang, 2006). A large body of existing research has examined the relationship between health-related quality of life and diabetes. In middle to older aged adults, diabetes is strongly correlated with physical disability, which includes impaired mobility, diminished strength and balance, and greater risk of falls (Gregg et al., 2000; Wray et al., 2005). In addition to limitations in physical health, adults with diabetes are more likely to have major depressive disorder which is associated with greater disability (Deschênes et al., 2015). Some studies have shown that even patients who are high-risk for diabetes have decreased health related quality of life relative to individuals without diabetes – particularly among individuals with comorbid depression (Grandy et al., 2008).

Diabetes related stigma is a multifaceted construct that includes 1) perceived blame and shame associated with having diabetes, 2) self-stigma reflecting the internalization of negative public attitudes about individuals with diabetes, and 3) perceived discrimination from others (e.g., rejection or exclusion) as result of one’s diabetes status (Browne et al., 2016). The International Diabetes Federation identified diabetes stigma as a critical problem that requires immediate attention (International Diabetes Federation, 2013). Yet, only a small body of literature has examined diabetes related stigma among adults with type 2 diabetes. At least one prior study suggests that diabetes stigma is more likely to affect those who have a higher BMI and poorer blood glucose control (Liu et al., 2017). Unfortunately, prior research suggests that diabetes related stigma is a common experience among adults with type 2 diabetes (Puhl et al., 2020). Clearly, greater research is needed to better understand stigmatizing experiences among adults with type 2 diabetes. Such research is necessary to develop effective approaches for clinical management of diabetes related stigma (Puhl et al., 2020).
Experiencing diabetes related stigma is associated with poorer psychosocial outcomes among adults with diabetes. For example, diabetes related stigma has been linked to negative appraisals of insulin use, higher rates of diabetes related emotional distress, lower self-esteem, and greater symptoms of depression and anxiety (Browne et al., 2016; Holmes-Truscott et al., 2020; Puhl et al., 2020). Further, greater perceived stigma is associated with greater non-adherence to treatment regimens, particularly in social situations that may elicit feelings of blame and judgement (Kato et al., 2020). Family perceived stigma has been associated with resenting self-care, while self-stigma has been found to be a predictor of lower patient activation levels (Harper et al., 2018; Kato et al., 2016). Individuals who experience diabetes related stigma report lower adherence to self-management behaviors and lower self-efficacy (Puhl et al., 2020). Finally, diabetes stigma has also been associated with poorer engagement in preventative health care. For example, greater diabetes stigma is associated with less frequent hemoglobin A1c and eye health checks (Puhl et al., 2020).

Patient activation, which consists of patient’s knowledge, skill, and confidence for managing their healthcare, is an important component of diabetes related health care (Hibbard et al., 2004, 2005). Low patient activation is associated with a higher likelihood of the diagnosis of a chronic disease (Hibbard et al., 2017). Patient activation is an important indicator of future health, as higher levels of patient activation are generally associated with greater family support and better self-rated overall health (Gleason et al., 2016). Type 2 diabetes requires intensive and often complex daily regimens for effective self-management and glycemic control. For example, diet, exercise, and medication regimes are important in preventing premature mortality or morbidities. (Kato et al., 2020). One prior study found that greater patient activation was positively correlated with disease knowledge, education level, and social support from friends.
Further, patient activation has been linked with more effective control of blood pressure, cholesterol, and blood sugar (Aung et al., 2015; Sacks et al., 2017). Patients with higher levels of patient activation have lower body mass index, higher quality of life scores, and decreased risk of depression (Gleason et al., 2016; Greene & Hibbard, 2012). Lower levels of patient activation are associated with a greater risk of acute medical service use (Begum et al., 2011). However, no studies have examined the relationship between the distinct facets of diabetes stigma and patient activation.

Individuals with diabetes have significantly higher rates of costly acute medical service use such as emergency department visits and hospitalizations compared to individuals without diabetes. For example, in 2018, 16 million emergency department visits were reported with diabetes listed as the primary diagnosis (Centers for Disease Control and Prevention, 2020). Among adults with type 2 diabetes, hospitalizations are most commonly due to diabetes related comorbidities, like heart disease (Ahmann, 1998). In 2018 there were 7.8 million hospital discharges with diabetes listed as the primary diagnosis, and of these, 2.1 million were for cardiovascular disease, lower limb amputation, hyperglycemic crisis, or hypoglycemia (Centers for Disease Control and Prevention, 2020). Yet, few studies have examined the link between diabetes related stigma, and acute medical care among type 2 diabetes.

The purpose of this study was to examine the association between distinct facets of diabetes related stigma (i.e., perceived discrimination, perceived shame and blame, and self-stigma) with patient activation and acute healthcare utilization among U.S. adults with type 2 diabetes. First, we hypothesized that discrimination, perceived blame, and self-stigma related to type 2 diabetes will be associated with lower patient activation. Second, we hypothesized that discrimination, perceived blame, and self-stigma related to type 2 diabetes will be associated
with greater likelihood of emergency department visits and hospitalizations during the prior 12-months.
METHODS

Participants

Participants were recruited from a web-based panel of adults with diabetes. To be eligible, panel members had to be 18 years of age or older, live in the United States, and report having type 2 diabetes. A total of 536 respondents initiated the screening survey to determine eligibility, with 529 (98.7%) agreeing to participate. Of these respondents, 420 (79.4%) reported having been diagnosed by a healthcare provider with type 2 diabetes. Of these eligible participants, 387 (92.1%) completed the survey. At the end of the survey participants were asked whether they had one of the following conditions: “type 1 diabetes”, “type 2 diabetes”, “pre-diabetes”, or “none of the above”. This measure was taken to help corroborate participants’ initial self-reported diagnosis of type 2 diabetes. Among participants who completed the survey 14 (3.6%) did not report having type 2 diabetes. Data from these participants were excluded from this study. Therefore, the final sample consisted of 373 U.S. adults with type 2 diabetes.

Measures

**Patient Activation.** The Patient Activation Measure (PAM-13) is a 13-item instrument used to measure a patient’s level of activation in their healthcare (Hibbard et al., 2005). Examples of items include: “I know what each of my prescribed medications do”, “I am confident that I can maintain lifestyle changes like diet and exercise even in times of stress”. Respondents rate each item on a 5-point Likert scale from 0 (“strongly disagree”) to 4 (“strongly agree”). Raw scores are computed by adding responses for each item. Raw scores are then converted into standardized scores, ranging from 0 to 100, using published conversion tables (Hibbard et al., 2005). The PAM-13 has demonstrated good to excellent reliability in previous studies ($\alpha = 0.85$) (Hibbard et al., 2005; Kato et al., 2020) as well as in this study ($\alpha = .90$).
**Diabetes Stigma.** The Type 2 Diabetes Stigma Assessment Scale (DSAS-2) is a 19 item scale used to self-report perceived and internalized stigma for adults with type 2 diabetes. (Browne et al., 2016). Responses to the items are made using a 5-point Likert scale that ranged from “*strongly disagree*” (0) to “*strongly agree*” (4). The DSAS-2 is organized into three subscales: discrimination (e.g., “Some people see me as a lesser person because I have type 2 diabetes”), perceived blame (e.g., “I have been told that I brought my type 2 diabetes on myself”), and self-stigma (i.e., “Having type 2 diabetes makes me feel like a failure”) (Browne et al., 2016). For each subscale, item responses are summed to generate a total score with higher scores reflecting greater diabetes related stigma. The DSAS-2 subscales have demonstrated good reliability in previous work (Browne et al., 2016) as well as in the present study (discrimination: $\alpha = .95$; blame: $\alpha = .93$; and self-stigma: $\alpha = .93$).

**Acute Service Use.** Emergency department visits were measured by asking respondents if they had visited the emergency department in the prior 12 months due to their diabetes (*Have you had to visit an emergency room in the past 12 months because of your diabetes?*). Hospitalizations were measured similarly, with respondents answering if they had been hospitalized in the prior 12 months due to their diabetes (*Have you had to be admitted to the hospital in the past 12 months because of your diabetes?*). Responses were coded “*No*” = 0, and “*Yes*” = 1. Reports of hospitalizations and emergency department visits by patients are accurate, according to previous research (i.e., 92% accurate) (Bhandari & Wagner, 2006; Petrou et al., 2002; Ritter et al., 2001).

**Control Variables.** All multivariable models in this study controlled for age, sex, insulin use, and race because each have shown to impact diabetes outcomes. Age has been found to be negatively correlated with patient activation (S. H. Hendriks et al., 2016; van Vugt et al., 2018).
Several studies have found that patients above the age of 75 with diabetes have a higher likelihood of diabetes related emergency-department visits and hospitalizations (Begum et al., 2011; McCoy et al., 2020). Two prior studies found that men have higher levels of patient activation than women (M. Hendriks & Rademakers, 2014; Rademakers et al., 2012). Women with diabetes are more likely to visit the emergency department or become hospitalized because of their diabetes than men (Chen et al., 2015; J. M. Lee et al., 2010). Some evidence suggests that individuals who use insulin have lower patient activation and more acute health care use than individuals who do not use insulin (Aung et al., 2015; McCoy et al., 2020). Differences in race and ethnicity have demonstrated a few important variations in diabetes outcomes. One study found that black patients had the highest rates of hypoglycemia related emergency department and hospitalizations (McCoy et al., 2020). Another study found that Non-Hispanic White patients with diabetes had greater health literacy than non-Hispanic Black or Asian Americans (Ledford et al., 2019).

Data Analysis

Descriptive statistics were used to characterize the sample. We tested bivariate associations between all study variables using Pearson correlations. We used a two-step hierarchical linear regression model to test the adjusted association of the self-stigma subscales and patient activation controlling for age, sex, race, and insulin use. Control variables were entered in the first block and all three self-stigma subscales scores were entered in the second block. We used two separate two-step hierarchical logistic regression models to test the adjusted association of the diabetes stigma subscales and diabetes related emergency department visits, and of the diabetes stigma subscales and diabetes related hospitalizations controlling for age, sex, race, and insulin use. Control variables were entered in the first block and all three self-stigma
subscale scores were entered in the second block. All inferential statistical tests were two-tailed with alpha = .05. SPSS was the statistical analysis software used for all analyses.
RESULTS

Sample Characteristics

The sample was primarily White and approximately half female with an average age of 55 years. See Table 1. Over three-quarters of the sample had finished some or more college, while almost all had finished high school or the equivalent. Approximately half of the sample made $50,000 or more per year and about 95% and 97% had health insurance and a primary care physician, respectively. Slightly over one-third of the sample used insulin, and the average time since diagnosis was approximately 12 years. About 14% of the sample had a diabetes related emergency department visit, while about 11% were hospitalized due to their diabetes. The mean score for the Patient Activation Measure was 68.68 – indicating that the sample had higher than average levels of patient activation. The mean DSAS-2 subscale scores, including Blame, Self-Stigma, and Discrimination were 21.4, 12.7, and 12.2, respectively.

Bivariate Associations

Pearson and point-biserial correlations were used to examine the associations among the study variables. See Table 2. The blame, self-stigma, and discrimination subscales of the DSAS-2 were significantly intercorrelated ($r = .70$ to .78, all $p$s < .05). Greater patient activation was associated with significantly lower blame ($p < .001$), self-stigma ($p = .000$), and discrimination ($p = .028$). Patients with one or more emergency department visits during the prior 12-months had higher blame ($p < .001$), self-stigma ($p = .001$), and discrimination ($p < .001$) compared to those with no emergency department visits during the prior 12-months. Patients with one or more hospitalizations during the prior 12-months had higher blame ($p < .001$), self-stigma ($p < .001$), and discrimination ($p < .001$) compared to those with no emergency department visits during the prior 12-months.
Patient Activation

A linear regression model was used to examine the relationship between diabetes stigma subscales and patient activation. See Table 3. Self-stigma was significantly associated with patient activation. However, the blame and the discrimination subscales were not significantly associated with patient activation. Of the control variables, age was significantly associated with patient activation, while sex, race, and insulin use were not.

Acute Medical Service Use

A logistic regression model was used to examine the association of diabetes stigma with diabetes related emergency department visits. See Table 4. In the first step, younger age and insulin use were both significantly associated with greater odds of emergency department visits. However, sex and race were not significantly associated with odds of emergency department visits. DSAS-2 subscales were added in the second step. Discrimination was significantly associated with greater odds of emergency department visits. Neither the blame subscale nor the self-stigma subscale were significantly associated with odds of diabetes related emergency department visits during the prior 12-months.

A second logistic regression model was used to examine the association of diabetes stigma with diabetes related hospitalizations. See Table 5. In the first step, younger age and insulin use were both significantly associated with greater odds of hospitalization. However, sex and race were not significantly associated with odds of hospitalization. DSAS-2 subscales were added in the second step. Discrimination was significantly associated with greater odds of hospitalizations. However, neither the shame and blame nor the self-stigma subscales were significantly associated with odds of diabetes related hospitalization during the prior 12-months.
<table>
<thead>
<tr>
<th></th>
<th>M (SD) or n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>54.85 (15.67)</td>
</tr>
<tr>
<td>Sex (female)</td>
<td>212 (56.8)</td>
</tr>
<tr>
<td>Race</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>293 (78.6)</td>
</tr>
<tr>
<td>Black</td>
<td>47 (12.6)</td>
</tr>
<tr>
<td>Other</td>
<td>33 (8.85)</td>
</tr>
<tr>
<td>Latinx</td>
<td>37 (9.9)</td>
</tr>
<tr>
<td>Education</td>
<td></td>
</tr>
<tr>
<td>&lt;High school</td>
<td>8 (2.2)</td>
</tr>
<tr>
<td>High school</td>
<td>75 (20.1)</td>
</tr>
<tr>
<td>Some college</td>
<td>290 (77.8)</td>
</tr>
<tr>
<td>Income</td>
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<tr>
<td>&lt;$30,000</td>
<td>110 (29.5)</td>
</tr>
<tr>
<td>$30,000 to 50,000</td>
<td>74 (19.8)</td>
</tr>
<tr>
<td>&gt;$50,000</td>
<td>189 (50.7)</td>
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<tr>
<td>Health Insurance</td>
<td>355 (95.2)</td>
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<tr>
<td>Current PCP</td>
<td>362 (11)</td>
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<tr>
<td>Insulin use (n = 370)</td>
<td>144 (38.6)</td>
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<td>Diabetes duration (n = 371)</td>
<td>12.71 (10.03)</td>
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<td>Emergency department visit</td>
<td>55 (14.7)</td>
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<td>Hospitalizations</td>
<td>42 (11.3)</td>
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<tr>
<td>Patient Activation Measure</td>
<td>68.68 (16.39)</td>
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<tr>
<td>DSAS-2</td>
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<tr>
<td>Shame &amp; Blame</td>
<td>21.45 (9.04)</td>
</tr>
<tr>
<td>Self-Stigma</td>
<td>12.68 (7.18)</td>
</tr>
<tr>
<td>Discrimination</td>
<td>12.21 (6.26)</td>
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Table 2. Pearson Correlations Among Study Variables

<table>
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<tr>
<th></th>
<th>Discrimination</th>
<th>Blame</th>
<th>Self-Stigma</th>
<th>ED visits</th>
<th>Hospitalizations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blame</td>
<td></td>
<td>0.78†</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Stigma</td>
<td>0.70†</td>
<td></td>
<td>0.78†</td>
<td></td>
<td></td>
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<tr>
<td>ED visits</td>
<td>0.52†</td>
<td>0.38†</td>
<td>0.42†</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospitalizations</td>
<td>0.45†</td>
<td>0.39†</td>
<td>0.43†</td>
<td>0.69†</td>
<td></td>
</tr>
<tr>
<td>Patient Activation</td>
<td>-0.11*</td>
<td>-0.19†</td>
<td>-0.22†</td>
<td>-0.02</td>
<td>-0.04</td>
</tr>
</tbody>
</table>

*p < .05
† p < .01
‡ p < .001
‡‡ p < .001
Table 3. Results of Linear Regression Examining Predictors Diabetes Stigma Subscales and Patient Activation.

<table>
<thead>
<tr>
<th>Step 1 (Control Variables)</th>
<th>B</th>
<th>SE</th>
<th>95% CI</th>
<th>ΔR²</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.13</td>
<td>0.06</td>
<td>0.01, 0.24</td>
<td>0.01</td>
<td>.304</td>
</tr>
<tr>
<td>Sex</td>
<td>-1.02</td>
<td>1.72</td>
<td>-4.40, 2.36</td>
<td>.304</td>
<td>.032</td>
</tr>
<tr>
<td>Race</td>
<td>0.28</td>
<td>2.10</td>
<td>-3.86, 4.41</td>
<td>.131</td>
<td>.552</td>
</tr>
<tr>
<td>Insulin</td>
<td>0.25</td>
<td>1.84</td>
<td>-3.56, 3.87</td>
<td>.890</td>
<td>.131</td>
</tr>
<tr>
<td>Step 2 (Diabetes Stigma)</td>
<td></td>
<td></td>
<td></td>
<td>.05</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Blame</td>
<td>-0.24</td>
<td>0.18</td>
<td>-0.59, 0.10</td>
<td>.165</td>
<td>.165</td>
</tr>
<tr>
<td>Self-stigma</td>
<td>-0.56</td>
<td>0.22</td>
<td>-1.00, -0.12</td>
<td>.012</td>
<td>.012</td>
</tr>
<tr>
<td>Discrimination</td>
<td>0.36</td>
<td>0.21</td>
<td>-0.09, 0.76</td>
<td>.097</td>
<td>.097</td>
</tr>
</tbody>
</table>

*B* = Unstandardized regression coefficient; *SE* = Standard Error; 95%CI = 95% Confidence Interval
Table 4. Results of Logistic Regression Examining Predictors Diabetes Stigma Subscales and Diabetes Related Emergency Department Visits.

<table>
<thead>
<tr>
<th></th>
<th>OR</th>
<th>SE</th>
<th>95%CI</th>
<th>p</th>
</tr>
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<tbody>
<tr>
<td>Control Variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>0.92</td>
<td>0.01</td>
<td>0.89, 0.94</td>
<td>.000</td>
</tr>
<tr>
<td>Sex</td>
<td>0.61</td>
<td>0.35</td>
<td>0.31, 1.20</td>
<td>.149</td>
</tr>
<tr>
<td>Race</td>
<td>0.72</td>
<td>0.42</td>
<td>0.32, 1.63</td>
<td>.426</td>
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<tr>
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<td>0.37</td>
<td>1.63, 6.88</td>
<td>.001</td>
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<tr>
<td>Diabetes Stigma</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Blame</td>
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<td>0.05</td>
<td>0.85, 1.01</td>
<td>.088</td>
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<tr>
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<td>0.05</td>
<td>0.98, 1.19</td>
<td>.113</td>
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<tr>
<td>Discrimination</td>
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<td>0.06</td>
<td>1.08, 1.34</td>
<td>.001</td>
</tr>
</tbody>
</table>

OR= Odds Ratio; SE = Standard Error; 95%CI = 95% Confidence Interval
Table 5. Results of Logistic Regression Examining Predictors Diabetes Stigma Subscales and Diabetes Related Hospitalizations.

<table>
<thead>
<tr>
<th></th>
<th>OR</th>
<th>SE</th>
<th>95%CI</th>
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<td>0.06</td>
<td>1.01, 1.28</td>
<td>.033</td>
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</tbody>
</table>

OR= Odds Ratio; SE = Standard Error; 95%CI = 95% Confidence Interval
DISCUSSION

Prior studies have consistently demonstrated a link between diabetes stigma and negative patient outcomes. A relatively small body of research specifically examined the association between diabetes related stigma and patient outcomes among adults with type 2 diabetes. This study adds to existing literature by examining the role of diabetes related stigma with two important markers of medical service utilization: patient activation and acute medical service use. Overall, our results suggest that stigma associated with having type 2 diabetes is linked with poorer engagement in health care and greater use of medical services.

Consistent with our hypothesis, we found that self-stigma was significantly associated with lower patient activation. This finding is consistent with results from two prior studies. First, a study of Japanese adults found that diabetes self-stigma was associated with lower patient activation (Kato et al., 2020) both directly and via the mediating role of low self-esteem and lower self-efficacy (Kato et al., 2020). There may be important cultural differences in experiences of stigma and healthcare engagement among U.S. and Japanese adults with type 2 diabetes. One meta-analysis discussed the effects of stigma in several countries, with Japanese adults experiencing additional stigma in interpersonal relationships (Schabert et al., 2013).

Further, the present study builds on findings from Kato et al., (2020) by examining the relationship between other important facets of diabetes stigma (i.e., discrimination and blame and shame) and patient activation. Prior work has found that diabetes self-stigma was associated with lower quality patient-provider collaboration and less frequent patient communication with their provider (Puhl et al., 2020). Findings by Puhl et al., fit with the results of the current study given findings from prior work demonstrating the robust positive relationship between patient-provider communication and patient activation (Alexander et al., 2012).
Counter to our hypothesis, we did not find a significant relationship between perceived
discrimination and blame and shame with patient activation. To date, there have been no other
studies that have directly investigated the relationship between of patient activation and diabetes
discrimination or perceived blame. However, a prior study also used the DSAS-2 to evaluate
their relationship to self-efficacy and self-management and found that self-stigma was negatively
correlated to self-efficacy and self-management while discrimination and blame experienced an
inverse association (Puhl et al., 2020). Somewhat similarly, the current study found an akin
relationship between self-stigma and patient involvement, while the perceived facets of stigma
did not correspond to this pattern. Other types of stigmatized conditions commonly cooccur with
diabetes. For example, adults with diabetes may experience weight-related stigma or other
chronic disease related social stigmas (Harper et al., 2018; Schabert et al., 2013; Tomiyama,
2014). These stigmas, particularly weight-related stigma, may compound upon diabetes related
stigma as obesity is a common comorbidity (Teixeira & Budd, 2010). For example, one model of
weight discrimination posits that the relationship between stigma and weight is characterized by
a positive feedback loop wherein elevated stigma results in greater weight gain. (Tomiyama,
2014). Future research could examine similar self-reinforcing processes underlying diabetes
stigma and diabetes related outcomes (e.g., self-management behaviors, glycemic control). For
example, higher levels of stigma coincide with lower levels of patient activation which could
lead to poorer glycemic control, which in turn may result in higher levels of stigma.

There is a lack of literature examining the relationship between diabetes stigma and acute
medical service use. Consistent with our hypothesis, we found that discrimination was
significantly associated with greater odds of both emergency department visits and
hospitalizations. Contrary to our hypothesis, neither the perceived blame and shame or self-
stigma subscales were significantly associated with emergency department visits or hospitalizations. Diabetes discrimination may be linked to greater use of acute medical services via two potential mechanisms. First, it is possible that diabetes related discrimination leads to reduced use of preventative healthcare services, which can lead to greater acute service use. Indeed, a very large body of research demonstrates that individuals with lower rates of ambulatory care visits and preventative screenings have higher rates of potentially preventable diabetes related hospitalization (Gibson et al., 2013; Rosano et al., 2013). While there has not been any research on diabetes related discrimination and preventative healthcare use, past research has shown that those who have reported experiencing other kinds of discrimination in a healthcare setting are less likely to receive preventative healthcare services (Trivedi & Ayanian, 2006). Second, experiencing discrimination is a potentially important stressor (Pascoe & Smart Richman, 2009). Prior research has shown that elevated stress levels increase the risk of hospitalizations related to ambulatory care-sensitive conditions, such as diabetes (Prior et al., 2017).

Limitations

The findings from this study are qualified by several important limitations. First, the present sample may not be representative of the general population of adults with diabetes. The patient activation levels of this sample are higher than average. Similarly, because the sample of this study was majority white, the results may not generalize to more racially and ethnically diverse populations, who typically have higher rates of diabetes, poorer diabetes control, and greater use of potentially preventable hospitalizations (Golden et al., 2012; Kirk et al., 2005; A. A. Lee et al., 2021; Saydah et al., 2007). As a consequence, our findings may not generalize to populations with lower patient activation or more racial diversity. Future studies should recreate
this study with a more diverse sample. Second, emergency room visits and hospitalization during the prior 12-months were assessed by self-report. Existing studies suggest that patient recall for major healthcare events such as emergency department visits and hospitalizations during the prior 12-months is relatively accurate (Bhandari & Wagner, 2006; Petrou et al., 2002; Ritter et al., 2001; Short et al., 2009). Future studies could use electronic medical records to confirm rates of acute medical care utilization. Third, given the cross-sectional study design, we could not establish a causal relationship between diabetes stigma and patient activation or acute medical service use.

**Clinical Implications**

This study has several important clinical implications. Specifically, the results of this study underscore the importance of clinical assessment of stigma among adults with type 2 diabetes. Healthcare providers should consider screening patients with type 2 diabetes for perceived and internalized stigma to assess a patient’s risk for low patient activation levels and acute service use. Efforts to lower stigma levels in adults with type 2 diabetes may have a number of beneficial impacts. First, fostering self-compassion in those with diabetes may be a way to fight against diabetes stigma and promote higher levels of patient activation. One study found that higher levels of self-compassion were associated with better self-management behaviors in adults with type 2 diabetes (Ventura et al., 2019). Second, it is possible that reducing levels of experienced judgement and stigma in healthcare settings may result in better patient-clinician collaborations, resulting in higher quality diabetes care and potentially lower risk for diabetes related hospitalizations and emergency department visits. Prior research has suggested that stigma can interfere with quality of care and primary care usage (Puhl et al., 2020; Teixeira & Budd, 2010)
Future studies should examine the results of different avenues of reducing stigma in adults with type 2 diabetes. Previous studies have shown that certain cognitive behavioral therapies can reduce internalized stigma in populations with substance abuse and mental health problems (Luoma et al., 2008; Macinnes & Lewis, 2008; Shimotsu et al., 2014). However, diabetes stigma can manifest both internally and externally, so it is imperative to address stigma at both facets. Education interventions at the patient, provider, and social levels may be necessary to reduce stigma in both manners, and future studies should analyze methods to do so, most especially in their effect on patient activation and acute service use.


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https://doi.org/10.1111/j.1525-1497.2006.00413.x


https://doi.org/10.2147/PPA.S188391


APPENDIX

Measures

Type 2 Diabetes Stigma Assessment Scale

Discrimination
1. Some people think I cannot fulfill my responsibilities (e.g., work, family) because I have type 2 diabetes
2. Some people treat me like I’m “sick” or “ill” because I have type 2 diabetes
3. Some people see me as a lesser person because I have type 2 diabetes
4. Some people exclude me from social occasions that involve food/drink they think I shouldn’t have
5. I have been discriminated against in the workplace because of my type 2 diabetes
6. I have been rejected by others (e.g., friends, colleagues, romantic partners) because of my type 2 diabetes

Blame and Shame
7. I have been told that I brought my type 2 diabetes on myself
8. There is blame and shame surrounding type 2 diabetes
9. Because I have type 2 diabetes, some people judge me for my food choices
10. Health professionals think that people with type 2 diabetes don’t know how to take care of themselves
11. Because of my type 2 diabetes, health professionals have made negative judgments about me
12. There is a negative stigma about type 2 diabetes being a “lifestyle disease”
13. Because I have type 2 diabetes, some people assume I must be overweight, or have been in the past

Self-Stigma
14. I feel embarrassed in social situations because of my type 2 diabetes
15. I’m ashamed of having type 2 diabetes
16. I blame myself for having type 2 diabetes
17. Because I have type 2 diabetes, I feel like I am not good enough
18. Having type 2 diabetes makes me feel like a failure
19. I feel guilty for having type 2 diabetes
Patient Activation Measure-13

1. When all is said and done, I am the person who is responsible for managing my health condition
2. Taking an active role in my own health care is the most important factor in determining my health and ability to function
3. I am confident that I can take actions that will help prevent or minimize some symptoms or problems associated with my health condition
4. I know what each of my prescribed medications do.
5. I am confident that I can tell when I need to go get medical care and when I can handle a health problem myself
6. I am confident I can tell my health care provider concerns I have even when he or she does not ask
7. I am confident that I can follow through on medical treatments I need to do at home
8. I understand the nature and causes of my health condition(s)
9. I know the different medical treatment options available for my health condition
10. I have been able to maintain the lifestyle changes for my health that I have made
11. I know how to prevent further problems with my health condition
12. I am confident I can figure out solutions when new situations or problems arise with my health condition
13. I am confident that I can maintain lifestyle changes like diet and exercise even during times of stress