Diabetes Self-Care is Explained by Self-Efficacy but is not Associated with Self-Reported Glycemic Control

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Background

- Over 100 million people in the United States (US) have diabetes or prediabetes as of 2017 [1].
- Ohioans, 18 and older, have a higher prevalence of diabetes (11.7%) than the US median (9.7%) [2].
- Diabetes is one of the 7 major controllable risk factors for cardiovascular disease [3].
- Adults with diabetes are 2 to 4 times more likely to die from heart disease than adults without diabetes [3].
- Self-regulation of diabetes requires potentially difficult behavioral changes; self-efficacy is useful in successfully making these changes [4].
- In a study of African American and Hispanic/Latino patients, increased self-efficacy lead to increased foot care [5].

Primary Aim: Determine the impact of diabetes self-efficacy on diabetes self-care and glycemic control in Appalachian Ohio.

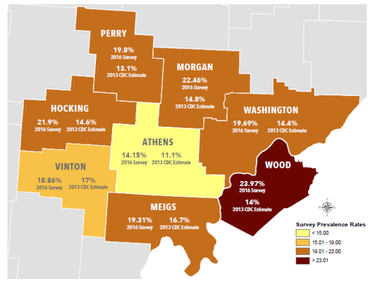

Figure 1. Diabetes prevalence rates from Ohio University's Needs Assessment Survey (2016).

Methods

- **Participants:** Students, faculty and staff at Ohio University (≥18 years of age) with type 1 or type 2 diabetes.
- **Measures:**
  - Surveys completed online using Qualtrics software.
  - Self-reported demographics (age, gender, race, ethnicity, diabetes type, time since diagnosis, smoking status).
  - Self-reported anthropometrics (height and weight).
  - Self-reported glycemic control (hemoglobin A1C)
  - Diabetes self-efficacy (CIDS scale).
  - Diabetes self-care inventory (SCI-2 scale) which measures the perceived adherence to the prescribed treatment plan.

Statistics

- **Descriptive Statistics:** (mean, %, SD) calculated for demographic characteristics, anthropometric features, hemoglobin A1C, and CIDS & SCI-2 scales.
- **Chi Square Test of Homogeneity:** determined differences in demographic profiles between age groups.
- **Independent T test:** determined differences in demographic profiles, BMI, hemoglobin A1C, and CIDS & SCI-2 scales between age groups.
- **Pearson Correlation:** determined the association between CIDS & SCI-2, CIDS & HbA1C, and SCI-2 & HbA1C between age groups.

Results

Table 1. Sample Demographics	≤ 25 years (N=79) n (%)	> 25 years (N=92) n (%)	Total (N=171) n (%)
Age			
Mean (sd) years	20.73 (1.82)	49.70 (1.80)	36.32 (16.90)
Gender *			
Male	28.57 (22)	45.65 (42)	37.87 (64)
Female	71.43 (55)	54.35 (50)	62.13 (105)
Race			
Asian	5.13 (4)	13.04 (12)	9.41 (16)
Black or African American	2.56 (2)	6.52 (6)	4.71 (8)
White or Caucasian	89.74 (70)	77.17 (71)	82.94 (141)
Mixed	0.00 (0)	2.17 (2)	1.18 (2)
Other	2.56 (2)	1.09 (1)	1.76 (3)
Ethnicity			
Hispanic or Latino	93.5 (86)	84.4 (54)	75.8 (254)
Not Hispanic or Latino	1.1 (1)	4.7 (3)	0.9 (3)
Diabetes Type *			
Type 1 DM	79.22 (61)	15.38 (14)	45.83 (77)
Type 2 DM	20.78 (16)	84.62 (77)	54.17 (91)
Time Since Diagnosis			
Mean (sd) years	11.05 (13.92)	11.08 (9.87)	11.07 (11.82)
Hemoglobin A1C *			
Mean (sd) % glycosylated hemoglobin	7.67 (1.74)	6.98 (1.57)	7.29 (1.68)
Body Mass Index (BMI) *			
Mean (sd) kg/m^2	26.41 (5.91)	33.23 (7.48)	30.12 (7.59)
Medications			
No medication (managed by lifestyle)	15.38 (12)	15.22 (14)	15.29 (26)
Oral Diabetes Medication(s)	8.97 (7)	45.65 (42)	28.82 (49)
Insulin	70.51 (55)	15.22 (14)	40.59 (69)
Insulin and Oral Diabetes Medication(s)	1.28 (1)	18.48 (17)	10.59 (18)
Other	3.85 (3)	5.43 (5)	4.71 (8)
Smoking Status			
Smoker	10.26 (8)	3.26 (3)	6.47 (11)
Nonsmoker	89.74 (70)	96.74 (89)	93.53 (159)

Table 1. Descriptive statistics (percentage, mean, standard deviation) of age, gender, race, ethnicity, diabetes type, time since diagnosis, hemoglobin A1C, BMI, medications, and smoking status. Independent t-tests determined differences in time since diagnosis, hemoglobin A1C, and BMI. χ^2 tests determined differences in gender, diabetes type, and smoking status. Variables with too few responses in each group were not statistically compared (race, ethnicity, & medications). *p<0.05.

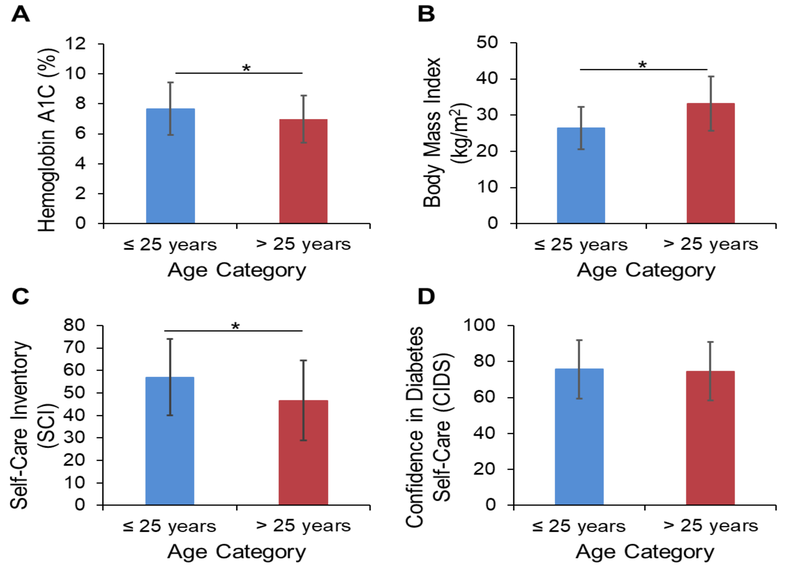

Figure 2. Differences in hemoglobin A1C, BMI, SCI-2, and CIDS by age group, determined by independent t-tests. **(A)** Hemoglobin A1C was significantly higher in young adults (25 years and younger) than in adults over 25 years, t(148.5)=2.63, p=0.009. **(B)** BMI was significantly higher in adults over 25 years than in the younger cohort, t(166.5)=-6.62, p<0.001. **(C)** Perceived adherence to the prescribed care regimen was measured by SCI-2. Young adults (≤25 years) had significantly higher perceived self-care, t(136)=3.50, p=0.001. **(D)** There was no statistical difference in confidence in diabetes self care between age groups. *p<0.05.

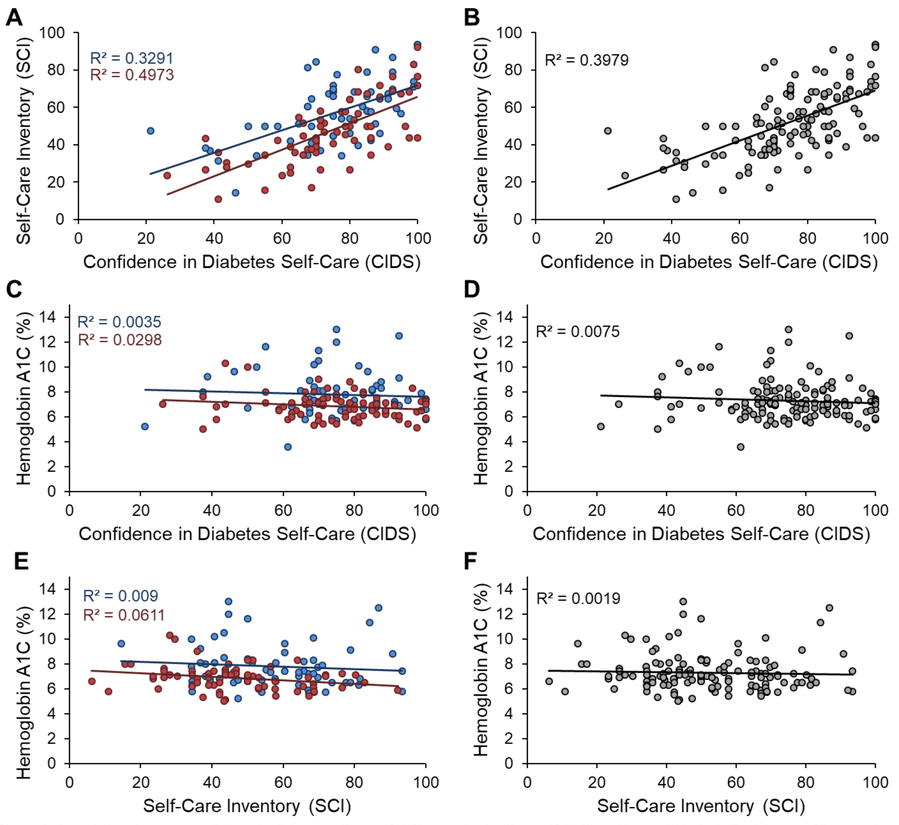

Figure 3. Associations between confidence in diabetes self-care (CIDS), perceived self-care (SCI-2), and hemoglobin A1C. Participants ≤25 years of age are in blue, >25 years of age are in red. Graphs depicting all participants combined are in gray. **(A)** CIDS was associated with self-care (SCI) in both young adults (r=0.57, p<0.001) and adults over 25 (r=0.705, p<0.001). **(B)** CIDS was associated with SCI in the overall sample (r=0.63, p<0.001). **(C)** There was no association between CIDS and HbA1C in either age group. **(D)** There was no association between CIDS and HbA1C in the overall sample (r=-0.09, p=0.302). **(E)** There was no association between SCI and HbA1C in either age group. **(F)** There was no association between SCI and HbA1C in the overall sample (r=-0.04, p=0.618). The critical p-value was set at 0.0167 to account for multiple comparisons.

Conclusions

- Most young adult (≤25 years) participants had type 1 diabetes while the majority of the adult age group (>25 years) had type 2 [Table 1].
- Young adult participants reported higher hemoglobin A1C readings, lower BMIs, and higher perceived self-care than older participants [Figure 2].
- Diabetes self-efficacy was associated with self-care in both age groups, with a stronger association in the adult age group (>25 years) [Figure 3].
- Neither diabetes self-efficacy nor self-care was associated with self-reported hemoglobin A1C in either age group [Figure 3].
- There appears to be a disconnect between self-efficacy, perceived self-care, and glycemic control that future research should explore further.

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