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Under Treatment of Depression Among Midlife and Older Adults in the United States

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Background: Although depression is common psychiatric disorder that occurs among 20% of adults in the United States, depression screening occurs in less than 3% of physician visits. Moreover, most patients with depressive symptoms underreport their symptoms to their primary care provider. Thus, more screening is warranted to identify individuals with depressive symptoms in need of further evaluation.
Objectives: To identify the socio-demographic and clinical characteristics that predicted the severity of depressive symptomatology among mid-life and older adults who participated in community screenings outside a primary care setting.
Patients and Methods: This is a secondary data analysis of 1,044 respondents aged 35 - 86 years who returned for Visit 2 of the Midlife Development in the United States (MIDUS 2) Survey during 2004 - 2006. Health behaviors and medical history, including depression, were ascertained with telephone interviews and self-administered mail questionnaires. Respondents were screened for depressive symptoms during the previous week using the instrument, The Center for Epidemiologic Studies Depression (CES-D) scale, with a range of 0-60. A CES-D score of 16 or greater was indicative of depressive symptomatology. Non-prescribed and prescribed medications, including antidepressants, were identified using the Multum Lexicon therapeutic classification system. Data were analyzed using bivariate analysis (t-tests and chi-square tests Pearson correlation) and multivariate linear regression to identify predictors of depressive symptomatology.
Results: There were 138 (13.2%) of the 1,044 participants with a CES-D score of 16 or greater and 31.9% of these participants were currently using antidepressant therapy. Significant predictors of the severity of depressive symptomatology in both men and women included history of depression, marital status, and self-rated physical health. Race did not predict depressive symptoms in either gender. Both age and use of prescribed medication predicted the severity of depressive symptomatology in women, but not in men.
Conclusions: Under treatment of depressive symptoms is prevalent among adults in the United States. Knowledge of patient-specific characteristics can be useful in identifying individuals who may benefit from early screening and proactive management of depression.

Keywords: Middle Aged; Aged; Mass Screening; Symptom Assessment; Antidepressant; Pharmacists

1. Background

Depression is a major cause of disability in the United States (1). Almost one-third of all mental health related ambulatory care visits by adults are depression-related (2). One in five adults in the United States will experience depression in their lifetime (3), and up to one-half will experience recurrent episodes of depression in a given year (4). Although diagnosis and treatment for depression has increased during the past two decades (5), data from the National Surveys on Drug Use and Health show that over 30% of adults treated for depression, and about 25% of untreated adults report that their need for mental health treatment or counseling is largely unmet (6).

Despite recommendations from the US Preventive Service Task Force (USPSTF) to screen adults for depression in the primary care setting (7), national data shows that screening occurs in less than 3% of community-based physician visits (8). Moreover, it is known that patients tend to underreport their depressive symptoms to their primary care physician (9). Although most patients with depression are treated by their primary care provider rather than a mental health specialist (10), less than half of all cases of depression are diagnosed in the primary care setting (11).

Self-awareness is paramount to mental health care-seeking behavior. When individuals become aware of their own poor mental health status, they are more likely to seek appropriate mental health services (12). Given that most patients do not discuss their depressive symptoms at their physician visits, screening for depression is the critical preliminary step for identifying that individuals who are most likely to meet the diagnostic criteria for clinical depression (13).

2. Objectives

The purpose of this study was to identify the socio-demographic and clinical characteristics that predicted the severity of depressive symptomatology among mid-life and older adults who participated in community screenings outside a primary care setting.

3. Patients and Methods

Data Source: We used data from the second wave of the Midlife Development in the United States (MIDUS 2). At the inception of the MIDUS study in 1995 - 1996, there were 7,108 respondents who were 25 to 74 years of age. The purpose of the MIDUS study was to investigate the influence of behavioral, social and psychological factors on physical and mental health in order to understand age-related differences in health. Details of the MIDUS study have been previously reported (14, 15). A second wave of the MIDUS study (MIDUS 2) was conducted during 2004 - 2006.

Study population: This study focused on MIDUS 2 respondents who participated in the Biomarker Project (n = 1,054). Ten respondents were excluded from our analyses due to discrepant CES-D scores (i.e. scores that were either negative or non-integers) resulting in a total sample of 1,044 participants. The Biomarker Project assessed biomarkers in order to integrate behavioral and psychosocial characteristics with biology (16). Participants completed phone interviews and self-administered questionnaires regarding their health behaviors (including sleep patterns and substance use) and medical histories (including depression, cardiovascular disease, diabetes, and lung disease).

3.1. Socio-Demographic and Clinical Predictors

Through telephone interviews and self-administered questionnaires, respondents were asked about their age, highest educational attainment (less than high school, high school, or post-high school), marital status (married, separated, widowed, or other), and their current health coverage status (yes, or no). Participants were asked about their health behaviors including current cigarette and alcohol consumption. Regarding their alcohol consumption, participants were asked if they had engaged in any binge drinking behavior during the past month (i.e. at least one event during which a respondent drank five or more drinks in the same occasion).

Clinical predictors: Respondents were asked to rate their physical health as one of five categories (excellent, very good, good, fair, or poor). They were screened for depressive symptoms in the previous week using the Center for Epidemiologic Studies Depression (CES-D). The CES-D scale has been validated for use in numerous populations and settings (17-19). The CES-D scale is a 20-item scale with a range of 0-60. Each item rates frequency of depressive symptoms during the previous week using the following scale: 0 = rarely (less than 1 day), 1 = some (1 - 2 days), 2 = occasionally (3 - 4 days), and 3 = most (5 - 7 days) (20). CES-D $\geq$ 16 is indicative of depressive symptomatology (21). Prescription and non-prescription medications, including antidepressants, were also inventoried by trained clinical staff for MIDUS respondents using the Multum Lexicon therapeutic classification system (22). Respondents were also asked about family history of depression. Before this study was conducted, the University of Pittsburgh Institutional Review Board reviewed and approved the analysis of de-identified data from MIDUS 2.

Statistical analysis: All statistical analyses were conducted to determine key gender differences. Bivariate analyses were conducted using t-tests for continuous variables and chi-square tests for categorical variables. Multivariate linear regression was used to examine the relationships between the degree of depressive symptoms (dependent variable) and socio-demographic characteristics and clinical factors (independent variables). The distribution of total CES-D scores was highly skewed, and a logarithmic transformation was used to reduce the skewness of these scores. These transformed CES-D scores provided a better model fit in linear regression analyses (23). Variables that yielded a P value < 0.20 in the univariate analysis were entered into the full regression model. Backward elimination was used to remove individual variables from the model sequentially beginning with the variables with the largest p-value. The final model was selected after regression diagnostics were performed (24). Statistical significance was determined at an alpha level of 0.05 using STATA version 13.1 (25).

4. Results

Table 1 depicts the socio-demographic and clinical characteristics of study participants. The participants were predominantly white (93.1%) and women (54.5%). The overall prevalence of depressive symptomatology (CES-D $\geq$ 16) was 13.2%. There were few differences in socio-demographic and clinical characteristics between white men and nonwhite men except for age, and perceived physical health. White men were generally older than nonwhite men (59.0 vs. 54.0; P = 0.023), but nonwhite men were also more likely to report poor physical health than white men (22.6% vs. 8.4%; P = 0.008). There were more racial differences among women than among men. White women were better educated than their nonwhite women (69.6% vs. 51.2%; P = 0.015). Nonwhite women were more likely to report poorer physical health (24.4% vs. 8.0%; P < 0.001), more depressive symptoms (24.4% vs. 12.7%, P = 0.036) and depressive symptomatology than white women (9.1% vs. 7.9%, P = 0.023). However, black women were less likely to report taking antidepressants than white women (7.3% vs. 19.0%, P = 0.061).

Table 2 displays study findings on the independent predictors of the severity of depressive symptomatology. Race was not a significant predictor of the number of

depressive symptoms in either men or women. Married participants among both men and women were found to have less depressive symptoms than other participants (β = 0.74, P = 0.001 in men and β = 0.82, P = 0.010). Irrespective of gender, participants with a history of depression had more depressive symptoms than their peers (β = 2.05, P < 0.001 in men and β = 1.54, P < 0.001 in women). Likewise, participants who rated their physical health as fair/poor had more depressive symptoms than their peers (β = 1.65, P < 0.001 in men and β = 1.89, P < 0.001 in women). Other predictors of the degree of depressive symptoms were observed in women but not in men. Older women had fewer depressive symptoms than younger women (β = 0.99, P = 0.001) while women who reported taking two or more two prescribed medications had more depressive symptoms than their peers who took prescribed fewer medications (β = 1.21, P = 0.018).

Table 1. Socio-Demographic and Clinical Characteristics of Study Participants [a]

Characteristic [b]	All (n = 1,044)	Men (n = 475)		P Value	Women (n = 569)		P Value
		White (n = 445)	Nonwhite (n = 31)		White (n = 526)	Nonwhite (n = 41)	
Sociodemographic characteristics							
Age, yr	58.0 ± 11.6	59.0 ± 11.9	54.0± 9.9	0.023	57.7 ± 11.4	54.3 ± 10.7	0.064
Post high school education	757 (72.6)	342 (77.4)	26 (83.9)	0.400	366 (69.6)	21 (51.2)	0.015
Marital status	732 (70.1)	351 (79.2)	19 (61.3)	0.020	340 (64.6)	20(48.8)	0.042
Behavioral/clinical characteristics							
Perceived fair/poor physical health	96 (9.2)	37 (8.4)	7 (22.6)	0.008	42 (8.0)	10 (24.4)	<0.001
Current cigarette smoking	116 (11.1)	53 (12.0)	3 (9.7)	0.700	53 (10.1)	7 (17.1)	0.161
Past month binge drinking	119 (11.5)	81 (18.4)	8 (25.8)	0.306	27 (5.2)	3 (7.3)	0.563
Depression							
CES-D 16+	138 (13.2)	55 (12.4)	6 (19.4)	0.265	67 (12.7)	10 (24.4)	0.036
Total CES-D score	8.0 ± 7.7	7.6 ± 7.3	8.9 ± 7.8	0.350	8.0 ± 7.9	11.0 ± 9.1	0.023
Taking any antidepressant medications	158 (15.1)	51 (11.5)	3 (9.7)	0.756	100 (19.0)	3 (7.3)	0.061
Family history of depression	373 (37.6)	134 (31.8)	7 (25.0)	0.451	217 (43.4)	15 (36.6)	0.397
Untreated depressive symptoms [c]							
Have health insurance coverage	42 (33.9)	13 (25.5)	2 (40.0)	0.602	26 (42.6)	1 (14.3)	0.230
Total prescribed medications				0.633			0.986
0 - 1	449 (43.0)	209 (47.2)	16 (51.6)		206 (39.2)	16 (39.0)	
2 or more	595 (57.0)	234 (52.8)	15 (48.4)		320 (60.8)	25 (61.0)	

[a] Data are presented as No. (%) or Mean ± SD, Percentages are based on available data and may not total 100% due to rounding error.
[b] There were missing data for some of the characteristics displayed.
[c] Percentages are based on the total number of individuals with depressive symptoms (i.e. CES-D 16+) and who were not taking any antidepressants: Total number of participants with untreated depressive symptoms (n = 124), Total number by gender and sex: White men (n = 51) versus nonwhite men (n = 5); White women (n = 61) versus nonwhite women (n = 7).

Table 2. Predictors of CES-D Scores in Multivariate Linear Regression Models Stratified by Gender

Characteristic	Men				Women			
	Unadjusted		Adjusted,[a,b]		Unadjusted		Adjusted [a,c]	
	β	P Value	β	P Value	β	P Value	β	P Value
Age, yr	-	-	-	-	0.84	0.001	0.99	0.001
History of depression								
No	Ref	-	Ref	-	Ref	-	Ref	-
Yes	2.18	< 0.001	2.05	< 0.001	2.72	< 0.001	1.54	< 0.001
Total number of medications								
0 - 1	-	-	-	-	Ref	-	Ref	-
2+	-	-	-	-	1.46	0.001	1.21	0.018
Married								
No	Ref	-	Ref	-	Ref	-	Ref	-
Yes	0.69	< 0.001	0.74	0.001	0.70	0.003	0.82	0.010
Self-rated physical health								
Good-excellent	Ref	-	Ref	-	Ref	-	Ref	-
Fair-poor	1.84	< 0.001	1.65	< 0.001	3.97	< 0.001	1.89	<0.001

[a] Each variable is adjusted for all other variables in the model.
[b] Full model: Adjusted R^2 = 0.16, F (3, df = 466) = 29.89, P < 0.001.
[c] Full model: Adjusted R^2 = 0.15, F (5, df = 554) = 20.36, P < 0.001.

5. Discussion

The goal of this exploratory study was to identify sociodemographic and clinical characteristics that predicted the severity of depressive symptomatology among US adults using CES-D scale. Only one-third of these individuals were taking antidepressant medications. Depression is often under-diagnosed and under-treated (26).

We found that marital status was a significant predictor of the number of depressive symptoms in both men and women. There is evidence that loss of marital status may be associated with a decline in mental health (27, 28) and that married individuals are more likely to have high quality mental health care than unmarried individuals (29). In addition, loss of marital status could potentially lead to negative changes in health insurance coverage. Consistent with previous research, a history of depression and poor self-rated physical health (30, 31) are also independent predictors of depressive symptomatology in both men and women. The majority of these patients receive psychiatric care from primary care settings where their depressive symptomatology is likely to be undertreated (26). Among patients who receive antidepressant treatment, those newly diagnosed are more likely to be non-adherent to medication than those with a prior history of depression (9, 32). Individuals who rate their physical health as poor are also more likely to experience significant psychological distress, including depression (31).

Age and medication use were predictors of the number of depressive symptoms among women and not in men. In this current study, older women have fewer depressive symptoms than younger women. Some studies suggest that this finding may be explained by a higher lifetime prevalence of depressive symptoms among younger women (28, 33). It is also plausible that younger women may be more willing to report their depressive symptoms (34). Individuals who may take multiple prescribed medications were also more likely to have comorbid conditions than those take fewer medications. Indeed, individuals with chronic health conditions are up to three times more likely to have depression than individuals without these conditions (35). Results from our study indicate that women who used two or more prescribed medications have more depressive symptoms than those who take one or none. It is known that women who have chronic conditions like cardiovascular disease are more likely to experience depressive symptomatology (36). This finding could serve as a proxy for community pharmacists to proactively screen for depression in older women taking two or more prescribed medications.

Screening for depression increases the likelihood that individuals will recognize if they have fair to poor mental health; this self-awareness increases the odds that individuals will proactively seek mental health services (12). Most individuals, who perceive a need for mental health treatment, fail to seek treatment due to attitudinal reasons rather than poor access to care. Among adults with depressive symptoms who fail to seek mental health services, 38% believe that they can handle their depression while 17% of people do not agree with their diagnosis (37). Hence, this presents a unique opportunity for pharmacists in community settings to address this gap in mental health care.

Community pharmacists can play a role in depression screening and antidepressant medication management (38). In particular, they often serve as the initial point of entry into health care delivery system due to their ease of accessibility by patients (39). They are also frequently the last healthcare provider that patients encounter before taking their medication (40). Past studies show that depression management can be improved when pharmacists address lifestyle factors during counseling (41), especially lifestyle factors that may be impede medication adherence (42). Moreover, pharmacists are especially effective in medication management among patients who are naïve to antidepressant medications (38).

5.1. Limitations

There are several limitations to this study. First, the study participants who returned for follow-up in the MIDUS Wave 2 were more likely to be white, female, married, better educated and healthier than participants that were lost to follow-up (15). This limits the generalizability of our study findings. Second, due to the small number of nonwhite participants in this study, there was insufficient statistical power to examine racial differences in predictors of depressive symptomatology. Third, we used the CES-D scale as a measure for depressive symptoms, but not all individuals who screen positive for depressive symptoms obtain diagnosis of depression after further evaluation by a physician. Fourth, the MIDUS survey did not distinguish the reasons for antidepressant medication use. Antidepressants may be prescribed for off-label uses, and this pattern of use is most prevalent among women (43). Finally, we had limited information on antidepressant medication use regarding duration of treatment and health care utilization patterns. Thus, the appropriateness of mental health services rendered to respondents could not be evaluated.

This study demonstrates that a significant number of individuals with depressive symptoms may be currently untreated. Given that diagnostic follow-up is costly and time consuming, it is important to determine the characteristics of patients who would most likely benefit from proactive routine screening. The incorporation of depression screening in community settings could provide a widespread opportunity to identify individuals with depressive symptoms that can benefit from early detection and complications of long-term untreated depression. Pharmacists can develop strategies to improve medication adherence among patients currently on antidepressants through medication review services. Research is needed to determine how pharmacists can be best integrated into the delivery system for mental health care services.

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Authors' Contributions

Irene M. Gathuru developed the concept, analyzed the data and wrote the manuscript. Olufunmilola K. Odukoya and Joshua M. Thorpe contributed to the concept, abstracted the data and contributed to the preparation of this manuscript.

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