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Abstract

Using national representative data, this study sought to examine receipt of physical activity communication and counseling among adults with mood disorders in comparison to the general population in the United States. The sample consisted of adult primary-care visits in the National Hospital Ambulatory Medical Care and National Ambulatory Medical Care Surveys. Multivariable logistic regression was used to examine the relationship between mental health status and receipt of physical activity communication and counseling. Overall, less than 20% of visits included physical

activity communication and counseling. Controlling for covariates, visits for adults with a mood disorder diagnosis were associated with an increased odds of including physical activity communication and counseling, odds ratio = 1.25, 95% confidence interval = [1.08, 1.45]. Although adults with mood disorders were more likely to receive physical activity communication and counseling, most primary-care visits for adults in the United States did not include physical activity communication and counseling.

Keywords

mental health, physical activity communication and counseling, primary care, National Hospital Ambulatory Medical Care Survey, National Ambulatory Medical Care Survey

Mood disorders (defined as mental illnesses, in which the underlying problem primarily affects a person's persistent emotional state) such as major depressive disorders, dysthymia, and bipolar disorders are common mental health illnesses in the United States, with more than 21% of adults experiencing a mood disorder at some time in their life (National Institute of Mental Health, 2017a). Individuals with mental illnesses have a mortality rate that is more than two times higher than that of those without mental illnesses (Walker, McGee, & Druss, 2015). This increased mortality is likely due to the elevated risk of cardiovascular disease that is associated with severe mental illness (Correll et al., 2017). Given its cardiovascular benefits (Naci & Ioannidis, 2015), antidepressant properties (Cooney et al., 2013; Kvam, Kleppe, Nordhus, & Hovland, 2016), as well as its positive effects on functioning and quality of life (Melo, Daher Ede, Albuquerque, & de Bruin, 2016), engagement in physical activity may be a pivotal component of the management of mental health disorders.

Physical Activity Health Education and Mental Illness

In their recent guidelines on physical activity, the U.S. Department of Health and Human Services recommended that adults engage in at least 150 min of moderate-intensity aerobic activity per week and highlighted the relationship between this recommended amount of physical activity and reduced depressive symptoms and risk of depressed mood (U.S. Department of Health and Human Services, 2018). Yet, despite the benefits of physical activity, adults with mood disorders, such as depression, often lead a sedentary life and spend significantly less time engaged in physical activity than the general population (Vancampfort et al., 2017). To ensure adults with mood disorders experience the benefits of physical activity, increased efforts to promote physical activity in this population are needed.

Among individuals with mental illnesses, physical and psychological factors such as stress, depressive symptoms, and low energy often act as barriers to engaging in physical activity (Glover, Ferron, & Whitley, 2013). In addition, a lack of support can also be a key barrier (Firth et al., 2016). Health care providers can play a pivotal role in influencing patients' physical activity behaviors (AuYoung et al., 2016). Provision of support by health care providers and other physical activity professionals may help individuals with mental illnesses overcome psychological barriers and sustain motivation for continued engagement in physical activity (Firth et al., 2016). However, communication or counseling about physical activity occurs infrequently during health encounters in the United States (Smith et al., 2011).

Moreover, estimates indicate that *health counseling of any type* is provided in only about half of primary-care visits for individuals with mental illnesses (Iyer & Young, 2015). In their work using national data from 1993 to 1998, Daumit, Pratt, Crum, Powe, and Ford (2002) showed that individuals with serious mental illnesses (defined as a diagnosis of schizophrenia, any psychotic disorder, or bipolar disorder) were no worse off in terms of receiving physical activity counseling than those without mental illness. Specifically, they found that while the likelihood of receiving physical activity counseling among those with serious mental illness was 17% and 13% in those without mental illness, this difference was not statistically significant as indicated by the *p*-value of .3.

Although these previous works provide insight into the health counseling and communication experiences of individuals with various mental illnesses, many important questions remain unanswered. For example, more than 16 million adults experience major depression and nearly 6 million are diagnosed with bipolar disorder annually (National Institute of Mental Health, 2017b, 2019), yet how physical activity communication or counseling occurs for individuals with these mood disorders remains unclear, as existing literature has examined serious mental illnesses broadly (Daumit et al., 2002) and not mood disorders exclusively. Moreover, since the early 2000s, there has been a national focus on promoting physical activity (American College of Sports Medicine, 2019). Efforts to attain the Healthy People 2020 objective to increase the proportion of physical activity counseling taking place in physician office visits for all adults require an increase in physical activity promotion education and training in medical education (Office of Disease Prevention and Health Promotion, 2014). As a result, U.S. medical schools are increasingly including training on physical activity counseling in their curriculum (Stoutenberg et al., 2015). Given these recent efforts, there is a need to understand how health care providers currently deliver physical activity communication and counseling to individuals with mental illnesses in the United States.

Using national data from 2005 to 2015, this study sought to examine receipt of physical activity communication and counseling among adults with mood disorders in comparison to the general population. As a secondary aim, interactions between mental health status and number of chronic physical conditions as well as body mass index (BMI) while controlling for sociodemographic and other health characteristics were tested to gain greater insight into the relationship between having a mood disorder diagnosis and receiving physical activity communication and counseling. Better understanding how often physical activity communication and counseling is delivered to individuals with mood disorders will inform clinical practice and interventions aimed at improving physical activity engagement and health outcomes among adults with mood disorders in the United States.

Methods

Study Sample

This cross-sectional study was conducted using data from the 2005 to 2011 National Hospital Ambulatory Medical Care Survey (NHAMCS) and 2005 to 2015 National Ambulatory Medical Care Survey (NAMCS). Conducted annually by the National Center for Health Statistics (2009), these national probability sample surveys collect patient encounter (i.e., visit level) data about ambulatory care services in outpatient departments (OPDs) of noninstitutional, general, and short-stay hospitals

(NHAMCS-OPD), and non-federal medical offices (NAMCS) in the United States. This strategy of collecting data from the provider, instead of the patient, allows for the collection of more detailed information about the health care encounter. For this study, complete data of the 2005 to 2011 NHAMCS and the 2005 to 2015 NAMCS were pooled through a public use file prior to the analyses. Samples of the patient record form used to collect the data provided in the NHAMCS and NAMCS public use files are available at https://www.cdc.gov/nchs/ahcd/ahcd_survey_instruments.htm.

As described in the survey documentation provided by the National Center for Health Statistics (2015), the sampling frame for the NAMCS comprised all physicians who appear in master files maintained by the American Medical Association (AMA) and the American Osteopathic Association (AOA). Physicians included in the master files were office based, clinically active, and nonfederally employed. Physicians practicing in the specialties of pathology, radiology, and anesthesiology were excluded. NAMCS uses a multistage probability design that begins with probability sampling units (PSUs), then physicians within PSUs, and finally patient visits within practices. PSUs can be a county, a group of counties, county equivalents, towns, townships, or a metropolitan statistical area. To select patient visits, each sampled physician was randomly assigned a 1-week reporting period, during which information from a random sample of visits was recorded using the survey-specific patient record form.

The NHAMCS uses a four-stage probability design beginning with PSUs, then hospitals within PSUs, followed by clinics/emergency service areas within outpatient/emergency departments, and finally, patient visits within the clinics/emergency service areas. Included patient visits were systematically selected from those occurring during a randomly assigned 4-week reporting period. Information about these visits was then collected using a survey-specific patient record form the National Center for Health Statistics (2011). Additional information about the methodology and description of these surveys are available at https://www.cdc.gov/nchs/ahcd/datasets_documentation_related.htm.

This study used complete visit data for adults age ≥18 years seen in a primary-care setting. Primary-care visits were classified as those occurring with a provider specializing in family practice/medicine, geriatric medicine, pediatrics, or obstetrics and gynecology. For the analyses, to aid in comparing individuals with a mood disorder to the general population, the sample was categorized into four mutually exclusive mental health status groups: (a) individuals with a reported diagnosis of schizophrenia (ICD-9 295 or 297-299), (b) individuals with a reported diagnosis of any mood disorder (ICD-9 296 or 311), (c) individuals with any other mental illness diagnosis (ICD-9 290-294, 300-310, and 312-316), and (d) individuals without a mental illness diagnosis. As the data used in this study are publicly available and do not contain identifying variables, this study was determined exempt from review by the authors' institution's Institutional Review Board.

Measures

Dependent variable: Physical activity communication and counseling

Receipt of physical activity communication and counseling was defined as visits where the patient record form indicated that health education on exercise or weight reduction was ordered or provided. As described in the NAMCS and NHAMCS public use micro-data file documentation, exercise health

education included any discussion related to the patient's conditioning or fitness including referrals to other health or fitness professionals (excluding referrals to physical therapy). Weight reduction health education included information given to assist with weight reduction including referrals to other health professionals for the purpose of weight reduction (National Center for Health Statistics, 2005, 2011, 2015). A dichotomous variable was used in the statistical analyses, comparing adults who received physical activity communication (exercise health education or weight reduction health education) to those who did not.

Covariates

Following the Andersen behavioral model (Andersen, 1995), predisposing, enabling, and need factors were considered as covariates. Predisposing factors included patient age in years (18-24, 25-44, 45-64, and 65+), sex, race and ethnicity (Hispanic, white [non-Hispanic], black [non-Hispanic], and other [non-Hispanic]), region of the United States (Northeast, Midwest, South, and West), and urbanicity (Metropolitan Statistical Area, categorized as metropolitan vs. non-metropolitan). Health insurance coverage, an enabling factor, was grouped in the following mutually exclusive categories: no health insurance, any publicly funded health insurance (Medicaid and/or Medicare), and private health insurance only. Setting type (NAMCS or NHAMCS-OPD) was also included as an enabling factor.

Need factors included the total number of chronic physical conditions, BMI, and major reason for the visit. BMI was categorized as underweight (<18.5), normal weight (18.5-24.99), overweight (25-29.99), and obese (≥30). The total number of chronic physical conditions was derived from a count of how many prespecified conditions (i.e., listed on the patient record form) a patient had. These conditions included conditions such as arthritis, asthma, cancer, cerebrovascular disease, congestive heart failure, chronic renal failure, chronic obstructive pulmonary disease, diabetes, hyperlipidemia, hypertension, ischemic heart disease, obesity, and osteoporosis. Potential reasons for the visit in the NAMCS and NHAMCS-OPD included a new problem (i.e., onset within 3 months of the visit), routine care for a chronic problem (i.e., a condition with an onset of 3 months or more before the visit), exacerbation or flare-up of a chronic condition, pre or postsurgery visit, and preventive care. For the analyses, reason for visit was categorized into four groups: new problem, chronic (i.e., routine or flare-up), pre/postsurgery, and preventive care. The Andersen Behavioral model has been operationalized in a similar fashion in other studies (Keller, Gangnon, & Witt, 2014; Keller, Hooker, & Jacobs, 2017; Litzelman, Keller, Tevaarwerk, & DuBenske, 2018).

Statistical Analysis

Descriptive statistics were calculated on all predisposing, enabling, and need factors. Adults with a primary-care visit were compared on all covariates using chi-square and *t*-tests. The receipt of physical activity communication and counseling was regressed on mental health status using bivariate logistic regression. Predisposing, enabling, and need factors were then sequentially added to this model in a multivariable logistic regression. Moderation was assessed by including interaction terms for (a) mental health status * total chronic physical conditions and (b) mental health status * BMI in separate regression models. The Wald test was used to test the null hypothesis that the effect of the interaction is equal to zero. Due to the increased sensitivity to Type I error associated with the Wald test, an alpha

level of 0.01 was considered significant for the interaction models. Predicted probabilities were calculated to compare estimates of the change in the likelihood of receiving physical activity communication and counseling for a change in BMI at three levels of number of chronic conditions (0, 1, 2+), holding all other covariates constant. Categorical variables were held constant at the reference group except for gender which was held constant at female. Age, a continuous variable, was centered to the mean value. All analyses were conducted in 2018 using Stata 14 (StataCorp, 2015) and applying survey-weighting procedures to account for the complex sampling frame of NAMCS and NHAMCS.

Sensitivity analysis

To assess whether our findings are robust to our operationalization of physical activity communication and counseling, we conducted sensitivity analyses testing receipt of exercise health education alone as the dependent variable and receipt of weight reduction health education alone as the dependent variable.

Results

The sociodemographic and health characteristics of the study sample by mental health status are presented in Tables 1 and 2. Compared to visits for adults without a mental health illness diagnosis, visits for those with a mood disorder diagnosis were more likely to be for females, White non-Hispanics, or obese adults. Visits for adults with a mood disorder diagnosis were less likely to be for those residing in a metropolitan area and those presenting for a new problem. The number of chronic physical conditions significantly varied by mental health status (mean conditions: 1.6 for adults without a mental health diagnosis vs. 1.3 for adults with a mood disorder, $p < .001$). Overall, less than 20% of visits for all adults included physical activity communication and counseling.

Table 1. Survey-Weighted Characteristics of Adults With Primary-Care Visits (Categorical Data), NAMCS, and NHAMCS-OPD (2005-2015).

	Mental Health Diagnosis				
	None	Schizophrenia	Other	Mood Disorder	
Weighted *N* (%)	91.3	0.2	5.9	2.6	
Unweighted *N*	105,130	253	6,181	2,924	
Variables	%	%	%	%	*p* value
Predisposing					
Sex					**<.01**
Male	37.4	59.4	40.6	29.0	
Female	62.6	40.6	59.4	71.0	
Race/ethnicity					**<.01**
White, non-Hispanic	69.3	50.5	79.0	79.9	
Black, non-Hispanic	13.0	38.2	9.2	9.0	
Hispanic	12.3	10.5[a]	8.7	9.2	
Other, non-Hispanic	5.4	0.7[a]	3.1	1.9	
Region					.18
Northeast	18.4	19.5	17.2	18.1	
Midwest	23.5	19.2	24.1	28.8	
South	37.7	38.3	36.1	33.0	
West	20.4	23.0	22.7	20.2	
MSA					**.01**
Metropolitan	87.6	86.8	85.6	83.0	
Non-metropolitan	12.4	13.2[a]	14.4	17.0	
Enabling Health insurance Private	55.9	20.2[a]	56.1	57.1	**<.01**
Public	36.7	75.2	33.7	35.1	
None	7.4	4.6[a]	10.2	7.8	
Setting					**<.01**
NAMCS	93.0	86.6	94.7	93.9	
NHAMCS-OPD	7.0	13.4	5.3	6.1	
Need					
BMI Underweight	1.8	1.5[a]	2.3	2.0	**<.01**

Normal	27.4	23.9	31.8	23.3	
Overweight	32.4	35.8	32.2	32.2	
Obese	38.5	38.8	33.7	42.6	
Reason for visit					**<.01**
New problem	36.7	24.0	28.0	26.0	
Chronic problem, routine, or flare-up	36.2	55.1	51.7	54.6	
Pre/post surgery	5.5	5.3[a]	2.5	2.9	
Preventive care	21.6	15.6	17.8	16.5	
Physical activity communication or counseling					**<.01**
No	83.6	86.1	86.0	80.3	
Yes	16.4	13.9	14.0	19.8	

Note. Boldface indicates statistical significance ($p < .05$). Percent is weighted. NAMCS = National Ambulatory Medical Care Survey; NHAMCS-OPD = National Hospital Ambulatory Medical Care Survey—Outpatient Departments; MSA = metropolitan statistical area; BMI = body mass index.
[a]*N* < 30.

Table 2. Survey-Weighted Characteristics of Adults With Primary-Care Visits (Continuous Data), NAMCS, and NHAMCS-OPD (2005-2015).

	Mental Health Diagnosis				
	None	Schizophrenia	Other	Mood Disorder	
Weighted *N* (%)	91.3	0.2	5.9	2.6	
Unweighted *N*	105,130	253	6,181	2,924	
Variables	*M* (*SE*)	*M* (*SE*)	*M* (*SE*)	*M* (*SE*)	*p* value
Predisposing					
Age	53.5 (16.1)	53.1 (12.4)	47.5 (13.8)	50.6 (14.5)	**<.01**
Need					
Chronic conditions	1.6 (1.4)	2.0 (1.1)	1.5 (1.2)	1.3 (1.2)	**<.01**
BMI	29.3 (6.3)	29.5 (5.0)	28.5 (5.5)	30.0 (6.4)	

Note. Boldface indicates statistical significance (p < .05). NAMCS = National Ambulatory Medical Care Survey; NHAMCS-OPD = National Hospital Ambulatory Medical Care Survey—Outpatient Departments; BMI= body mass index.

In the unadjusted logistic regression model of the association between mental health status and receipt of physical activity communication and counseling (Table 3), compared to visits for the general population (i.e., those without a mental health illness diagnosis) visits for individuals with a mood disorder diagnosis were associated with an increased odds of including physical activity communication and counseling (odds ratio [OR] = 1.26, 95% confidence interval [CI] = [1.08, 1.46]). When predisposing factors were added to the logistic regression model, individuals with a mood disorder diagnosis continued to have an increased odds of receiving physical activity health communication and counseling compared to the general population (OR = 1.29, 95% CI = [1.11, 1.50]). The association between having a mood disorder diagnosis and physical activity communication and counseling remained consistent when predisposing and enabling factors were included in the model (OR = 1.30, 95% CI = [1.12, 1.51]) and as well as when predisposing, enabling, and need factors were included (OR = 1.25, 95% CI = [1.08, 1.45]).

Table 3. Association Between Mental Health Diagnosis Status and Physical Activity Communication and Counseling.

	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Mental Health Diagnosis								
None	Ref.		Ref.		Ref.		Ref.	
Schizophrenia	0.82	[0.40, 1.69]	0.76	[0.37, 1.56]	0.82	[0.40, 1.68]	0.76	[0.38, 1.53]
Other	0.83*	[0.72, 0.96]	0.85*	[0.73, 0.98]	0.85*	[0.74, 0.99]	0.81*	[0.68, 0.95]
Mood disorder	1.26*	[1.08, 1.46]	1.29*	[1.11, 1.50]	1.30*	[1.12, 1.51]	1.25*	[1.08, 1.45]
Predisposing								
Age			1.00*	[1.00, 1.00]	1.00*	[1.00, 1.01]	0.99*	[0.99, 0.99]
Gender								
Male			Ref.		Ref.		Ref.	
Female			0.90	[0.84, 0.97]	0.91	[0.84, 0.98]	0.98	[0.91, 1.06]
Race/ethnicity								
White, non-Hispanic			Ref.		Ref.		Ref.	
Black, non-Hispanic			1.28*	[1.10, 1.49]	1.32*	[1.13, 1.54]	1.15	[0.99, 1.34]
Hispanic			1.27*	[1.06, 1.52]	1.29*	[1.08, 1.55]	1.27*	[1.05, 1.54]
Other, non-Hispanic			1.03	[0.85, 1.26]	1.04	[0.85, 1.27]	1.23	[1.00, 1.52]
Region								
Northeast			Ref.		Ref.		Ref.	
Midwest			0.92	[0.69, 1.23]	0.92	[0.68, 1.24]	0.89	[0.66, 1.21]
South			0.88	[0.65, 1.18]	0.87	[0.65, 1.17]	0.89	[0.66, 1.20]
West			0.86	[0.64, 1.15]	0.85	[0.64, 1.14]	0.88	[0.65, 1.19]
MSA								
Metropolitan			Ref.		Ref.		Ref.	
Non-metropolitan			0.96	[0.67, 1.38]	0.99	[0.69, 1.41]	0.96	[0.68, 1.36]
Enabling								
Health insurance								
Private					Ref.		Ref.	

Public					0.82*	[0.74, 0.91]	0.75*	[0.68, 0.82
None					0.98	[0.79, 1.21]	0.99	[0.80, 1.22]
Setting								
NAMCS					Ref.		Ref.	
NHAMCS-OPD					0.91	[0.68, 1.21]	0.89	[0.68, 1.16]
Need								
Reason for visit								
New problem							Ref.	
Chronic problem, routine, or flare-up							1.87*	[1.66, 2.10]
Pre/post surgery							1.22	[0.94, 1.59]
Preventive care							2.44*	[2.10, 2.84]
Chronic conditions							1.29*	[1.24, 1.33]
BMI (categorical)								
Underweight							Ref.	
Normal							0.91	[0.66, 1.27]
Overweight							1.29	[0.94, 1.77]
Obese							2.08*	[1.53, 2.85]

Note. Asterisk at data indicates significant at $p < .05$. OR = odds ratio; CI = confidence interval; MSA= metropolitan statistical area; NAMCS = National Ambulatory Medical Care Survey; NHAMCS-OPD = National Hospital Ambulatory Medical Care Survey—Outpatient Departments; BMI = body mass index.

Among predisposing, enabling, and need factors, there were several correlates of receiving physical activity communication and counseling (Table 3, Column 4). Among predisposing factors, encounters for Hispanic adults were more likely to include physical activity communication and counseling (OR = 1.27, 95% CI = [1.05, 1.54]) compared to visits for White non-Hispanic adults. A similar trend was seen for visits for Black non-Hispanic adults; however, this was not statistically significant (OR = 1.15, 95% CI = [0.99, 1.34]). Among enabling factors, visits for individuals with public insurance were less likely to include physical activity communication and counseling than those for privately insured adults (OR = 0.75, 95% CI = [0.68, 0.82]). With regards to need factors, a higher number of chronic conditions (OR = 1.29, 95% CI = [1.24, 1.33]) and being obese (OR = 2.08, 95% CI = [1.53, 2.85]) were associated with an increased likelihood of physical activity communication and counseling being included in the visit. Compared to visits for a new problem, visits for a chronic problem or preventive care were more likely to involve physical activity communication and counseling (OR = 1.87, 95% CI = [1.66, 2.10] and OR = 2.44, 95% CI = [2.10, 2.84], respectively).

With regards to the interactions, BMI ($p_{interaction}$ = .50) and the number of chronic physical conditions ($p_{interaction}$ = .23) did not moderate the relationships between mental health status and physical activity communication and counseling. Figure 1 shows the predicted probabilities of receiving physical activity communication and counseling for women living in metropolitan areas controlling for covariates (with age centered at the mean). For each mental health status category, the predicted probability increased as BMI increased, and within each BMI category, the predicted probability increased as the number of chronic physical conditions increased. Moreover, across the mental health status categories, the patterns for the predicted probability of physical activity communication and counseling by BMI and chronic physical conditions remained fairly consistent. Those who had a mood disorder diagnosis along with multiple chronic physical conditions and were obese had the highest probability of receiving physical activity communication and counseling (26%). The predicted probability for those who had a mood disorder diagnosis without a comorbid chronic physical condition and were normal weight was 6%.

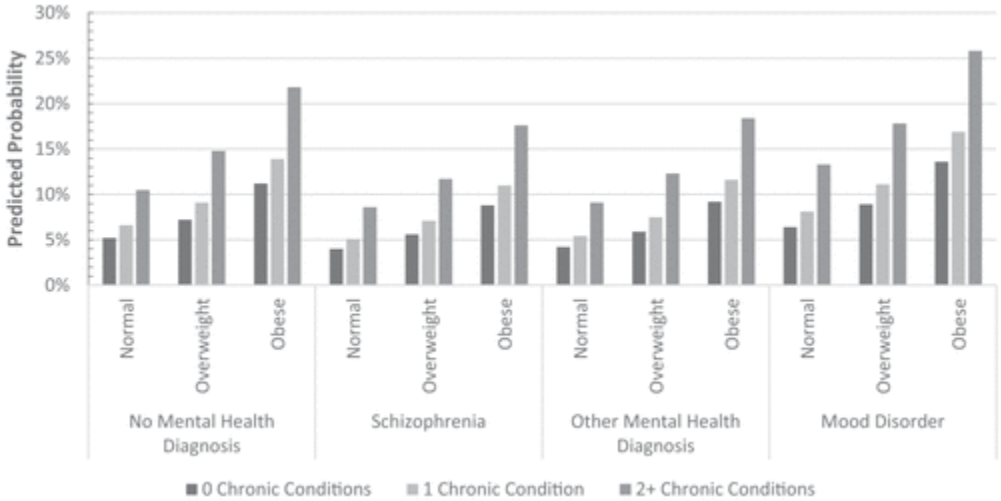

Figure 1. Predicted probability of physical activity communication or counseling.

Sensitivity Analysis

In sensitivity analyses, changing the definition of the dependent variable from physical activity communication and counseling (combining exercise health education and weight reduction health education) to receipt of exercise health education alone or weight reduction health education alone did not change the results. After controlling for predisposing, enabling, and need factors, visits for individuals with a mood disorder diagnosis

were associated with an increased odds of including exercise health education and weight reduction health education (OR = 1.22, 95% CI = [1.03, 1.45] and OR = 1.33, 95% CI = [1.06, 1.67], respectively).

Discussion

This national study examined if the likelihood of receiving physical activity communication and counseling among adults with mood disorders was similar to that of the general population. Consistent with previous research (Ahmed, Delgado, & Saxena, 2017), this study found that in the United States, physical activity communication and counseling was not addressed in most adult primary-care visits. Moreover, this study found that visits for adults with mood disorders were more likely to include physical activity communication and counseling than visits for adults without a mental health diagnosis. Although this study provides evidence suggesting that physical activity communication and counseling is being used as a health promotion strategy for individuals with mood disorders, previous studies have not shown an association between a serious mental illness diagnosis and receipt of health promotion education (Daumit et al., 2002; Iyer & Young, 2015). A potential explanation for these dissimilar results relates to the differences in the composition of the groups being assessed.

This study examined the experiences of individuals with a mood disorder diagnosis. In their works, Daumit et al. (2002) and Iyer and Young (2015), focused on individuals with serious mental illness; however, each used slightly different criteria to define having a serious mental illness. Daumit et al. defined a serious mental illness diagnosis as a diagnosis of schizophrenia, any psychotic disorder, or bipolar disorder. Iyer and Young expanded on this definition to include individuals diagnosed with major depressive disorder but excluded those with a single major depressive episode or recurrent major depression. In addition, both studies compared individuals with a serious mental illness to those who did not meet their specified definition of having a serious mental illness diagnosis as opposed to those without any mental illness diagnoses. Including individuals with other mental illness diagnoses in the comparison group increases the heterogeneity of the comparison group which may have obscured differences in the likelihood of receiving health promotion education. To address this limitation in the existing literature, this study categorized mental health status into four mutually exclusive groups thereby allowing a comparison group comprised of individuals without any mental health diagnoses. Given that this study found that having a mental illness diagnosis other than schizophrenia or a mood disorder was associated with a decreased odds of receiving physical activity communication and counseling. Future research is needed to better elucidate the barriers to physical activity communication and counseling in primary-care visits for these individuals.

Physical activity has been recognized as an integral component of effective chronic disease management. Despite recommendations that health care providers should include physical activity assessment and prescription as part of routine care (Thornton et al., 2016), this study found that less than 20% of primary-care visit adults, regardless of their mental illness diagnosis status, received physical activity communication or counseling. This estimate is consistent with the study by Bleich, Simon, and Cooper (2012), where in a national sample, only 23% of visits for obese patients involved exercise counseling. However, in their study using data from the 2010 National Health Interview Survey (NHIS), Ahmed et al. (2017) reported that nearly 34% of adults received counseling on exercise from a health care provider. The difference between the estimates from the Ahmed et al. study and this study is likely due to the way information about physical activity health communication and counseling was collected. NAMCS and NHAMCS information is from a single visit and is obtained through the abstraction of the medical record (National Center for Health Statistics, 2009). Alternatively, the NHIS employed in the Ahmed et al. study used a cross-sectional household survey to collect

self-reported health information for the previous 12 months (National Center for Health Statistics, 2019). It is possible that using data from a single visit, as done in the NAMCS and NHAMCS, underestimates the prevalence of physical activity communication and counseling, as conversations about physical activity may not be occurring at every single visit but rather the topic is revisited periodically over time. This is particularly likely given that the likelihood of receiving physical activity counseling increases with the frequency of visits to a health care provider (Simkin-Silverman et al., 2005). Further longitudinal research is needed to understand the relationship between continuity of health care and physical activity communication and counseling for individuals with mood disorders.

Regular physical activity can improve the health and well-being of adults, regardless of the presence of a physical or mental health illness (U.S. Department of health and Human Services, 2018). Yet, this study found that across all mental health status groups, the predicted probability of receiving physical activity communication and counseling was positively associated with BMI and the number of chronic physical conditions. This may reflect the U.S. Preventive Task Force recommendation that in the presence of cardiovascular risk factors, primary-care providers offer or refer for intensive behavioral counseling (e.g., physical activity and nutrition). In individuals who are normal weight and have no known cardiovascular risk factors, the decision to provide such counseling is left to the discretion of the provider (U.S. Preventive Services Task Force, 2017). The findings of this study are similar to findings demonstrated in the secondary analysis of the National Health and Nutrition Examination Survey by Loprinzi and Beets' (2014) showing that normal weight individuals and those without comorbidities were less likely to report being told by a health care provider to increase physical activity. While it is encouraging that physical activity communication and counseling is more likely to be provided for individuals with a higher BMI and those with chronic physical conditions, the overall low rate of physical activity communication and counseling in adult primary-care visits suggests an opportunity for improving physical activity health promotion as a prevention strategy for all adults.

Due to the potential to reach a broad sector of the U.S. population (Centers for Disease Control and Prevention, 2017), primary-care visits are a promising setting for offering physical activity counseling and referrals. However, providers often experience challenges providing these services due to competing demands on their time and lack of formal education on physical activity promotion (Huijg et al., 2015). Among providers working with individuals with mental illness, a key barrier to physical activity promotion is the perception that physical activity would not be helpful or would exacerbate the mental illness symptoms (Glowacki, Weatherson, & Faulkner, 2018). Although lack of resources has been identified as a potential barrier to physical activity counseling by providers (Glowacki et al., 2018), a recent review of research within the allied health and nursing professions did not find an association between remuneration and physical activity promotion (Crisford et al., 2018). While evidence indicates that physicians and nurses are both effective in providing lifestyle change counseling in primary-care settings (Noordman, van der Weijden, & van Dulmen, 2012), as suggested by others, patient outcomes may be improved by realigning the roles of members of the health care team such that nurses and allied health professionals play a central role in providing counseling and support for behavior change (Katon, Von Korff, Lin, & Simon, 2001). Interventions for primary-care physicians, nurses, physician assistants, and other allied health professionals that combine education on the mental health benefits of physical activity and training on physical activity promotion with evidence-based behavioral modification strategies such as motivational interviewing (Lundahl et al., 2013) are necessary for improving the integration of physical activity communication and counseling into health care encounters.

In this study, racial and ethnic minority status was positively associated with the receipt of physical activity communication and counseling even after controlling for need factors. Consistent with previous research (Ahmed et al., 2017), visits for Hispanic adults were more likely to include physical activity communication and counseling compared to those for white non-Hispanics. No difference was found between visits for black non-Hispanics and Whites. Given that white non-Hispanic adults are more likely to meet the federal guidelines for leisure-time physical activity than Hispanic and black non-Hispanic adults (Blackwell, Lucas, & Clarke, 2014), the findings from this study suggest that health care providers are appropriately counseling Hispanic adults about engagement in physical activity. Although the likelihood of receiving physical activity communication and counseling did not differ between black and White non-Hispanic adults, their differential levels of leisure-time physical activity participation indicates that black non-Hispanic adults may have a greater need for physical activity counseling. Addressing the process of physical activity communication and counseling in primary-care visits for black non-Hispanic adults should be an important objective for researchers, health care systems, and policymakers.

It is noteworthy that this study found the receipt of physical activity health education to vary by insurance type. These findings add to the body of literature indicating that having health insurance coverage does not guarantee the receipt of high-quality health care (McMorrow, Long, & Fogel, 2015). There are several points of vulnerability within patient-health system interactions, where the gap between access to health insurance and high-quality care are thought to widen (Eisenberg & Power, 2000). Although increasing access to health insurance and preventive services through policies such as the Affordable Care Act (U.S. Government Publishing Office, 2010) is a necessary step for improving the health of the nation, future research is needed to further understand the points of vulnerability and other barriers to receiving physical activity communication and counseling in primary-care visits.

This study should be interpreted in light of several limitations. First, the available data did not include information about patients' current physical activity level, so the appropriateness of physical activity health communication and counseling could not be determined. Therefore, it is possible that providers were not providing physical activity communication and counseling because the patient was already meeting the guidelines for physical activity. However, even when patients are regularly engaged in physical activity, conversations with health care providers may be beneficial for encouraging persistence. Second, information about physical activity communication and counseling was obtained from the medical chart and recorded onto the patient record forms. During this process, information may have been erroneously recorded leading to misclassification of the occurrence of physical activity communication and counseling at some visits. In addition, abstracting data from the medical record does not allow for assessment of patient recall of receipt of physical activity health communication provision or the adequacy of the physical activity communication. Third, the definition of physical activity communication and counseling includes information given to assist with weight reduction which may have focused on nutrition and diet and may not have included discussion of physical activity or exercise. However, sensitivity analyses showed no significant difference in the odds of receiving physical activity communication and counseling, exercise health education, or weight reduction health education. This provides support for the approach of combining exercise health education and weight reduction health education. Fourth, the study sample comprised adults aged ≥18 years, who were seen in a primary-care visit, and therefore, these results may not be generalizable to patients who do not receive care in this setting. In addition, this study uses cross-sectional data, as such, the observed relationships cannot be interpreted as causal. Moreover, using data from a single visit may underestimate the prevalence of physical activity health communication and counseling as conversations about physical activity may not be occurring at

every single visit but rather the topic is revisited periodically over time. Nevertheless, this study makes use of large national data sets with recent data and provides compelling evidence of differences in receipt of physical activity communication and counseling for adults with mental illnesses.

In conclusion, this study found that although adults with mood disorders were more likely to receive physical activity communication and counseling than adults without a mental illness diagnosis, the majority of primary-care visits for adults in the United States do not include physical activity communication and counseling. This highlights the need for interventions to improve the integration of physical activity communication and counseling into medical encounters for all adults. Innovative approaches to address barriers to physical activity health education, including, augmenting providers' motivational interviewing skills and delegating provision of physical activity communication and counseling to other members of the health care team, such as nurses as part of the discharge process, may improve physical activity engagement for adults with and without a mental illness diagnosis. Future research should develop and systematically test strategies for effectively implementing physical activity communication and counseling into primary-care visits.

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