Race and Self-Care Behaviors in US Elderly Adult Diabetics

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Introduction

- Diabetes has been the 7th leading cause of death in the U.S.
- 25% of adults ages 65 and older make up the US diabetic population.
- People with diabetes are at increased risk of serious health complications including vision loss; amputation of toes, feet, or legs; heart disease; and kidney failure.
- Diabetes can be managed through physical activity, diet, use of insulin, and other medications that regulate blood sugar levels.
- In 2015, the rates of diabetes found in Non-Hispanic Blacks (12.7%), American Indians/Alaska Natives (15.1%), Hispanics (12.1%), Asians (8.0%) was much higher than that of Non-Hispanic Whites (7.4%).
- Self-care behavior refers to “the decisions and actions that an individual can take to cope with a health problem or to improve his or her health.
- Although U.S. adults age 65 and older are the predominant population that has diabetes, few studies have assessed their self-care behaviors.

Research Aim

- Further research is needed to look at sociodemographic factors and self-care behaviors of different US racial/ethnic groups ages 65 and older.

- Using 2017 data from the Behavioral Risk Factor Surveillance System (BRFSS), the objective of our study was to determine if race predicts the diabetic self-care behaviors of elderly U.S. adults.

Data Source

- Data: 2017 Behavioral Risk Factor Surveillance System (BRFSS)
- The BRFSS is a statewide data collection program from the 50 states, the District of Columbia, and Puerto Rico via monthly telephone interviews that is designed to measure behavioral risk factors for people 18 years of age or older.
- 450,016 total records
- Age 65 years and older with a diabetes diagnosis: 32,950 respondents.

Dependent Variables

Five diabetes self-care behaviors:

1. Diabetes Education
2. Physical Activity
3. Feet Check
4. Eye Exam
5. Blood Glucose use

Composite Variable: adding up the five self-care behaviors

Independent Variables

- **Races**: non-Hispanic white, non-Hispanic black, Hispanic, and non-Hispanic other
- **Age**: 65-69, 70-74, 75-79, and more than 79 years old
- **Marital status**: married, divorced/widowed/separated, and never married
- **Education**: less than high school, high school graduate, some college, and college graduate
- **Income level**: less than $15,000, $15,000 to less than $25,000, $25,000 to less than $35,000, $35,000 to less than $50,000, and $50,000+
- **BMI**: underweight, normal weight, overweight, and obese.
- **Health status**: excellent/very good, good, and fair/poor.

More Independent Variables

- Insurance
- Regular providers
- Insulin use
- Smoking
- Chronic conditions:
  - Coronary heart disease
  - Chronic kidney disease
  - Chronic heart attack
  - High cholesterol level
  - Hypertension

Statistical Analyses

- Means and standard errors to describe the dependent variables and independent variables in the population
- The number of different types of diabetes self-care behaviors: Poisson regression
- The complex survey design was accounted for using the R package **survey**.

```
brfssdsgn <- svydesign(id=~1, strata = ~ `_STSTR`,
                       weights = ~ `_LLCPWT`, data = your_data)
svyglm(Y ~ X, design = brfssdsgn, family=quasipoisson())
```

Results

Table 1. Descriptive Statistics for Number of Self-Care Behaviors

Variable Name	Mean	Standard Error
Number of Self-Care Behaviors		
None	0.001	0
One	0.024	0.003
Two	0.09	0.005
Three	0.251	0.007
Four	0.371	0.008
Five	0.264	0.007
Self-Care Behaviors		
Diabetes education	0.537	0.008
Physical activity	0.563	0.008
Feet check	0.81	0.007
Eye exam	0.986	0.001
Blood glucose use	0.862	0.005

Results

Table 2. Demographic and Socioeconomic Characteristics of the Study Population

Variable Name	Mean	Standard Error
Race		
Non-Hispanic White	0.739	0.008
Non-Hispanic Black	0.129	0.006
Hispanic	0.09	0.007
Other	0.042	0.003
Gender		
Female	0.475	0.009
Male	0.525	0.009
Age		
65-69yr	0.338	0.008
70-74yr	0.286	0.008
75-79yr	0.199	0.007
>79yr	0.176	0.007
Marital status		
Married	0.529	0.009
Divorced/Widowed/Separated	0.429	0.009
Never Married	0.043	0.004
Education		
Less than High School	0.175	0.008
High School Graduate	0.325	0.008
Some College	0.287	0.007
College Graduate	0.212	0.007
Income		
Less than 15000	0.128	0.006
15000 to 25000	0.247	0.008
25000 to 35000	0.156	0.007
35000 to 50000	0.156	0.006
More than 50000	0.312	0.008

Results

Table 2. Demographic and Socioeconomic Characteristics of the Study Population

Variable Name	Mean	Standard Error
Body weight index		
Under/Normal Weight	0.155	0.006
Overweight	0.361	0.008
Obese	0.483	0.009
Insurance: Yes	0.98	0.004
Provider: Yes	0.965	0.003
Health status		
Fair Poor	0.411	0.009
Good	0.372	0.008
Excellent/Very good	0.217	0.007
Insulin: Yes	0.323	0.008
Smoking: Yes	0.084	0.004
Coronary heart disease: Yes	0.194	0.007
Chronic kidney disease: Yes	0.123	0.005
Chronic heart attack: Yes	0.173	0.006
High cholesterol level: Yes	0.653	0.008
Hypertension: Yes	0.793	0.007

Results

Table 3 Poisson regression estimates of predictors for the mean number of diabetes self-care behaviors

variables	IRR	95% confidence interval	
(Intercept)	3.193	2.942	3.466
Race (reference: Non-Hispanic White)			
Non-Hispanic Black	1.051	1.027	1.075
Hispanic	0.97	0.921	1.022
Other	0.972	0.931	1.014
Gender: Male	0.982	0.965	1
Age (reference: 65-69 yr)			
70-74 yr	0.998	0.978	1.018
75-79 yr	0.953	0.928	0.979
>79 yr	0.936	0.913	0.959
Marital status (reference: Married)			
Divorced/Widowed/Separated	0.978	0.958	0.999
Never Married	0.976	0.947	1.005
Education (reference: Less than High School)			
High School Graduate	1.047	1.014	1.08
Some College	1.075	1.041	1.11
College Graduate	1.084	1.047	1.122
Income level (reference: Less than $15000)			
$15000 to $25000	1.043	1.008	1.078
$25000 to $35000	1.037	0.995	1.08
$35000 to $50000	1.045	1.006	1.086
More than $50000	1.043	1.004	1.083

Results

Table 3. Poisson Regression Estimates of Predictors for the Mean Number of Diabetes Self-Care Behaviors

Variable Name	IRR	95% Confidence Interval	
BMI (reference: Under/Normal Weight)			
Overweight	1.013	0.985	1.042
Obese	1.004	0.977	1.032
Insurance: Yes	0.98	0.928	1.035
provider: Yes	1.077	1.014	1.143
Health status (reference: Fair Poor)			
Good	1.045	1.025	1.066
Excellent/Very good	1.024	0.999	1.05
Insulin: Yes	1.119	1.099	1.139
Smoking: Yes	0.972	0.947	0.999
Coronary heart disease: Yes	1.013	0.99	1.036
Chronic kidney disease: Yes	1.027	1.004	1.05
Chronic heart attack: Yes	1.002	0.979	1.025
High cholesterol level: Yes	1.01	0.992	1.028
Hypertension: Yes	0.997	0.977	1.017

Discussion

- Majority of respondents practiced four self-care behaviors.
- Past studies had also looked at how diabetes management varies across different demographic variables.
    - Used diabetes education and blood glucose monitoring as the determinants of diabetes management and found that disparities in diabetes management existed based on socioeconomic status.
- Found significant differences in the self-care behaviors of Non-Hispanic Blacks compared to Non-Hispanic Whites.
- Blacks more likely than Hispanics and other racial groups to engage in a higher mean number of self-care behaviors.
- Respondents in the higher income level ranges ($35000 to $50000; more than $50000) had higher mean number of self-care behaviors than lower income level ranges (less than $15,000).
- College graduates had higher mean number of self-care behaviors than other education levels.

Discussion

Strengths

- Used BRFSS Data
    - Nationally representative collection of health survey results that has been validated for its reliability and accuracy.
- Large sample size allowed us to detect any differences that may exist between the categories of self-care behaviors.
- One of few studies that have created self-care categories in order to determine the relationship that exists between race and how well elderly adults manage their diabetes.

Discussion

Limitations

- Used self-reported data which may bias our results due to recall bias.
- Our study sample was not truly representative of the U.S. diabetic population since the respondents in this sample had a higher SES.
    - Large percent had insurance and a healthcare provider, which would result in better diabetes management.
- Self-care behaviors used for diabetes management were based on the availability of relevant diabetes questions included in the BRFSS survey questions.
- Cross-sectional study, so we cannot make any casual projections from our findings.

Discussion

Public Health Implications

- Results can be used to help inform primary and secondary preventative measures for diabetes that are promoted by healthcare professionals.
- Results can also be used to help develop interventions that are better catered towards the elderly adults that will help overcome any social barriers that exist for better diabetes management.
    - This will eventually help lead to a reduction in the prevalence and economic burden of diabetes reported annually in the U.S.

Conclusion

- We found that there were significant differences in the self-care behaviors of Non-Hispanic Blacks compared to Non-Hispanic Whites. In addition, Blacks were more likely than Hispanics and other racial groups to engage in a higher mean number of self-care behaviors.

- Race, marital status, education, healthcare provider and health status were associated with diabetes management.

- Future studies should further explore how increased access to healthcare resources influences diabetes management and thus self-care behaviors in different elderly racial groups.

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THANK YOU!

Questions?