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Does General Health Differ by Routine Check-Up in Diabetic, Middle-Aged Females?

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Abstract

Objective: Given limited evidence that routine check-ups improves quality of life, the purpose of this study is to assess whether general health differs by routine check-up in diabetic, middle-aged females in the general population.

Methods: This cross-sectional analysis used 2016 data from the Behavioral Risk Factor Surveillance System (BRFSS) for diabetic females ages 45-65 from Alabama (N=370), Georgia (N=256), Kentucky (N=485), Mississippi (N=275), and West Virginia (N=268). The relationship between general health and routine check-ups was assessed separately by state using multiple logistic regression analysis while controlling for comorbid health conditions, weight status, physical activity, tobacco and alcohol use, age, ethnicity, educational level, income level and employment status.

Results: Across states, about half of diabetic females reported fair or poor general health (50-53%), while most reported having a routine check-up within the past year (90-93%). Adjusted analysis indicated that general health was not significantly related to routine check-up but was inversely related to having diabetes plus two or more health conditions and positively related to physical activity.

Conclusion: The results of this study indicated that general health was not related to routine check-up in diabetic middle-aged females in the general population. However, general health showed strong inverse relations with multiple health conditions and a moderate positive relation with physical activity. Therefore, with diabetic, middle-aged females, practitioners should automatically screen for and optimize care of additional health conditions and encourage physical activity in order to improve general health in these patients.

Introduction

More than 30 million people have diabetes in the United States [1,2]. In 2014 alone, this disease led to 14 million trips to the emergency room and 76,488 deaths, making diabetes the 7th leading cause of mortality in the United States [2,3]. Furthermore, it affects 12.6% of the population 20 years and older [3] and has the potential to disrupt one's health-related quality of life by leading to other complications such as heart disease, stroke, blindness, kidney disease, and amputations [1,4]. Although people in the general population typically have a less than perfect view of their health, people with chronic conditions report even lower views of their health [5-7].

Health-related quality of life can be described as mental, physical, emotional, and social well-being [5,7,8-14]. Research has shown that quality of life in diabetic patients is related to health, socioeconomic status, and demographic factors. For example, quality of life is lower in diabetic patients with a declining health status and complications due to diabetes including cardiovascular disease, renal disease and neuropathy [5,6,10-12]. In addition, diabetics with mental health conditions such as depression, anxiety, and other psychiatric disorders reported that their quality of life was negatively impacted [4,7,8,13]. Furthermore, diabetic patients with a lower socioeconomic status including lower income and education levels reported a decreased quality of life compared to patients with a higher socioeconomic status, which may be related to greater access to medical care, exercise facilities and healthier food options [4,6,12,13]. For demographic factors, a lower quality of life has been reported with aging [5,6,12,13], and female diabetic patients report a lower quality of life than males with diabetes [12,13].

Routine check-ups may also be related to quality of life for those with diabetes. Continued care and medical interventions during routine check-ups can improve physical and social functioning as well

as encourage positive changes in smoking, medication use, and diet to improve patient health in those with diabetes [15,16]. Furthermore, the motivation to manage chronic illnesses, such as diabetes, through self-care routines can be improved by routine check-ups [16]. Thus, annual visits aimed at advocating for, planning and monitoring diabetic conditions with the support of a knowledgeable provider can improve overall patient outcomes and adherence to treatment [4,11,12]. However, previous research shows limited evidence that continuity of care such as routine check-ups with a medical provider improves quality of life over an extended period of time [11,12,14,15]. As health care providers, it is important to know if the presence of yearly routine check-ups is sufficient to improve the health status of diabetic patients [6-8,13]. Therefore, the purpose of this study was to assess whether general health differs by routine check-up in diabetic, middle-aged 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 Centers for

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Disease Control and Prevention (CDC, [17]). BRFSS is a nationwide annual survey system used to gather health-related information including chronic health conditions, health risk behaviors, and preventative strategies in adults 18 years of age and older across all 50 states. BRFSS is conducted annually using random-digit dialing methods on both landlines and cell phones. The CDC compiles the 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 diabetic middle-aged (45-65 years old) females from Alabama (N=370), Georgia (N=256), Kentucky (N=485), Mississippi (N=275), and West Virginia (N=268). We selected these states based on the higher prevalence of (a) diabetic females in the target age range and (b) reported fair or poor health as compared to other states [18].

Data

The outcome, general health, was measured as either "good or better" versus "fair or poor." The factor of interest, routine check-up, was measured as yes/no to having a routine check-up in the past year.

The control variables included health-related, demographic, and socioeconomic factors. Health conditions was measured as the number of "yes" responses to the following: heart attack, CHD, stroke, skin cancer, cancer, COPD, arthritis, depression, kidney disease, and asthma. This number was then categorized into "diabetes only," "diabetes plus one other health condition," and "diabetes plus two or more other health conditions." Weight status was measured as

Variable	Alabama N = 370		Georgia N = 256		Kentucky N = 485		Mississippi N = 275		West Virginia N = 268	
	N	%	N	%	N	%	N	%	N	%
General Health Status	368	99	255	100	483	100	275	100	266	99
Good or better	173	47	127	50	234	48	130	47	124	47
Fair or poor	195	53	128	50	249	52	145	53	142	53
Routine Check-up	363	98	255	100	474	98	271	99	265	99
Yes	336	93	234	92	433	91	243	90	244	92
No	27	7	21	8	41	9	28	10	21	8
Health Conditions	357	96	250	98	461	95	257	93	251	94
Diabetes only	59	16	54	22	69	15	57	22	51	20
Diabetes plus one	81	23	75	30	113	25	76	30	68	27
Diabetes plus two or more	217	61	121	48	279	61	124	48	132	53
Weight Status	333	90	224	88	431	89	255	93	259	97
Overweight or obese	297	89	195	87	384	89	223	87	241	93
Not overweight or obese	36	11	29	13	47	11	32	13	18	7
Physical Activity	370	100	256	100	485	100	274	100	268	100
Yes	187	51	137	54	261	54	133	49	157	59
No	183	49	119	47	224	46	141	51	111	41
Tobacco Use	356	96	250	98	469	97	267	97	262	93
Current smoker	63	18	55	22	92	20	50	19	54	21
Not current smoker	293	82	195	78	377	80	217	81	208	79
Alcohol Use	354	96	248	97	470	97	263	96	262	98
Yes	82	23	63	26	89	19	57	22	81	31
No	272	77	185	75	381	81	206	78	181	69
Age	370	100	256	100	485	100	275	100	268	100
45-54	123	33	95	37	158	33	75	27	78	29
55-60	110	30	81	32	170	35	103	37	89	33
61-65	137	37	80	31	157	32	97	35	101	38
Ethnicity/Race	366	99	251	98	480	99	274	100	268	100
White, non-Hispanic	197	54	129	51	406	85	123	45	246	94
Other	169	46	122	49	74	15	151	55	17	6
Educational Level	369	100	255	100	484	100	275	100	268	100
Did not graduate high school	57	16	49	19	61	12	48	17	48	18
Graduated high school	119	32	86	34	175	36	84	31	102	38
Some college/technical school	122	33	60	24	134	28	81	29	68	25
Graduated college/technical school	71	19	60	24	114	24	62	23	50	19
Income level	290	78	210	82	391	81	219	80	234	87
$0 to less than $25,000	157	54	102	49	185	47	118	54	86	37
$25,000 to less than $50,000	56	19	54	26	91	23	47	21	59	25
$50,000 or more	77	27	54	26	115	30	54	25	89	38
Employment Status	368	99	254	99	484	100	274	100	268	100
Employed	108	29	71	28	168	35	105	38	113	42
Not Employed	260	71	183	72	316	65	169	62	155	58

Table 1: Participant Characteristics by State.

"overweight or obese" versus "not overweight or obese." Physical activity was measured as yes/no to "performed physical activity or exercise in the past 30 days." Tobacco use was measured as "current smoker" versus "non-smoker." Alcohol use was measured as yes/no to "drank alcohol in past 30 days." Age was categorized into "45-54," "55-60," or "61-65." Ethnicity/race was measured as "White, non-Hispanic" versus "other." Educational level was categorized as "did not graduate high school," "graduated high school," "some college/technical school," or "graduated college/technical school." Income level was categorized as "$0 to less than $25,000" "$25,000 to less than $50,000" or "$50,000 or more." Employment status was measured as "not employed" versus "employed."

Analysis

Frequency distributions by state were used to describe the samples and determine any problems with the distributions of variables. We analyzed data separately by state to assess patterns in relationships among variables of interest across similar samples. Similar results in 3 or more of the 5 states was considered reliable findings for variable relations. Multiple logistic regression by state was conducted to assess the relationship between general health and routine check-up after controlling for health-related, demographic and socioeconomic factors. Any observations with missing data for any variable were excluded from the adjusted analysis. All analyses were conducted in STATA Version 15.1 (Copyright 1985-2017 StataCorp LLC).

Results

Descriptive Statistics

Table 1 lists participant characteristics for diabetic, middle-aged females in Alabama, Georgia, Kentucky, Mississippi and West Virginia. Across states, about half of the participants reported having good

Predicting General Health Status (good/better vs. fair/poor)	Alabama			Georgia			Kentucky			Mississippi			West Virginia		
	AOR	95% CI		AOR	95% CI		AOR	95% CI		AOR	95% CI		AOR	95% CI	
		Low	High		Low	High		Low	High		Low	High		Low	High
Routine Check-up															
No	ref	-	-	ref	-	-	ref	-	-	ref	-	-	ref	-	-
Yes	1.45	0.41	5.12	**4.81**	1.20	19.30	0.69	0.27	1.77	0.72	0.21	2.40	0.80	0.24	2.68
Health Conditions															
Diabetes only	ref	-	-	ref	-	-	ref	-	-	ref	-	-	ref	-	-
Diabetes plus one	0.86	0.30	2.45	0.38	0.13	1.13	**0.29**	0.11	0.76	0.49	0.16	1.52	0.65	0.25	1.69
Diabetes plus two or more	**0.16**	0.07	0.41	**0.27**	0.09	0.78	**0.18**	0.07	0.44	**0.17**	0.06	0.49	**0.31**	0.21	0.77
Weight Status															
Not overweight or obese	ref	-	-	ref	-	-	ref	-	-	ref	-	-	ref	-	-
Overweight or obese	0.76	0.27	2.11	1.48	0.49	4.44	1.01	0.42	2.43	0.77	0.23	2.58	0.59	0.15	2.30
Physical Activity															
No	ref	-	-	ref	-	-	ref	-	-	ref	-	-	ref	-	-
Yes	**2.68**	1.45	4.98	**2.14**	1.06	4.35	**2.42**	1.40	4.19	2.06	1.00	4.29	**2.13**	1.06	4.28
Tobacco Use															
Not current smoker	ref	-	-	ref	-	-	ref	-	-	ref	-	-	ref	-	-
Current smoker	0.49	0.20	1.20	0.71	0.31	1.63	0.95	0.48	1.86	0.76	0.28	2.05	0.60	0.23	1.55
Alcohol Use															
No	ref	-	-	ref	-	-	ref	-	-	ref	-	-	ref	-	-
Yes	1.46	0.71	3.04	1.51	0.64	3.55	**2.00**	1.02	3.93	1.55	0.62	3.90	0.80	0.38	1.68
Age															
45-54	ref	-	-	ref	-	-	ref	-	-	ref	-	-	ref	-	-
55-60	0.58	0.27	1.25	1.65	0.69	3.94	1.58	0.81	3.07	2.10	0.81	5.46	1.04	0.45	2.37
61-65	0.65	0.30	1.38	1.45	0.61	3.47	1.46	0.76	2.83	1.71	0.63	4.61	0.88	0.36	2.17
Ethnicity/Race															
Other	ref	-	-	ref	-	-	ref	-	-	ref	-	-	ref	-	-
White, non-Hispanic	1.39	0.68	2.81	1.03	0.50	2.13	1.55	0.75	3.21	1.47	0.68	3.20	1.72	0.30	9.67
Educational Level															
Did not graduate high school	ref	-	-	ref	-	-	ref	-	-	ref	-	-	ref	-	-
Graduated high school	2.59	0.80	8.37	2.57	0.88	7.49	1.22	0.49	3.04	0.46	0.15	1.41	1.28	0.42	3.89
Some college/technical school	2.76	0.85	8.97	1.36	0.42	4.40	1.44	0.55	3.73	0.49	0.14	1.67	1.72	0.53	5.55
Graduated college/technical school	3.27	0.90	11.90	2.69	0.77	9.28	1.61	0.57	4.52	1.27	0.35	4.65	1.35	0.37	4.93
Income level															
$0 to less than $25,000	ref	-	-	ref	-	-	ref	-	-	ref	-	-	ref	-	-
$25,000 to less than $50,000	2.20	0.93	5.20	1.76	0.75	4.12	1.16	0.60	2.25	1.55	0.61	3.92	2.27	0.94	5.48
$50,000 or more	2.34	0.94	5.79	2.66	0.77	9.28	1.31	0.66	2.63	1.87	0.69	5.07	**3.30**	1.35	8.07
Employment Status															
Not Employed	ref	-	-	ref	-	-	ref	-	-	ref	-	-	ref	-	-
Employed	1.49	0.71	3.10	2.03	0.83	4.95	**2.30**	1.29	4.12	**3.68**	1.57	8.67	1.16	0.54	2.53

Note. AOR = adjusted odds ratio; 95% CI = 95% confidence intervals; ref = referent group; boldface indicates significance (*AOR*s with 95% CI that do not include 1.00 are significant)

Table 2: Adjusted Results by State.

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general health in the past month (47-50%) and most reported having a routine check-up within the past year (90-93%). For health conditions, about half to two-thirds reported having diabetes plus two or more health conditions (48-61%), and most reported being overweight or obese (87-93%). Regarding health behaviors, about half performed physical activity or exercise in the past 30 days (49-59%) and most reported not currently smoking (78-82%) or drinking alcohol within in the past 30 days (69-81%). For demographics, about one-third of the participants fell within each age category (45-54: 27-37%; 55-60: 30-37%; and 61-65: 31-38%), and there was a wide variation of the samples across states who reported white, non-Hispanic (45-94%). For socioeconomic status, about one-fourth graduated college or technical school (19-24%); about one-third to half had an income level below $25,000 (37-54%); and the majority of the sample was not employed (58-72%).

Adjusted Analysis

As shown in Table 2, the results of multiple logistic regression analysis for diabetic, middle-aged females in Alabama, Georgia, Kentucky, Mississippi and West Virginia indicated that, after controlling for all other variables in the model, general health status was significantly related to routine check-up in the past year in only one of five states. However, in 5 of 5 states, participants who reported having diabetes plus 2 or more health conditions were about 3-7 times less likely to report good or better general health compared to those with diabetes only. In addition, in 4 of 5 states, participants who performed physical activity in the past 30 days were about 2-3 times more likely to report good or better general health status compared to those who did not perform physical activity in the past 30 days.

Discussion

The purpose of this study was to assess whether general health differs by routine check-up in diabetic, middle-aged females. Across states, about half of diabetic females reported fair or poor general health, while most reported having a routine check-up within the past year. The results of adjusted analysis across states indicated that general health was not related to having routine check-ups in this target population. These results differ from previous studies that have found that routine check-ups improve the general health of those with diabetes [4,11,12,15,16]. Discrepancies may be related to different measures and target populations. Prior research investigated the collaborative management of chronic diseases between the practitioner and patient [16], while our study assessed routine check-ups within the past year. Furthermore, prior research focused on male and female adults ages 18 years and older with Type 2 diabetes [11,14], while our research focused on diabetic, middle-aged females 45-65 years old.

The results of this study did, however, show that general health among diabetic, middle-aged females is strongly and inversely related to having diabetes plus two or more health conditions, which is similar to the findings from prior research [11]. General health was also significantly and positively related to physical activity within the last 30 days, which is also similar to the results of previous studies [14,19]. When considered together, the findings suggest that general health for this target population may be less related to having routine check-ups and more related to managing comorbidities and engaging in physical activity.

Limitations

The use of BRFSS data allowed assessment for multiple large samples of middle-aged diabetic females. Although the results determined that multiple health conditions were inversely related to good or better general health, we had no information for the severity of health conditions and how well multiple conditions were being managed to further understand which treatment options may improve overall general health. Furthermore, the results of our study indicated that physical activity in the past 30 days was related to good or better general health; however, there was no information for the frequency, intensity, or duration of physical activity to assess the minimum requirement necessary to improve overall general health in this target population.

Conclusion

Because this was a population-based study, the results may generalize to diabetic females ages 45-65 in diabetic clinics or endocrinology settings. Practitioners may find that approximately half of their diabetic, middle-aged female patients report fair or poor health and that the vast majority will have had a routine medical check-up within the past year; however, these may not be related. Thus, providers should always screen this target population for general health status. In addition, with a moderate prevalence of diabetes plus two or more health conditions and a strong relation with general health, practitioners should automatically screen all diabetic, middle-aged female patients for the presence of multiple comorbidities to ensure the optimization of treatment for each health condition to improve general health status. Furthermore, with a moderate prevalence of the target population not engaging in physical activity, and a moderate relation to general health, practitioners should screen for physical activity in all diabetic, middle-aged females and provide education and recommendations for physical activity that may fit within the patient's lifestyle as well as referrals to physical therapy or exercise physiology as needed.

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