

DOI: 10.21767/2572-5483.100017

Does General Health Differ by Healthcare Access in Diabetic Females Ages 30 – 50?

Angela Alarcon, Valerie Swartzentruber, Roma Vaswani, Joshua Chua, Vic Holmes and Jessica L Hartos*

Department of Physician Assistant Studies, University of North Texas Health Science Center, USA

*Corresponding author: Jessica L Hartos, Department of Physician Assistant Studies, University of North Texas Health Science Center, USA, Tel: 817-735-2454, Fax: 817-735-2529, E-mail: Jessica.hartos@unthsc.edu

Received date: November 13, 2017; Accepted date: December 7, 2017; Publication date: December 14, 2017

Citation: Alarcon A, Swartzentruber V, Vaswani R, Chua J, Holmes V, et al. (2017) Does General Health Differ by Healthcare Access in Diabetic Females Ages 30 – 50? J Prev Med Vol.2 No.3: 7.

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Abstract

Purpose: Limited healthcare access can affect general health for diabetics, but information on this relationship is lacking for middle-aged, female diabetics. Our study aims to assess whether general health differs by healthcare access, both coverage and cost, in diabetic females ages 30-50 years.

Methods: This cross-sectional analysis used 2015 data from the Behavioral Risk Factor Surveillance System (BRFSS) for diabetic females ages 30-50 from Louisiana, Mississippi, Oklahoma, South Carolina, and Tennessee.

We assessed the relationship between general health and healthcare access, both coverage and cost, using multiple logistic regression analysis while controlling for weight status, comorbid health conditions, age, ethnicity, marital status, income, education level, and state.

Results: Across states, the majority of diabetic females reported good or better general health (49-63%), having healthcare coverage (77-89%), and not having cost preclude doctor visits (69-76%).

Adjusted analyses indicated that healthcare coverage was not related to general health, but those with healthcare costs precluding doctors' visits were about two times less likely to report good or better general health. General health was also related inversely to having two or more comorbid health conditions, and related positively to income and education levels.

Conclusion: General health was related inversely to healthcare costs and number of comorbid health conditions, and positively related to socioeconomic status. Given that healthcare coverage was not related to general health, the issues around health in middle-aged diabetic females may be more related to the out of pocket expenses for healthcare rather than just having health insurance.

For middle-aged diabetic females in primary care, practitioners should screen for multiple health conditions and assess management for all health conditions, especially as related to whether the patient can afford treatment. Practitioners in low income areas should be aware of treatment options for those who cannot afford them.

Keywords Diabetes; General health; Healthcare access; BRFSS; Healthcare cost; Healthcare coverage

Introduction

Diabetes is one of the fastest growing epidemics worldwide [1]. In 2013, there were 382 million people living with diabetes, with the cost of diabetes management reaching \$116 billion in the United States [2]. Diabetes is associated with high rates of medication use and medical complications, including hypertension, hyperlipidemia, heart disease, stroke, eye problems, kidney disease, and lower limb amputation [3]. Complications increase the cost of diabetes management, with hospitalizations being the most important direct driver of cost [2].

Healthcare access is important for the identification and management of diabetes [1]; however, approximately 25% of adults in the United States report being uninsured for at least part of the past 12 months [4]. While the number of uninsured adults has decreased in recent years, 12.6% of U.S. adults were still without health coverage in 2015 [5]. Theoretically, access to healthcare would make required medical care more attainable; however, even in countries with universal health insurance coverage, not every patient utilizes the medical care available [6]. Overall, the avoidance of complications and negative outcomes related to diabetes requires access to comprehensive and integrated care [7,8], including medication access [9] and regular doctor visits [10].

Diabetic patients are found to have lower general health when compared to those without diabetes [11], especially those who report cost-related medication underuse or forgoing treatment [12,13]. General health in diabetics is also impacted

by obesity and having multiple chronic health conditions [12-14], which can lead to further problems with physical functioning and emotional stability [11]. Demographic factors related to quality of life in those with diabetes include age, gender, ethnicity/race, marital status, and low income [7,14-16]. For age and gender, previous studies have indicated that younger patients and male patients tend to have lower rates of follow up with providers [6], and that women have higher prescription costs and other healthcare expenditures [7].

Although included, no studies that we found focused on the relations between general health and health care access in middle-aged females only. Females ages 30 to 50 with diabetes may have full lives with families and professions so it would be important to determine whether access issues affect their general health and whether resources are needed for this target population. Therefore, our study aims to assess whether general health differs by healthcare access, both coverage and cost, in diabetic females 30-50 years of age.

Methods

Design

This cross-sectional analysis used data from the 2015 Behavioral Risk Factor Surveillance System (BRFSS) conducted by the Center for Disease and Prevention [5]. The purpose of the BRFSS is to gather prevalence data from U.S. adults about their health risk behaviors, the measures they use to take care of their health, and the effect on overall health status.

BRFSS data is gathered through standardized telephone surveys conducted monthly by state health departments through random digit dialing techniques. The CDC compiles all state data and allows data access to the general public. This study was given exempt status by the Institutional Review Board at The University of North Texas Health Science Center.

Sample

The sample included diabetic females aged 30-50 years from Louisiana (N=83), Mississippi (N=98), Oklahoma (N=90), South Carolina (N=177), and Tennessee (N=99). These states were chosen for their higher percentages of diabetes diagnoses and lower percentages of healthcare access [5].

Data

The outcome, general health, was measured in BRFSS as "good or better" versus "fair or poor." The factor of interest, healthcare access, was measured two ways. Healthcare coverage was measured as yes/no to having "private or public healthcare coverage". Healthcare cost was measured as yes/no to whether "cost precluded seeing a doctor in the past 12 months."

Control variables included weight status, number of comorbid health conditions, age, ethnicity, marital status, income, education level, and state. Weight status was categorized as "obese" or "not obese." The number of health conditions was determined by adding the number of "yes" answers to having the following diagnoses: high blood pressure, high cholesterol, heart attack, coronary heart disease, stroke, skin cancer, cancer, COPD, arthritis, depression, kidney disease, and asthma.

This number was then categorized as "0," "1," or "2 or more." Because most participants reported their race as white, ethnicity/race was categorized as "white, non-Hispanic" versus "other." Marital status was measured as "married" or "not married." Because of the high percentage of lower incomes in our sample, annual income was measured as "\$0 to less than \$25,000" and "\$25,000 and over."

Education level was measured as "graduated college or technical school" versus "did not graduate college or technical school." The categories and responses for each variable are listed in Table 1.

Table 1: Sample characteristics by state.

Variable	Louisiana N= 83		Mississippi N=98		Oklahoma N=90		South Carolina N=177		Tennessee N=99	
	N	%	N	%	N	%	N	%	N	%
General Health										
Good or better	41	49	54	55	52	58	111	63	55	56
Fair or poor	42	51	44	45	38	42	65	37	44	44
Total	83	100	98	100	90	100	176	99	99	100
Healthcare Cost										
Cost precluded seeing a doctor	20	24	30	31	26	29	51	29	24	25
Cost did not	63	76	68	69	64	71	126	71	73	75
Total	83	100	98	100	90	100	177	100	97	98
Healthcare Coverage										
Yes	64	77	83	85	76	84	151	86	88	89

No	19	23	15	15	14	16	25	14	11	11
Total	83	100	98	100	90	100	176	99	99	100
Weight Status										
Obese	52	69	59	70	64	75	102	63	58	63
Not obese	23	31	26	30	21	25	59	37	34	37
Total	75	90	85	87	85	94	161	91	92	93
Health Conditions										
0 conditions	9	13	8	10	7	10	25	15	10	11
1 condition	12	17	16	20	9	13	33	20	10	11
2 or more conditions	51	71	55	69	54	77	105	64	67	77
Total	72	87	77	79	70	78	163	92	87	88
Age										
30-34	11	13	15	15	11	12	20	11	9	9
35-44	43	52	40	41	38	42	74	42	42	42
45-50	29	35	43	44	41	46	83	47	48	48
Total	83	100	98	100	90	100	177	100	99	100
Ethnicity/Race										
White	45	55	42	43	51	57	95	55	69	70
Not white	37	45	55	57	39	43	78	45	29	30
Total	82	99	97	99	90	100	173	98	98	99
Marital Status										
Married	39	47	38	39	56	62	90	51	49	49
Not married	44	53	60	61	34	38	87	49	49	49
Total	83	100	98	100	90	100	177	100	99	98
Income Level										
\$0 to \$25,000	35	46	39	46	45	54	84	52	22	26
\$25,000 or more	41	54	45	54	39	46	79	49	62	74
Total	76	92	84	86	84	93	163	92	84	85
Education Level										
Graduate college/technical school	19	23	32	33	24	27	40	23	13	13
Did not graduate college/technical school	64	77	66	67	66	73	137	77	86	87
Total	83	100	98	100	90	100	177	100	99	100

Analysis

This study utilized frequency distributions by state to describe the sample and to identify any issues with the variable distributions. Because of the low prevalence of diabetic females ages 30-50 in each state, the samples were combined for adjusted analysis. The relationship between general health and

healthcare access was analyzed as one sample using multiple logistic regressions, while controlling for health factors, demographic factors, and state. The adjusted results are shown in Figure 1. All analyses were conducted in R (R version 3.3.3, Copyright 2017, The R Foundation for Statistical Computing).

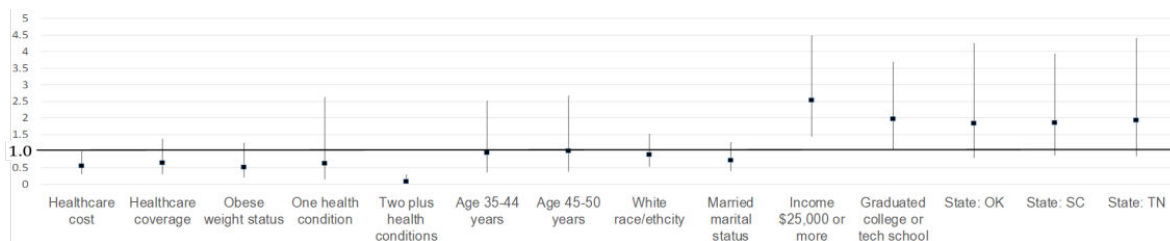


Figure 1: Results of Multiple Logistic Regression Analysis, shown are adjusted odds ratios and 95% confidence intervals for factors predicting general health in diabetic females ages 30-50. Factors with 95% confidence intervals that do not pass through 1.0 are significant. OK=Oklahoma, SC=South Carolina, TN=Tennessee.

Results

Descriptive

As shown in Table 1, the majority of diabetic females ages 30 to 50 across states reported having good or better general health (49-63%), having healthcare coverage (77-89%), and not having cost preclude doctor visits in the past 12 months (69-76%). In addition, most participants were obese (63-75%) and reported having two or more health conditions (64-77%). Across states, the majority were white race and lower socioeconomic status.

Adjusted

As shown in Figure 1, after combining our samples for multivariate analysis, the results indicated that general health status in middle-aged diabetic females was related to healthcare cost, but not to healthcare coverage. Compared to those who reported cost was not a barrier, those who reported that healthcare cost precluded seeing a doctor in the last 12 months were 1.82 times less likely (OR=0.55, 95% CI=0.31, 0.97) to report good or better general health. In addition, general health was inversely related to the number of comorbid conditions. Those with two or more comorbid conditions were 12.5 times less likely (OR=0.08, 95% CI=0.02, 0.27) to report good or better general health. Furthermore, general health status was related positively to socioeconomic factors. Those who graduated college or technical school were 1.97 times more likely (OR=1.97, 95% CI=1.06, 3.66) to report good or better general health and those who reported an income greater than \$25,000 were 2.54 more likely (OR=2.54, 95% CI=1.44, 4.45) to report good or better general health.

Discussion

The purpose of this study was to assess the relationship between general health and healthcare access, both coverage and cost, among diabetic females ages 30-50 years. Across states, the majority of diabetic females reported good or better general health, having healthcare coverage, and not having cost preclude doctor visits. The results of adjusted analysis indicated that general health in this population was not related to healthcare coverage, which differs from previous studies that have found that having healthcare coverage improved general

health outcomes [9,12]. This discrepancy may be related to different target populations or different measures for healthcare coverage as ours did not include specific types of plans, such as Medicare, Medicaid, other public insurance, private insurance, or high deductible plans [15,17].

However, the results of this study did show that general health among middle-aged female diabetics was significantly and inversely related to healthcare cost, which is similar to previous studies [4,12]. Indeed, this study also found that general health was inversely related to having multiple chronic health conditions and positively related to socioeconomic status, which are also found in prior research results [7,12-14]. Taken together, these findings suggest that issues related to healthcare access for this target population may be less related to having health insurance coverage and more related to out of pockets expenses, even with healthcare coverage.

This study used data from the BRFSS database, a national general population-based survey, which allowed for large numbers for the target population. However, in the BRFSS survey, diabetes status was measured dichotomously as presence or absence of a diagnosis of diabetes, which does not provide information about the severity, management, duration, or type of diabetes. This is unfortunate since general health outcomes are related to time since diabetes diagnosis and level of management [12,15]. In addition, understanding how the impact of healthcare costs differs among type 1, type 2, and gestational diabetes [2] and further breaking down healthcare costs, including medications and supplies, would also be beneficial, as a large portion of managing diabetes is related to medication use [10]. In addition, presence of multiple comorbid health conditions was also significantly related to poor general health in this study, but BRFSS data did not describe the type, severity, or management of the comorbid conditions. Further information for complications and comorbid conditions could provide a greater understanding of the impact of diabetes on general health and finances [6].

Conclusion

The results of this population-based study may generalize to diabetic female's ages 30-50 years in primary care settings. Given that a moderate proportion of this target population may have poor general health, primary care clinicians should

automatically screen for general health status in this population. In addition, with the high prevalence of multiple health conditions and the highly significant relationship between these and general health in middle aged diabetic females, clinicians should also automatically screen for health comorbidities to ensure any are identified and properly managed. Furthermore, given that a moderate proportion of diabetic females ages 30-50 years may have healthcare cost preclude doctor visits (despite having healthcare coverage), providers should make patient education and resources available for treatment options, medication programs, and generic prescription plans, especially in low income areas.

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