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Research Article

Relations between diabetes status, comorbid conditions, and current mental health in older adult females

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ABSTRACT

Purpose: Research relates diabetes to mental health conditions, but not to general mental health, especially in specific demographic groups. The purpose of this study was to examine whether current general mental health differs by diabetes status in older adult females in the general population.

Methods: This cross-sectional analysis used 2016 data from the Behavioral Risk Factor Surveillance System (BRFSS) for females ages 65-75 from Alabama (N=867), Kentucky (N=1356), Mississippi (N=668), and Texas (N=1714). Multiple logistic regression analysis by state was used to assess the relationship between diabetes status and mental health while controlling for health-related and demographic factors.

Results: Across states, about one-fourth of participants reported mental health issues (22-31%) and a diabetes diagnosis (23-26%). In addition, about one-half reported having 2 or more health conditions (41-51%) other than diabetes. The results of adjusted analyses indicated that mental health was related to diabetes status and healthcare access in two of four states and to number of health conditions in all four states.

Conclusion: Overall, current mental health was marginally related to diabetes status and healthcare access, but consistently related to number of health conditions in older adult females. Primary care providers should screen for mental health issues and multiple health conditions, including diabetes, in older adult females who present with either, assess the management of any conditions, and refer to psychiatry or other specialties as appropriate. In additions, providers may need to consider cost as a barrier in treatment plans for older adult females with multiple health issues.

Key words*: Mental health, Diabetes, Older-adult females, Health conditions*

Introduction

Mental illness is the largest contributor to disability in the United States and describes a broad variety of emotional and behavioral disorders including anxiety and depression [1]. Recent data shows prevalence rates of up to 11% for depression and up to 15% for anxiety, indicating that these conditions should not be ignored [1-5]. Research indicates that mental illness is higher among women than men, and for those with lower education, lower socioeconomic status, minority status, and chronic conditions, including diagnosed diabetes [1,6-8].

Diabetes mellitus is also a large contributor to disability worldwide [3]. It is characterized as a metabolic condition in which there is an insufficient amount of insulin or the body is resistant to insulin [3,5,7]. In 2014, 422 million people reported having diabetes mellitus and the prevalence has been increasing in the past three decades worldwide [3]. The prevalence has

also been increasing in the United States with up to 9% of the population reporting a diagnosis of diabetes mellitus [9]. This increase may be related to multiple factors including physical inactivity, poor diet, body weight increases, genetics, hypertension, lower socioeconomic status, and minority status [5,7,10]. Diabetes tends to be comorbid with many medical conditions including metabolic syndrome, eating disorders, anxiety disorders, vision loss, kidney failure, cardiovascular disease, neuropathy, cognitive decline (including dementia and Alzheimer's Disease), and elevated BMI, all of which lead to increased burden on the patient's body [3,5-7,10,11].

Research shows increased rates of mental health problems such as depression and anxiety in diabetics as compared to the general population [8,10-13]. Stress from managing diabetes, diabetes complications, and comorbidities can increase depressive symptoms for individuals ages 55 and older with diabetes, and women report significantly higher distress, depression, and anxiety compared to men [12,14]. Many studies link physical health and specific mental health conditions to diabetes, but there is a lack of data and clinical focus on current general mental health as related to a patient's diabetic status [3-4]. Additionally, there is still limited research for relations between diabetes and mental health within older adult samples [7]. Therefore, the purpose of this study was to examine whether overall mental health differs by diabetes status in older adult females in the general population.

Methods

Design

This cross-sectional analysis used 2016 data from the Behavioral Risk Factor Surveillance System (BRFSS) conducted by the Center for Disease Control and Prevention (CDC) [15]. BRFSS collects annual data from US residents regarding chronic health conditions, health-related risk behaviors, and use of preventative services by telephone survey using random digit dialing (RDD) techniques in all 50 states. Monetary compensation is not provided for BRFSS survey participants. The CDC compiles all BRFSS data and allows researchers access to de-identified data to conduct secondary data analyses. This study was given exempt status by The University of North Texas Health Science Center.

Sample

The samples included older adult females ages 65 to 75 in Alabama (N=867), Kentucky (N=1356), Mississippi (N=668), and Texas (N=1714). This age group was chosen because there is limited research related to older adults in regard to diabetes and mental health [7]. Further, women were chosen because prevalence of mental illness is higher in women than men [1,6-8]. Lastly, these states were chosen because of their higher proportions of individuals who reported having diabetes and mental health issues as compared to other states based on the BRFSS 2016 prevalence survey data maps [16].

Data

The outcome, mental health, was originally measured in BRFSS as the number of "not good" mental health days in the past 30 days "which includes stress, depression, and problems with emotions." The means for this variable in all four states were severely skewed as the mode in each state was 0 days of "not good" mental health. We reversed this variable to reflect "good current mental health" and dichotomized it as "yes" for reporting no days of mental health issues in the past 30 days or "no" for reporting one or more days of mental health issues in the past 30 days. The factor of interest was diabetes, which was measured as yes/no to having "ever been diagnosed with diabetes."

Control variables included weight status, health conditions, healthcare access, ethnicity/race, income level, employment status, and education level. Weight status was measured as yes/no to being "overweight or obese." The number of health conditions was determined as number of "yes" responses to diagnoses for any of the following: heart attack, CHD, stroke, skin cancer, other cancer, COPD, arthritis, depression, kidney disease, asthma. This number was then categorized as "0 health conditions," "1 health condition," or "2 or more health conditions" other than diabetes. Healthcare access was measured as yes/no to "cost precluded seeing a doctor in the past 12 months." Because most participants were white, ethnicity/race was measured as "white, non-Hispanic" or "other." Income level was measured as yes/no to having an annual income of "$50,000 or more." Employment status was measured as yes/no to being "employed." Education level was measured as yes/no to "graduated college/technical school."

Analysis

Frequency distributions by state were used to assess sample characteristics and identify any issues with the distribution of variables. Multiple logistic regression analyses by state were used to assess the relationship between diabetes status and mental health in older adult females while controlling for health-related and demographic factors. We chose to analyze data from multiple states separately to determine patterns among variable relations across similar samples. Similar results in three or four out of four states were considered evidence for reliable relationships. Any observations with missing data for any variable were removed from the multivariate models. All statistical analyses were conducted using STATA 15.1 (Copyright 1985-2017 StataCorp LLC).

Results

Descriptive

Table 1 lists participant characteristics for older adult females ages 65-75 in Alabama, Kentucky, Mississippi, and Texas. Across states, approximately one-fourth of the participants reported mental health issues in the past 30 days (22-31%) and a diagnosis of diabetes (23-26%). Additionally, the majority of participants reported being overweight or obese (68-71%), about one-half reported having 2 or more health conditions (41-51%) other than diabetes, and few reported that cost was a barrier to seeing a health care provider (5-7%). For demographic factors, most reported white race (67-88%), few

Table 1. Participant Characteristics by State

Variable	Alabama (N=867)		Kentucky (N=1356)		Mississippi (N=668)		Texas (N=1714)	
	N	%	N	%	N	%	N	%
Good Current Mental Health	867	100	1356	100	668	100	1679	100
Yes	270	31	316	23	148	22	438	26
No	597	69	1040	77	520	78	1241	74
Diabetes	867	100	1355	100	668	100	1711	100
Yes	225	26	336	25	162	24	397	23
No	642	74	1019	75	506	76	1314	77
Weight Status	799	92	1268	94	631	94	1544	90
Overweight or obese	544	68	897	71	443	70	1054	68
Not overweight or obese	255	32	371	29	188	30	490	32
Health Conditions (other than Diabetes)	838	97	1305	96	646	97	1666	100
0	144	17	247	19	151	23	441	26
1	274	33	398	31	219	34	547	33
2 or more	420	50	660	51	276	43	678	41
Healthcare access	866	100	1354	100	667	100	1713	100
Cost was barrier to seeing provider	58	7	93	7	35	5	114	7
Cost was not barrier to seeing provider	808	93	1261	93	632	95	1599	93
Ethnicity/race	856	99	1344	99	659	99	1657	97
White, non-Hispanic	625	73	1178	88	443	67	1265	76
Other	231	27	166	12	216	33	392	24
Income level	635	73	1029	76	504	75	1377	80
$50,000 or more	183	29	320	31	132	26	509	37
Less than $50,000	452	71	709	69	372	74	868	63
Employment status	863	100	1351	99	667	100	1646	99
Employed	107	12	207	15	84	13	270	16
Not employed	756	88	1144	85	583	87	1426	84
Education level	866	100	1355	100	668	100	1700	99
Graduated college/technical school	212	24	363	27	177	27	587	35
Did not graduate college/technical school	654	76	992	73	491	74	1113	65

were employed (12-16%), and most reported having an income of less than $50,000 (63-74%) and not graduating college or technical school (65-76%).

Adjusted

As shown in Table 2, the results of multiple logistic regression analysis for older adult females in Alabama, Kentucky, Mississippi, and Texas indicated that after controlling for all other variables in the model, mental health was related to diabetes status in only 2 of 4 states. In those states, diabetic participants were about 2 times less likely to report good current mental health. Mental health was also related to healthcare access in 2 of 4 states. In those states, participants who reported having cost preclude seeing a provider were about 2 to 2.5 times less likely to report good current mental health. However, mental health was related to number of health conditions other than diabetes in all states. Compared to those with zero health conditions, participants in four of four states who reported two or more health conditions other than diabetes were about 2 to 4 times less likely to report good current mental health.

Discussion

The purpose of this study was to examine the relations between diabetes status and current general mental health in older adult females in the general population. Across states, about one-fourth of females ages 65 to 75 reported mental health issues and about one-fourth reported having been diagnosed with diabetes. The results of the adjusted analysis indicated that current mental health was marginally related to diabetes status (findings in only 2 of 4 states) in older adult females. Prior research indicated that diabetes status was related to mental health [8,10-13]; however, previous studies measured symptoms of depression and anxiety rather than days of overall mental health. Previous research also controlled for HbA1c, diabetes duration, and treatment regimen [2,3,6-9], whereas our study did not. Additionally, we selected older adult women to assess current general mental health and diabetes status and to our knowledge we are the first to do so.

The results of this study did, however, indicate that current mental health and number of health conditions were consistently related. Compared to zero health conditions, participants in all four states who reported two or more health conditions other than diabetes were about 2-4 times less likely to report good current mental health. Similarly, prior research found that higher comorbidity was independently associated with higher intensity and longer duration of depressive symptoms [6]. This study also found that current mental health was marginally related to healthcare access (findings in only 2 of 4 states). Thus,

Table 2. Results of Multiple Logistic Regression Analyses Across States

Predicting Good Current Mental Health (Yes vs. no)	Alabama			Kentucky			Mississippi			Texas		
	AOR	95% CI		AOR	95% CI		AOR	95% CI		AOR	95% CI	
		Low	High		Low	High		Low	High		Low	High
Diabetes												
No	ref	-	-	ref	-	-	ref	-	-	ref	-	-
Yes	0.55	0.36	0.85	1.00	0.71	1.42	0.56	0.34	0.93	0.92	0.67	1.27
Weight Status												
Not overweight or obese	ref	-	-	ref	-	-	ref	-	-	ref	ref	ref
Overweight or obese	1.21	0.80	1.84	1.06	0.75	1.50	0.95	0.56	1.62	1.14	0.84	1.54
Health Conditions (other than Diabetes)												
0	ref	-	-	ref	-	-	ref	-	-	ref	-	-
1	0.72	0.37	1.40	0.64	0.37	1.08	1.01	0.50	2.07	0.54	0.35	0.83
2 or more	0.25	0.13	0.46	0.33	0.20	0.53	0.44	0.24	0.83	0.25	0.17	0.37
Healthcare access												
Cost did not preclude seeing provider	ref	-	-	ref	-	-	ref	-	-	ref	-	-
Cost precluded seeing provider	0.40	0.20	0.78	0.54	0.32	0.89	0.58	0.24	1.30	0.40	0.25	0.66
Ethnicity/race												
Other	ref	-	-	ref	-	-	ref	-	-	ref	-	-
White, non-Hispanic	0.91	0.58	1.43	1.09	0.69	1.73	0.66	0.39	1.11	1.09	0.78	1.53
Income Level												
Less than $50,000	ref	-	-	ref	-	-	ref	-	-	ref	-	-
$50,000 or more	1.33	0.82	2.17	1.39	0.95	2.05	1.39	0.76	2.58	1.38	1.02	1.88
Employment Status												
Not employed	ref	-	-	ref	-	-	ref	-	-	ref	-	-
Employed	1.38	0.74	2.59	1.32	0.84	2.08	0.90	0.44	1.83	1.32	0,90	2,94
Education Level												
Did not graduate college/technical school	ref	-	-	ref	-	-	ref	-	-	ref	-	-
Graduated college/technical school	0.94	0.59	1.49	1.19	0.81	1.73	1.27	0.70	2.31	0.98	0.73	1.32

AOR=adjusted odds ratio; 95% CI=95% confidence interval; ref=referent group; boldface indicates significance (AORs with 95% CI not including 1.00 are significant)

mental health issues in this target population may be more a result of the current severity and management of one or more health issues, especially if cost is a barrier to health care. Future studies may want to focus on facets of disease burden such as symptoms, severity, activity limitations, or lifestyle changes as related to current mental health and chronic health conditions for older adults.

Limitations

The BRFSS data allowed assessment of patterns among variable relations in large, similar samples using recent data. However, we lacked information on the severity and management of the participants' health conditions, including diabetes, which could aid in understanding the context of the participants' mental health issues. Also, we had no data on what medications the participants are taking for their health conditions. This information could be helpful in determining whether their medications are contributing to their mental health, as many common medications have adverse effects of depression and/or anxiety.

Conclusion

The results of this population-based study may generalize to older adult females in primary care. Primary care providers may expect about one-fourth of their female patients ages 65-75 to report mental health issues and about one-fourth to have a diabetes diagnosis. The results of this study indicated that diabetes status was marginally related to current mental health. In addition, about half of patients in this target population may report two or more health conditions other than diabetes and having multiple health conditions was consistently related to current mental health in older adult females. Thus, practitioners should not automatically screen for mental health issues in all 65 to 75-year-old females based on diabetes status; however, practitioners should screen for mental health issues and multiple health conditions, including diabetes, in older adult females that present with either. Practitioners should determine the severity and management of any conditions, coordinate management and care for all conditions, and refer to psychiatry or other specialties as needed. Because mental health issues were marginally related to healthcare access in this study, providers may want to consider cost in treatment plans for older adult females with multiple co-morbidities, including diabetes, if cost is a barrier for treatment for patients in this target population.

Disclaimer

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