

Research Article

Is weight status related to current mental health in young adult females in the general population?

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ABSTRACT

Purpose: The purpose of this study was to assess the relationship between weight status and current mental health in young adult females given the limited research for this relationship in this target population.

Methods: This cross-sectional analysis used 2016 BRFSS data for females ages 18-34 from Alabama (N=636), Kentucky (N=751), Louisiana (N=303), and Mississippi (N=441). Ordered logistic regression was conducted by state to assess the relationship between current mental health and weight status while controlling for health-related and demographic factors.

Results: About half of young adult females reported low to moderate current mental health (43-54%) and the majority reported being overweight (26-32%) or obese (29-38%). Adjusted results indicated that current mental health was not significantly related to weight status across states. However,

current mental health was related to general health status and sleep duration in all four states.

Conclusion: The results indicate that half or more of young adult females may report low to moderate current mental health and overweight or obese status, but that these are not significantly related. Therefore, primary care practitioners should screen all young adult women for both but treat any issues separately. However, current mental health was moderately to highly-related to general health and sleep duration in all states. Thus, primary care practitioners should screen for all if young adult females present with any of these and coordinate treatment plans across them. Practitioners should educate patients on ways to improve mental health, weight status, general health, and sleep, and provide referrals to specialists as needed.

Key words: Mental health, Weight status, Young adult females, Sleep

Introduction

Every year, up to 25% of U.S. adults suffer from mental illness [1-3], and up to 50% will suffer from mental illness at some point in their lives [1]. Mental illness has been linked to cardiovascular disease, diabetes, asthma, epilepsy, and cancer [1,3,4], as well as to suicide and premature death [5,6]. The increasing prevalence of mental illness not only has major public health implications, but also carries a large economic burden,

costing the United States around \$193 billion every year [2,4,7].

Research shows that mental health is related to health behaviors and socioeconomic status [4,8]. Poor mental health has been associated with sedentary lifestyle, disordered sleeping, and an unhealthy diet [6,9,10]. Mental health issues are also linked to use of alcohol and tobacco [1,5]. In addition, socioeconomic status, including lower education level, poverty, and social disadvantage, have been associated with poor mental

health [3,11].

Another prominent health issue in the United States that may be related to mental health is weight status, specifically overweight or obese, which are defined as having a body mass index (BMI) of 25-30 kg/m² or a BMI greater than 30 kg/m², respectively. In 2008, there were 1.5 billion adults in the U.S. that were overweight or obese [13]. Both poor diet and reduced physical activity are risk factors for obesity [9,11], and obesity has been linked to cardiovascular disease, musculoskeletal disease, diabetes, and reduced life expectancy [5,6,11,13,14].

The relationship between obesity and mental health has been an issue of debate for many decades, and current evidence is inconclusive. Some studies have shown positive associations between increased BMI and poor mental health outcomes, whereas other studies have reported inverse findings or no relationship [9,12,13]. Many studies have suggested that gender may affect the association between poor mental health and weight status; however, some studies have found that poor mental health outcomes are associated with overweight or obese in men, whereas others have only found the relationship in women [4,6-8,14].

Despite research assessing the association between increased BMI and poor mental health outcomes, there are limited studies focused on these associations in young adult females. Because young adult women have a higher risk of suffering from mental illness than young adult men and three-fourths of chronic mental illnesses begin by age 24, it would be important to determine clinical implications and improve practice guidelines for both weight and mental health outcomes in this target population [2,9,12]. Therefore, the purpose of this study is to assess the relationship between weight status and current mental health in young 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 Centers for Disease Control and Prevention (CDC) [15]. BRFSS conducts annual, nationwide surveys that gather data to assess health outcomes, behaviors, and prevention among adults in the 50 states, District of Columbia, and 3 U.S. territories. BRFSS uses random digit dialing techniques to conduct over 400,000 telephone interviews each year. 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 contain females ages 18-34 in Alabama (N=636), Kentucky (N=751), Louisiana (N=303), and Mississippi (N=441). This age and gender were chosen because of the limited research on the relationship between mental health and weight status in young adult females (review, Hoare et al., 2014; Jung & Chang, 2014). These states were chosen for their higher rates of obese or overweight young adult females with fair or poor mental health status compared to the other states [16].

Data: The outcome, current 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.” These responses were then categorized as “low” (0 days), “moderate” (1-16 days) and “high” (17-30 days) levels of “not good” mental health; however, we reversed these categories to reflect “good” mental health. Thus, current mental health was categorized as “low” (0 to 16 days of good mental health), “moderate” (17-29 days of good mental health), and “high” (30 days of good mental health). The BRFSS variable for the factor of interest, weight status, was originally categorized as “underweight,” “normal,” “overweight,” and “obese.” Because the percentages of underweight individuals in all four states were less than 10%, the underweight category was combined with the normal category, resulting in 3 categories for analysis: “underweight/normal,” “overweight” and “obese.”

The control variables were general health status, physical activity, sleep duration, tobacco use, alcohol use, income level, education level, employment status, age category, and ethnicity/race. General health status was measured as “good or better” or “fair or poor.” Physical activity was measured as “yes” or “no” regarding “performing physical activity or exercise in the past 30 days other than regular job.” Sleep duration was categorized as “short” (less than 6 hours), “moderate” (6 to 8 hours), or “long” (more than 8 hours). Tobacco use was measured as “never,” “former,” “some days,” or “every day.” Alcohol use was measured as “yes” or “no” regarding “drinking alcohol in the past 30 days.” Income level was measured as “\$0 to less than \$25,000” or “\$25,000 or more.” Education level was measured as “graduated college or technical school” or “did not graduate college or technical school.” Employment status was measured as “employed” or “not employed.” Age categories included “18-24” and “25-34.” Because most of the sample listed their race as white, ethnicity/race was measured as “white, non-Hispanic” and “other.”

Analysis: Frequency distributions conducted by state were used to describe the samples and determine any issues with the distributions of variables. Adjusted analyses were conducted separately by state to assess patterns in the relationships among variables in similar samples. As such, similar results in 3 or 4 out of 4 states was considered reliable evidence for a relationship. Ordered logistic regression by state was used to assess the relationship between current mental health and weight status after controlling for health-related and demographic factors. An ordered logistic regression model is used to estimate a relationship between an ordinal dependent variable and a set of independent variables. The proportional odds produced for each IV relates “proportionally” or equally applies to comparisons of DV groups greater than k versus those who are in groups less than or equal to k, where k is any level of the response variable. Therefore, the interpretation of an associated OR is that for a one unit change in the predictor variable, the odds for a group that is greater than k versus less than or equal to k are the proportional odds times larger. Any observation with missing data for any variable in the model was excluded from the adjusted analyses. All analyses were conducted in STATA 15 (version 15.1, © 1985-2017 StataCorp LLC Statistics/Data Analysis).

Results

Descriptive statistics

Table 1 lists participant characteristics for young adult females in Alabama, Kentucky, Louisiana, and Mississippi. Across states, about half reported low or moderate current mental health (43-54%) and the majority reported being overweight (26-32%) or obese (29-38%). For health-related factors, most reported having good or better general health (88-90%), performing some type of physical activity or exercise other than their regular job in the last thirty days (76-79%), and receiving a moderate amount (6-8 hours) of sleep a night (75-79%). For substance use, about half reported that they drank alcohol in the last thirty days (48-60%), and about two-thirds reported being non-smokers (65-72%). For socioeconomic status, nearly half

reported an annual income of less than \$25,000 (39-46%), most reported that they did not graduate from college or technical school (66-74%), and the majority reported being employed (58-61%). For demographic factors, the majority were ages 25-34 (59-71%) and half or more were white, non-Hispanic (45-84%).

Adjusted statistics

As shown in Table 2, the results of ordered logistic regression analysis for young adult females in Alabama, Kentucky, Louisiana, and Mississippi indicated that after controlling for all other variables in the model, current mental health was not significantly related to weight status across states in this target population. However, compared to those with fair or poor general health, participants in 4 of 4 states that reported good

Table 1. Participant Characteristics by State

Variables	Alabama (N=636)		Kentucky (N=751)		Louisiana (N=303)		Mississippi (N=401)	
	N	%	N	%	N	%	N	%
Current Mental Health	636	100	744	99	303	100	401	100
Low	125	20	148	20	42	14	69	17
Moderate	219	34	247	33	100	33	117	29
High	292	46	349	47	161	53	215	54
Weight Status	615	97	719	96	293	97	394	98
Underweight or Normal	250	41	304	42	116	40	126	32
Overweight	161	26	194	27	93	32	120	30
Obese	204	33	221	31	84	29	148	38
General Health Status	634	100	751	100	303	100	400	100
Good or better	559	88	670	89	269	89	358	90
Fair or poor	75	12	81	11	34	11	42	10
Physical Activity	635	100	751	100	303	100	401	100
Yes	498	78	592	79	234	77	306	76
No	137	22	159	21	69	23	95	24
Sleep Duration	636	100	747	99	303	100	401	100
Short	102	16	126	17	44	15	53	13
Moderate	478	75	571	76	230	76	315	79
Long	56	9	50	7	29	10	33	8
Tobacco Use	617	97	729	97	288	95	396	99
Never	414	67	476	65	206	72	266	67
Former	62	10	64	9	22	8	40	10
Some days	41	7	33	5	17	6	19	5
Every day	100	16	156	21	43	15	71	18
Alcohol Use	603	95	719	97	286	94	390	97
Yes	317	53	342	48	173	60	186	48
No	286	47	377	52	113	40	204	52
Income Level	546	86	593	80	262	86	330	82
Less than \$25,000	247	45	229	39	103	39	153	46
\$25,000 or more	299	55	364	61	159	61	177	54
Education	635	100	751	100	303	100	401	100
Graduated college/technical school	166	26	240	32	102	34	137	34
Did not graduate college or technical school	469	74	511	68	201	66	264	66
Employment Status	631	99	744	99	301	99	401	100
Employed	387	61	432	58	180	60	246	61
Not employed	244	39	312	42	121	40	155	39
Age Category	636	100	751	100	303	100	401	100
18-24	214	34	309	41	89	29	118	29
25-34	422	66	442	59	214	71	283	71
Ethnicity/Race	636	100	750	100	300	99	400	100
White, non-Hispanic	348	55	631	84	160	53	178	45
Other	288	45	119	16	140	47	222	56

Table 2. Adjusted Results across States

Predicting Current Mental Health (low vs. moderate vs. high)	Alabama			Kentucky			Louisiana			Mississippi		
	AOR	95% CI		AOR	95% CI		AOR	95% CI		AOR	95% CI	
		Low	High		Low	High		Low	High		Low	High
Weight Status												
Under or Normal	ref	-	-	ref	-	-	ref	-	-	ref	-	-
Overweight	0.59	0.38	0.92	0.86	0.57	1.28	1.28	0.66	2.48	0.83	0.45	1.53
Obese	0.64	0.42	0.97	0.73	0.49	1.09	0.64	0.33	1.25	1.49	.82	2.72
General Health Status												
Good or better	2.34	1.34	4.08	3.23	1.80	5.80	3.54	1.43	8.79	3.39	1.67	6.88
Physical Activity												
Yes	0.81	0.51	1.27	0.76	0.49	1.18	0.82	0.41	1.66	1.20	0.68	2.17
Sleep Duration												
Short	0.58	0.36	0.95	0.60	0.38	0.95	0.30	0.13	0.66	0.34	0.17	0.65
Moderate	ref	-	-	ref	-	-	ref	-	-	ref	-	-
Long	0.72	0.37	1.39	0.92	0.45	1.87	0.51	0.20	1.26	1.39	0.58	3.32
Tobacco Use												
Never	ref	-	-	ref	-	-	ref	-	-	ref	-	-
Former	0.51	0.29	0.91	0.69	0.39	1.22	1.47	0.48	4.49	0.50	0.24	1.05
Some days	0.55	0.28	1.07	0.62	0.29	1.33	1.00	0.36	2.82	0.54	0.20	1.41
Every day	0.43	0.25	0.74	0.97	0.60	1.56	0.56	0.24	1.30	1.09	0.53	2.22
Alcohol Use												
Yes	0.62	0.43	0.88	0.75	0.52	1.06	0.55	0.31	0.99	0.77	0.48	1.23
Income Level												
\$25,000 or more	1.27	0.86	1.87	1.09	0.75	1.56	1.59	0.87	1.41	1.41	0.82	2.44
Education												
Graduated college/technical school	1.38	0.90	2.12	1.09	0.74	1.61	0.90	0.49	1.65	0.89	0.52	1.54
Employment Status												
Employed	1.39	0.95	2.04	1.57	1.09	2.25	1.18	0.66	2.11	1.22	0.74	2.02
Age Category												
25-34	1.92	1.30	2.86	1.52	1.04	2.17	0.83	0.44	1.56	2.12	1.23	3.57
Ethnicity/Race												
White, non-Hispanic	0.63	0.43	0.92	0.88	0.54	1.43	0.77	0.42	1.38	0.94	0.54	1.63

or better general health were about 2.5 to 3.5 times more likely to report each successive level of mental health. In contrast, compared to those who reported a moderate amount of sleep (6 to 8 hours), participants in 4 of 4 states who reported a short amount of sleep (less than 6 hours) were about 2 to 3 times less likely to report each successive level of mental health. Lastly, compared to those who were 18-24 years old, participants in 3 of 4 states who were 25-34 years old were about 1.5 to 2 times more likely to report each successive level of mental health.

Discussion

The purpose of this study was to assess the relationship between weight status and current mental health in young adult females in the general population. The results of adjusted analyses indicated that current mental health was not significantly related to weight status across states in this target population. This finding is noteworthy because it contradicts previous research that has found increased BMI to be associated with poorer mental health outcomes in adult women [4,7,10,12,13]. Discrepancies may be related to target populations and measures. While previous studies included females ages 16-55 in general populations, this study included only females ages 18-34. In addition, previous studies examined specific mental illnesses, including depression and anxiety [5,6,10,12]. While our study examined general current mental

health. Previous studies also compared normal weight status to obesity, while our study compared normal weight, overweight, and obese [5,12,14]. Thus, weight status per se in the general population of young female adults may not impact mental health without other negative facets of weight status, including health complications or negative self-views.

The results of this study also found that, across all states, young adult women with good or better general health were more likely to report each successive level of mental health and those that reported a short amount of sleep were less likely to report each successive level of mental health. In addition, in all four states, participants ages 25 to 34 were more likely to report each successive level of mental health than those ages 18-24. These findings for general health, sleep duration, and age are consistent with previous research [1,6,17].

Limitations. Strengths of this study include the use of BRFSS data, which has a standardized method of data collection across all states resulting in a large and cohesive database. In comparison to previous studies, this study had a wider variety of control variables, including alcohol and tobacco use. However, weaknesses of this study include a lack of access to information on eating habits of participants, as diet can relate to weight status [6,9,11] and mental health status [4,7,9,10]. In addition, we had no information regarding participants' the severity

and management of current health conditions, medication use, and extenuating life circumstances, such as social support and external stressors, all of which have been shown to be related to mental health and weight status in previous studies [7,10].

Conclusion

Because this was a population-based study, the findings may apply to young adult females ages 18-34 in primary care settings. For this target population, there may be a moderate prevalence of low or moderate mental health and a high prevalence of overweight or obese weight status. However, based on the results of this study, there is no significant relationship between them within this target population. Therefore, primary care practitioners should screen all patients in this target population for mental health and weight status but treat any issues separately. Providers should educate young adult females about ways to improve mental health and weight status and refer to psychiatry or other specialists as appropriate. In addition, there may be a low prevalence of both fair to poor general health and short sleep duration in young adult female patients; however, current mental health was moderately to highly-related to general health and sleep duration in this target population. Thus, primary care practitioners should screen for mental health, general health, and sleep duration if young adult females present with issues related to any of these, especially in those ages 18-24. Practitioners should educate patients on ways to improve general health by ensuring that patients are up to date with health maintenance screenings and compliant with medications and current treatment plans. Providers should also provide education on ways to improve sleep, coordinate treatment plans for comorbid conditions, and make referrals to specialists as needed.

Disclaimers

No author has any conflict of interest.

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