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Depressive Symptom Severity in Individuals with Epilepsy and Recent Health Complications:

Depression Severity in PWE

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Abstract

Identifying relationships between depression severity and clinical factors may help with appropriate recognition and management of neuropsychiatric conditions in persons with epilepsy (PWE). Demographic characteristics, epilepsy variables, and medical and psychiatric comorbidities were examined from a baseline RCT sample of 120 PWE. Among demographic characteristics, only inability to work was significantly associated with depression severity ($p=0.05$). Higher 30-day seizure frequency ($p <0.01$) and lower quality of life ($p<0.0001$) were

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associated with greater depression severity. Comorbid bipolar disorder (p=0.02), panic disorder (p<0.01), and obsessive-compulsive disorder (p<0.01) were correlated with worse depression severity. The literature supports our findings of correlations between worse depression, seizure frequency and lower quality of life. Less well-studied is our finding of greater depression severity and selected psychiatric comorbidities in PWE.

Keywords

Epilepsy; depression; bipolar disorder; panic disorder; obsessive-compulsive disorder

INTRODUCTION

Depression is a common comorbidity in epilepsy, occurring in 9–37% of persons with epilepsy (PWE) and linked to a variety of negative outcomes (Ettinger et al., 2004; Mohammadi et al., 2006, Kwon and Park, 2014, Fiest et al., 2013). A systematic review and meta-analysis of 9 studies reporting on 29,891 PWE found an overall prevalence of active (current or past year) depression of 23.1% (95%CI 20.6-28.31) (Fiest et al., 2013). In 5 other studies of 1,217,024 patients, the same report found an overall odds ratio for active depression of 2.77 (95%CI 2.09-3.67) in PWE (Fiest et al., 2013). Depression in these studies was diagnosed by either self-report, administrative data codes, or clinical assessment, resulting in some heterogeneity of cases in the meta-analysis. The most catastrophic potential outcome of depression is suicide, and PWE have a 32 times greater risk compared to those in the general population (Christensen et al., 2007).

Pharmacological treatments and epilepsy surgery are less likely to be effective, and have poorer outcomes in PWE with concurrent depression (Kwon and Park, 2014). Worse epilepsy-related adverse events in PWE correlate strongly with depression, and patients are more likely to report greater cognitive difficulties due to medication side effects, such as drug rashes (Kwon and Park, 2014). In addition, quality of life is a major concern in PWE with comorbid depression, and depression may have a greater impact on quality of life than seizure frequency, severity, and chronicity (Johnson et al., 2004). One study found that depression was the sole predictor of quality of life in PWE when studied alongside other clinical and demographic variables, including age, sex, marital status, seizure frequency, duration and type of seizure disorder, seizure localization, and number of anti-epileptic drugs (AEDs) (Boylan et al., 2004). It is also likely that depression is a significant cause of non-adherence to seizure medications in epilepsy (Guo et al., 2015). This might explain why higher rates of uncontrolled seizures are seen in PWE who have more severe depression (Chen et al., 2018).

Given the negative impact of depression on outcomes in PWE, screening and monitoring of depressive symptoms is important (Kwon and Park, 2014). While there are a variety of standardized scales to evaluate depression in PWE, brief, self-rated instruments may be particularly useful and practical for busy clinical settings (Gil et al., 2017). The 9-item Patient Health Questionnaire (PHQ-9) is a widely used self-rated instrument which has been used to both screen for and monitor the severity of depressive symptoms in people with a

variety of chronic health conditions, including epilepsy (Rathore et al., 2014; Seminario et al., 2009). The PHQ-9 can be completed in minutes, is scored rapidly by the clinician, and is commonly used in primary care settings. The scoring process is standardized and thresholds for varying levels of depression severity have been well-established (Manea et al., 2012).

In addition to depression, PWE may be at risk of other psychiatric conditions, such as anxiety disorders, bipolar disorder, and schizophrenia (Josephson & Jetté, 2017; Patel et al., 2017). However, evaluating people with other psychiatric conditions may be challenging, as self-rated screening instruments may have limited utility in people with psychotic conditions or bipolar disorder (Sajatovic & Ramirez, 2012). Additionally, it is not clear how much of a burden depressive symptoms may be in PWE who may have psychiatric conditions outside of major depressive disorder.

This analysis evaluates self-reported psychiatric comorbidity in a sample of PWE who have had recent epilepsy-related complications (seizures, hospitalization, emergency room visits, self-harm attempts) and compares sample sub-groups using well-established levels of depression severity (minimal, mild, moderate, moderately severe, severe) as evaluated by the PHQ-9. Given the wide use of the PHQ-9 in primary care settings, identifying clinical characteristics, including psychiatric comorbidities, in PWE with varying levels of depressive symptoms has substantial clinical relevance. For example, high depressive symptom severity in the context of self-reported bipolar mood disorder might suggest a need for diagnostic evaluation by a psychiatrist or other mental health professional in addition to care by the primary care provider and the neurologist or epileptologist. In this sample of individuals with recent epilepsy-related complications, we hypothesized that depressive symptoms would be common, would be associated with worse quality of life, and would be associated with multiple types of psychiatric comorbidity.

METHODS

Data Source

This report is an analysis of baseline data from a larger randomized controlled trial (RCT) testing a new self-management approach in PWE. The larger RCT methods and results are described in detail elsewhere (Sajatovic et al., 2018).

Study Design

The original RCT study design was a prospective 6-month randomized comparison of a curriculum-driven epilepsy self-management approach vs. a 6-month wait-list control. Study inclusion criteria included a self-reported diagnosis of epilepsy, adults 18 years of age and older, having experienced a negative health event (NHE) within the last 6 months of initial contact/screen, and being able to provide written informed consent and participate in study procedures. PWE were identified using the electronic medical record problem lists from 2 large urban, university-affiliated health systems to identify people with epilepsy for study screening. NHE counts were self-reported and defined as seizures, accidents or traumatic injury, self-harm attempts, emergency department visits, and hospitalizations. An *a priori* selected sub-set (from the safety net institution) were later validated with NHEs identified by

emergency room and hospital encounters noted in the electronic health record (Sajatovic et al., 2018). Participants completed initial assessments in-person at the study medical center. Participants were excluded if they were at immediate risk of self-harm, had dementia, were pregnant, or were unable to read and/or understand English. Recruitment was conducted in an urban setting in northeastern Ohio. All participants provided written informed consent, and the study was approved by the local institutional review board (IRB).

Assessments

This analysis used screening and baseline data collected immediately prior to intervention randomization in this RCT. Information collected included demographics and epilepsy characteristics such as epilepsy type, epilepsy duration in years, number of prescribed antiepileptic drugs (AEDs), and past 30-days seizure frequency. Demographic and clinical information included age, gender, race, ethnicity, marital status, education, income and employment status, depressive symptom severity, quality of life, cumulative self-reported medical burden, and self-reported mental health comorbidity. Standardized instruments were used to evaluate health literacy, depression severity, quality of life and cumulative medical burden.

Health Literacy—Health literacy was measured by the Rapid Estimate of Adult Literacy in Medicine (REALM-R), an 8-item instrument based off of the longer REALM questionnaire of 125 items (Dumenci et al., 2013). In the REALM, the patient read aloud words in order of increasing difficulty. The number of correctly pronounced words was sorted into 4 reading levels used as grade equivalencies: 3rd grade and below, 4th-6th grade, 7th-8th grade, and 9th grade or above. According to the test authors, patients with a less than 9th grade level would have difficulty comprehending patient education materials (Murphy et al., 1993). In the REALM-R, a similar concept was used, with the respondent being asked to pronounce 8 specific words chosen to minimize bias unrelated to literacy (Bass et al., 2003).

Depression—Depressive symptoms were measured with the PHQ-9, based on 9 diagnostic criteria for the diagnosis of major depressive disorder based on the Diagnostic and Statistical Manual of Mental Disorders-5 (DSM-5) (Carey et al., 2014). Scaled on a score of 0-27, with increasing scores indicating more severe depression, the PHQ-9 categorizes depression severity in 5 categories: 1-4 as minimal, 5-9 as mild, 10-14 as moderate, 15-19 as moderately severe, and 20-27 as severe depression. The PHQ-9 has been found to be both reliable and efficient in clinical practice (Kroenke et al., 2001). In PWE, the PHQ-9 is an efficient instrument displaying both accuracy and validity (Rathore et al., 2014; Seminario et al., 2009).

Quality of Life—Quality of life was assessed with the 10-item Quality of Life in Epilepsy (QOLIE-10) instrument, a 10-item questionnaire that groups epilepsy-specific domains into 3 factors: mental health (energy, depression, overall quality of life), epilepsy effects (memory, physical and mental effects of medication), and role functioning (seizure worry, work, driving, social limits) (Cramer et al., 1996). The QOLIE-10 has been widely used in studies of PWE (Wang et al., 2017). For this analysis the QOLIE-10 was calibrated with scores from 1-5, with higher scores indicating a worse quality of life.

Physical and Mental Health Comorbidity—Comorbidity was measured with the self-reported version Charlson Comorbidity Index (CCI), widely utilized by health researchers to measure disease burden and case mix (Quan et al., 2011). One study of 7,761 patients that compared predictive value between the original Charlson index and a self-reported Charlson index found that the self-reported version predicted mortality well, with all 6 models tested achieving areas under the curve (AUCs) between 0.70 and 0.74 (Chaudhry et al., 2005). Mental health comorbidity was identified via patient self-report using a checklist format. The mental health comorbidity choices on the checklist (see Figure 1) were depression, anxiety, bipolar disorder, panic disorder, schizophrenia, Obsessive-Compulsive disorder (OCD), Attention Deficit Hyperactive disorder (ADHD), Post-Traumatic Stress disorder (PTSD), and "Other" mental disorders not otherwise classified.

Statistical Analysis

Statistical analysis was performed using Statistical Package for the Social Sciences (SPSS) software version 24 (IBM Corporation, NY). Descriptive analyses were summarized for demographic variables and clinical variables. Pearson correlations were computed to detect the correlation between demographic/clinical variables and depression categories.

RESULTS

Overall Sample Description

For this sample (N=120), the mean age was 41.27 years (SD 11.80), predominantly female (N=81, 68.07%), and predominantly African-American (N=80, 69.57%), with a small portion of Hispanics (N=9, 7.63%). The majority was single, separated, divorced, or widowed (N=82, 68.33%), with an education level greater than high school (N=67, 56.3%), an income less than U.S. $25,000 (N=104, 87.39%). The majority was unable to work (N=62, 51.67%). The mean REALM-R score of the entire sample (N=120) was 6.47 (SD 2.10) and the mean QOLIE-10 was 2.99 (SD 0.89).

While the original PHQ-9 has 5 categories, we combined minimal and mild depression categories, given the relatively limited number of individuals across categories and to improve clinical generalizability of findings. As noted in Table 1, of 120 PWE in the sample, 58 (48.3%) were minimally/mildly depressed, 27 (22.5%) were moderately depressed, 18 (15.0%) had moderately severe depression, and 17 (14.2%) had severe depression.

Table 2 shows epilepsy-related characteristics in this sample. The mean duration of epilepsy was 20.54 years (SD 15.21) and PWE were prescribed a mean of 1.64 (SD 0.84) AEDs. The majority of the sample had experienced a seizure in the last 30 days (N=69, 57.5%), with those seizures predominantly generalized (N=85, 71.43%).

Table 3 shows psychiatric comorbidity in the sample. The most common psychiatric comorbidity was depression (N=69, 57.5%). Other less common psychiatric comorbidities include anxiety (N=39, 32.5%), bipolar disorder (N=26, 21.67%), panic disorder (N=14, 11.67%), schizophrenia (N=5, 4.17%), OCD (N=3, 2.5%), ADHD (N=7, 5.83%), PTSD (N=13, 10.83%), and other non-categorized psychiatric disorders (N=9, 7.5%).

Relationship Between Depression Severity and Demographic Factors, Epilepsy Variables and Comorbidity

An inability to work was associated with greater depression severity compared to other employment categories (p=0.05). Other demographic variables, including age, gender, race, ethnicity, marital status, education level, and income were not significantly associated with depression severity. No correlation was seen between depression severity and health literacy as measured by the REALM-R (p=.328).

With respect to epilepsy variables, there was no association between depression severity and epilepsy duration (p=0.698), number of prescribed AEDs (p=0.681), or seizure type (p=0.78). The presence of seizures in the past 30 days correlated with increased depression severity (p<0.01), and increased number of seizures was correlated with worse depression severity (p=0.002).

There was no significant association between medical comorbidities as measured by the CCI and depression severity (p=0.125). However, several psychiatric comorbidities in PWE were associated with increased depression severity. Having comorbid bipolar disorder (p=0.02), panic disorder (p<0.01), and OCD (p<0.01) were all associated with greater depressive symptom severity in PWE. Other psychiatric comorbidities measured were not associated with increased depressive symptom severity. Finally, increased depressive symptom severity was correlated with lower quality of life as measured by the QOLIE-10 (p<0.0001).

DISCUSSION

This is a baseline analysis from a prospective RCT of PWE that investigated the association between depressive symptoms (measured by the PHQ-9, a widely used instrument that has been used to both screen for and monitor depressive severity in populations with chronic health conditions, including epilepsy) and demographic and clinical variables. In this sample of PWE, approximately half had clinically significant depression as measured by established thresholds on the PHQ-9. Psychiatric comorbidity in the sample was also substantial, with depression in 58%, anxiety in 33%, and bipolar disorder in 22%. Strengths of the analysis include the relatively large population of minorities, notably African-Americans (N=80, 69.57%), and the focus on high-risk PWE with recent health complications, who are often excluded from typical clinical trials. Recent epidemiological studies have found a wide range in the prevalence of depression and anxiety in PWE (Ettinger et al., 2004; Mohammadi et al., 2006, Kwon and Park, 2014, Fiest et al., 2013; Blaszczyk and Czuczwar, 2016). In hospitalized PWE, depression is reported in the range of 50–55% (Blaszczyk and Czuczwar, 2016). The results of our sample indicate a slightly higher prevalence (57.5%) of participants that reported depression, but this is not a significant deviation from the literature overall, and may be reflective of the fact that our sample were all individuals who had experienced recent complications of epilepsy, such as emergency room visits or hospitalizations.

Our study is notable for being composed of predominantly (almost 70%) African-American PWE. In contrast, some epilepsy studies either do not mention race and/or ethnicity in their demographic characteristics (Cramer et al., 2003), or have a significantly larger proportion

of whites in their sample (Friedman et al., 2013). The urban location and targeting of PWE who have been traditionally under-represented in research (Sajatovic et al., 2018) likely was responsible for this robust minority representation. Findings of this analysis suggest depression and psychiatric comorbidity are common among African-Americans with epilepsy, in line with the literature that has mostly been conducted amongst white PWE. However, it is also possible that the sociocultural features of the sample could have influenced the findings on depression prevalence, severity, and other psychiatric comorbidity. For example, poverty and limited occupational opportunities are more common in racial and ethnic minorities, thus making it difficult to tease out the effects of epilepsy versus the effects of coping with financial adversity and stressful life events.

As is true of much of the literature, this analysis generally found limited associations between demographic variables and depression severity in PWE. The only association present was between inability to work and increased depression severity. Previous literature showed a correlation between depression in PWE and unemployment and being single (Thompson et al., 2009; Reisinger & Dilorio, 2009). With regards to the association between other demographic factors and depression severity in PWE, the literature is inconsistent. A few studies showed increased depression in women compared to men with PWE (Seyfhashemi and Bahadoran, 2013; Caplan et al., 2005). Another report found no significant associations between depressive symptoms and age or gender, but a higher level of depressive symptoms in unmarried PWE and in those with lower socioeconomic status (Lacey et al., 2016). As epilepsy often begins early in life, PWE may have difficulty with accomplishing life milestones such as establishing a career or being able to start their own families. In this sample, in spite of the fact that approximately half of PWE had completed high school, only a quarter were working or in school full-time. Only a third were married and nearly 90% had an annual income of less than U.S. $25,000. While this cross-sectional analysis does not permit a causal determination of depression in PWE, it is possible that limited employment opportunities, poverty, and poor social support could explain the relatively high rates of depression and other psychiatric comorbidity in our sample and in the broader literature.

Our results of increased seizure frequency in the last 30 days and lower quality of life with increased depression severity line up with previous literature and confirmed our initial hypotheses. Recent studies found that more severe depression is correlated with a greater number of seizures in the last 30 days, last 6 months, and increased health complications overall (Kumar et al., 2018). Several studies have found depression to be the most powerful predictor of health-related reduction in quality of life, even after controlling for seizure frequency, severity, and other psychosocial variables (Lehrner et al., 1999; Perrine et al., 1995; Gilliam et al., 1997; Boylan et al., 2004; Cramer et al., 2003). That our results indicated a higher seizure frequency and greater presence of seizures in the last 30 days in participants with more severe depression was not surprising. A previous study examining depression and epilepsy found that depression amongst PWE taking an AED was significantly associated with failure to achieve 1-year seizure freedom (Josephson et al., 2017).

In contrast to the limited associations between depression severity and demographic variables, psychiatric comorbidities—in particular, depression, bipolar disorder, panic disorder and OCD—were seen in PWE who were more severely depressed. Studies have found a high prevalence of comorbid depression and anxiety disorders in PWE, with 1 report noting approximately 9-37% suffering from depression and 11-25% from anxiety (Kwon and Park, 2014). Individuals with these psychiatric conditions may have increased risk of suicidality, stigmatization, and decreased quality of life (Park, 2016). The relatively high rate of clinically significant depression in our sample could have been due to the fact that we specifically targeted those with recent health complications related to epilepsy.

While our results did not find higher rates of anxiety comorbidity in PWE who had more severe depressive symptoms, it is possible that this could have been related to under-recognition of anxiety disorder using our self-report methods. Depression and anxiety are frequently comorbid and are often difficult to separately distinguish, given overlapping signs and symptoms. Anxiety is much less studied in the epilepsy literature compared to depression, possibly due to more limited screening and the presence of several different anxiety disorders (Hansen and Amiri, 2015). Perhaps using a standardized assessment of anxiety such as the Beck Anxiety Inventory would have identified more PWE with anxiety in our sample, as seen in previous literature (Kwon and Park, 2014).

Panic disorder is common in epilepsy, and in 1 recent study was observed in 13.5% of PWE (Wiglusz et al., 2018). There are few studies on panic disorder in epilepsy, possibly because of the difficulty in distinguishing between panic disorder and epilepsy in PWE that suffer panic attacks as symptoms of seizures (Scalise et al., 2006). A previous study of PWE versus the general population found that the point prevalence of panic disorder was significantly higher in PWE than in the general population (Brandt et al., 2010).

Obsessive–compulsive disorder has been linked to epilepsy, with 10-22% of temporal lobe epilepsy patients also having OCD (Kaplan, 2010). Furthermore, there appears to be a link between OCD and depression in PWE; 1 study of patients with temporal lobe epilepsy found the most common comorbidity with OCD to be depression (Ertekin et al., 2009). Bipolar disorder has also been shown to have an association with epilepsy, with several studies noting the increased incidence of bipolar disorder in PWE compared to persons without epilepsy (Ettinger et al., 2005; Clarke et al., 2012; Chang et al., 2013).

Previous reports support an association between PTSD and epilepsy, with 1 study supporting a possible temporal association between PTSD and the development of epilepsy (Chen et al., 2017). However, there is little in the literature that specifically discusses comorbidity of depression and PTSD in PWE. It is possible that highly stressful events related to having a seizure such as physical injury and emotional trauma could contribute to PTSD in PWE.

Our findings potentially inform the clinical management of PWE, and emphasize the importance of screening tools for depression and other psychiatric conditions in standard clinical settings. However, it is important to remember that self-report tools like the PHQ-9 are screening instruments and that a more detailed clinical evaluation is warranted in patients who score in the moderate or higher range of depression severity. Our analysis suggests that

higher levels of depressive symptom severity may occur in the context of other psychiatric conditions such as bipolar disorder, PTSD, or OCD in PWE. Specialist referral may be indicated in these instances, since some commonly used treatments, such as the use of antidepressant monotherapy, can worsen the clinical course of bipolar disorder (Strejilevich et al., 2011).

Our study has a number of limitations, including relatively small sample size, gender imbalance (predominantly women), use of self-report to identify medical and psychiatric comorbidity, and use of a depression severity measure that was not developed specifically for PWE. Self-selected individuals who volunteer to participate in an epilepsy self-management study are not necessarily representative of the wider population of PWE. Also, as stated earlier, depression and anxiety are frequently comorbid and have overlapping signs and symptoms. A different methodological approach might have brought out demographic or other differences that we did not see in our study. Furthermore, it is possible that our study over-diagnosed psychiatric disorders given the method used (self-reporting by patient) to determine the presence of psychiatric disorders. Despite the methodological limitations of our study, many of our findings confirm those shown in previous studies and expand upon the importance of assessing psychiatric comorbidities beyond major depressive disorder in PWE who have higher levels of depressive symptom severity

CONCLUSIONS

In conclusion, this mostly African-American sample of PWE with recent epilepsy-related complications had high rates of depressive symptoms and significant mental health comorbidity. Those with more severe depressive symptom severity have more frequent seizures, lower quality of life, and greater number of psychiatric comorbidities. Clinicians who treat PWE who have depressive symptoms should screen for additional psychiatric conditions beyond major depressive disorder and ensure that these individuals get treatment that is appropriate for their specific clinical situation.

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1) Have you ever been diagnosed with (check all that apply) [ ] Depression
[ ] Anxiety
[ ] Bipolar Disorder
[ ] Panic Disorder
[ ] Schizophrenia
[ ] Obsessive Compulsive Disorder
[ ] Attention Deficit Hyperactive Disorder
[ ] Post-Traumatic Stress Disorder
[ ] Other
[ ] None of the above
[ ] Don't Know
[ ] Refused

2) If mental health diagnosis is other, please specify:

3) Are you currently receiving treatment for any of these conditions? [ ] Yes
[ ] No
[ ] Don't Know
[ ] Refused

4) What kind of treatment are you receiving?
[ ] Medication
[ ] Counseling
[ ] Other

5) Are you currently taking any medication for depression? [ ] Yes
[ ] No
[ ] Don't Know
[ ] Refused

Figure 1:
Format of Self-Reported Mental Health Questionnaire

Table 1:

Demographic Characteristics from an Epilepsy Self-Management Trial Baseline Sample

	All (N=120)	Minimal/Mild depression (N=58)	Moderate depression (N=27)	Moderately severe (N=18)	Severe depression (N=17)	P-Value
Age – Mean, SD	41.27, 11.80	39.59, 12.51	41.69, 10.25	43.06, 12.89	44.69, 10.00	.245 *a*
Gender – N (%)	119	57	27	18	17	.60 *b*
Female	81, 68.07%	36, 63.16%	21, 77.78%	12, 66.67%	12, 70.59%	
Male	38, 31.93%	21, 36.84%	6, 22.22%	6, 33.33%	5, 29.41%	
Race – N (%)	115	56	25	18	16	.13 *b*
African-American	80, 69.57%	38, 67.86%	20, 80%	9, 50%	13, 81.25%	
White	35, 30.43%	18, 32.14%	5, 20%	9, 50%	3, 18.75%	
Ethnicity – N (%)	118	57	26	18	17	.71 *b*
Hispanic	9, 7.63%	3, 5.26%	3, 11.54%	2, 11.11%	1, 5.88%	
Marital Status – N (%)	120	58	27	18	17	.24 *b*
Single/Separated/Divorced/Widowed	82, 68.33%	36, 62.07%	19, 70.37%	12, 66.67%	15, 88.24%	
Married/Co-habiting	38, 31.67%	22, 37.93%	8, 29.63%	6, 33.33%	2, 11.76%	
Education – N (%)	119	57	27	18	17	.18 *b*
Less than/equal to High School	52, 43.7%	19, 33.33%	15, 55.56%	9, 50.00%	9, 52.94%	
More than High school	67, 56.3%	38, 66.67%	12, 44.44%	9, 50.00%	8, 47.06%	
Income – N (%)	119	58	27	17	17	.75 *b*
<$25K	104, 87.39%	49, 84.48%	24, 88.89%	15, 88.24%	16, 94.12%	
>=$25K	15, 12.61%	9, 15.52%	3, 11.11%	2, 11.76%	1, 5.88%	
Employment Status- N(%)	120	58	27	18	17	**.05** *b*
Unemployment/Retired	27, 22.5%	13, 22.41%	7, 25.93%	5, 27.78%	2, 11.76%	
Unable to work	62, 51.67%	23, 39.66%	17, 62.96%	9, 50.00%	13, 76.47%	
Student/Employed/Full-Time Homemaker	31, 25.83%	22, 37.93%	3, 11.11%	4, 22.22%	2, 11.76%	
REALM-R Health Literacy-Mean, SD	6.47, 2.10	6.78, 1.91	6.07, 2.35	6.17, 2.48	6.35, 1.90	.328 *a*
QOLIE-10 – Mean, SD	2.99, 0.89	2.30, 0.62	3.37, 0.53	3.64, .52	4.06, 043	**<.0001** *a*

a: Kruskal-Wallis test.

b: Chi-Square test.

Table 2:

Epilepsy-Related Variables from an Epilepsy Self-Management Trial Baseline Sample

	All (N=120)	**Minimal/Mild depression (N=58)**	**Moderate depression (N=27)**	**Moderately severe (N=27)**	**Severe depression (N=27)**	**P-Value**
Duration of epilepsy in years – Mean, SD	20.54, 15.21	19.76, 16.13	19.77, 16.02	22.39, 14.48	22.47, 11.81	.698 *a*
Number Prescribed AEDs* – Mean, SD	1.64, 0.84	1.58, 0.82	1.56, 0.70	1.88, 1.05	1.76, .90	.681 *a*
Seizure Type – N (%)	119	57	27	18	17	.44 *b*
Generalized seizure	85, 71.43%	38, 66.67%	21, 77.78%	13, 72.22%	13, 76.47%	
Generalized non-convulsive	2, 1.68%	2, 3.51%	0, 0%	0, 0%	0, 0%	
Focal seizure	4, 3.36%	3, 5.26%	0, 0%	0, 0%	1, 5.88%	
Focal seizure with loss of consciousness	5, 4.2%	2, 3.51%	1, 3.7%	2, 11.11%	0, 0%	
Other	23, 19.33%	12, 21.05%	5, 18.52%	3, 16.67%	3, 17.65%	
Seizure Frequency – N (%)	114	56	26	15	17	.71 *b*
Seizure-free for > 1 year	13, 11.4%	8, 14.29%	2, 7.69%	2, 13.33%	1, 5.88%	
Less than once a year	27, 23.68%	15, 26.79%	6, 23.08%	3, 20.00%	3, 17.65%	
Less than once a month	25, 21.93%	16, 28.57%	4, 15.38%	3, 20.00%	2, 11.76%	
More than once a month	49, 42.98%	17, 30.36%	14, 53.85%	7, 46.67%	11, 64.71%	
Presence of Seizures in the last 30 days	120	58	27	18	17	**<.01** *b*
Yes	69, 57.5%	27, 46.55%	17, 62.96%	9, 50.00%	16, 94.12%	
No	51, 42.5%	31, 53.45%	10, 37.04%	9, 50.00%	1, 5.88%	
Seizure count in the last 30 days – Mean, SD	2.2, 4.9	1.2, 2.3	1.4, 1.5	3.1, 7.6	5.6, 8.8	**.002** *a*

a: Kruskal-Wallis test.

b: Chi-Square test.

Table 3:

Comorbidity Characteristics from an Epilepsy Self-Management Trial Baseline Sample

	All (N=120)	Minimal/Mild depression (N=58)	Moderate depression (N=27)	Moderately severe (N=18)	Severe depression (N=17)	P-Value
Charlson Comorbidity Index – Mean, SD	2.06, 2.48	1.78, 2.46	1.93, 2.18	1.67, 1.88	3.65, 3.10	.125 *a*
Depression	69, 57.5%	24, 41.38%	20, 74.07%	11, 61.11	14, 82.35	**<.01** *b*
Anxiety	39, 32.5%	14, 24.14%	10, 37.04%	7, 38.89	8, 47.06	.25 *b*
Bipolar	26, 21.67%	7, 12.07%	6, 22.22%	5, 27.78	8, 47.06	**.02** *b*
Panic Disorder	14, 11.67%	3, 5.17%	6, 22.22%	5, 27.78	0, 0%	**<.01** *b*
Schizophrenia	5, 4.17%	0, 0%	3, 11.11%	1, 5.56	1, 5.88	.11 *b*
Obsessive Compulsive Disorder	3, 2.5%	0, 0%	0, 0%	0, 0%	3, 17.65	**<.01** *b*
Attention Deficit Hyperactive Disorder	7, 5.83%	4, 6.9%	0, 0%	1, 5.56	2, 11.76	.41 *b*
Post-Traumatic Stress Disorder	13, 10.83%	3, 5.17%	3, 11.11%	3, 16.67	4, 23.53	.14 *b*
Other	9, 7.5%	2, 3.45%	1, 3.7%	3, 16.67	3, 17.65	.08 *b*

a: Kruskal-Wallis test.

b: Chi-Square test.