Short Depression Screening Test for Patients with Epilepsy: CES-D with 10 Items

Morteza Naserbakht, MD[1,2]
Amir Shabani, MD[1]
Hadi Teimoori, MD[3]
Mehri Gholami, MD[1]
Masood Ahmadzad Asl; **MD**[1,2]
1.Mental Health Research Center,Tehran Psychiatric Institue, Iran University Medical Science   , Tehran, Iran
2 Nikan   Health Research Center,Tehran,Iran.
3 Iran University Medical Science, Tehran, Iran

Corresponding author:
Naserbakht Morteza, MD
Specialist of Preventive and Community Medicine, Mental Health Research Center, Tehran Psychiatric Institute, Niayesh Street, Sattarkhan Ave, Tehran,Iran.
Email: mnaserbakht@gmail.com
Tel:+98-21-66506862

Objective: Depression is the most common co-morbid psychiatric disorder in patients with epilepsy. Yet it remains under recognized and under-treated. For depression screening in this patient need to a convenient questionnaire for patients with epilepsy. This questionnaire has shown high sensitivity for depression screening in many studies. The center for Epidemiological Studies Depression Scale (CES-D) has been widely used in studies of late-life depression. The CES-D is easy to use in most settings.

Method: Two groups of patients from two hospital centers were selected to participate in this study: the control group and the experimental group which included patients with approved diagnosis of epilepsy, regardless of any type of seizures. Then all the subjects went through a semi structural clinical interview for (SCID-I) DSM-IV by one psychiatrist. Consequently, all the patients completed the CES-D 10 items questionnaire along with the interview. In the two groups, the CESD scale cut-off point was obtained using ROC analysis.

Results: The optimal cut-off score of CES-D in the both group was ≥3. Sensitivity, specificity, and positive predicted values in the epileptic group were 86.4%, 55.3%and 60%   ; and sensitivity, specificity, and positive predicted values in the control group were 72.7% ,68.6%, 38.3% respectively.

Conclusion: It appears that CES-D 10 items   is an appropriate tool for screening patients with epilepsy, particularly if the multi-stage screening system is used with other methods.

Key Words:
Depression, Epilepsy, Screening, Sensitivity and Specificity

Depressive disorders in the general population The lifetime prevalence of MDD in the adult (non epileptic) population from the Epidemiological Catchments Area study was 5.8%, but other estimates have noted rates as high as 26% for women and 12% for men (1). A point prevalence of 5–9% was found in women and 2–3% in men.

Prevalence rates of depressive disorders in epilepsy
Depressive disorders (DDs) are frequent psychiatric co-morbidities of neurological disorders like epilepsy. Despite their multifaceted clinical expressions and relatively high prevalence in epilepsy, DDs very often go unrecognized and untreated. (2) Depression is the most common co-morbid psychiatric disorder in patients with epilepsy (3), yet it remains under recognized and under-treated. Wiegartz et al. found that 43% of 76 patients with epilepsy had major depressive disorder (MDD) and that 38% of these patients with lifetime histories of MDD never referred for treatment, while 68% of the patients with a minor depression were untreated (4). In a study of 97 children and adults with epilepsy and a depressive disorder

severe enough to warrant pharmacotherapy, Ettinger et al. identified symptoms of depression in 26% of 44 children with epilepsy—all were undiagnosed and untreated (5).

Depressive disorders in patients with epilepsy can mimic the primary mood disorders described in the fourth edition (text revised) of the Diagnostic and Statistical Manual of Mental Disorder (DSM-IV-TR), (6).

Hermann et al. reviewed the published data using DSM-IV and International Classification of Disease (ICD) for rates of mood disorders in patients with epilepsy (PWE). The lifetime prevalence-to-date of mood disorders ranged from 44 to 63% of the patients evaluated. The lifetime prevalence-to-date of MDD ranged from 8 to 48% (7).

In a community-based study that used the Hospital Anxiety and Depression Scale, Jacoby et al. observed in a large survey that 21% of 168 patients with recurrent seizures were depressed (8).

More recently, O'Donoghue et al. used the same scale to demonstrate that among a group of 155 patients identified through two large primary care practices in

the United Kingdom, 33% with recurrent seizures and 6% of those in remission had depression (9). Eden and Toone found that 22% of 88 epilepsy patients identified from general practices in the United Kingdom had depression using the Clinical Interview Schedule. (10) Blum et al, recently reported that among the 2900 people with epilepsy, 29% reported having experienced at least one episode of depression (11).

In contrast to gender differences in the prevalence of DDs in non-epileptic populations, there was no difference in the prevalence of depression between men and women among PWE. These findings were interesting as manic symptoms in PWE have frequently been quoted as being rare; these data clearly show a higher prevalence of DDs among PWE than the general population (7, 12).

CES-D is a self-reported study and was established by Rudolf in 1977 for screening depression (13). This scale has a long format with 20 questions and 2 short formats with 10 questions. This scale is used in numerous studies and different populations and includes aging population and medical and neurological diseases such as epilepsy. Johns and et al found predominant capability in this scale for diagnosis of major depression in patients with epilepsy (14).In one study for the assessment of depression in the medically ill using CES-D scale, analyses of sensitivity and specificity indicated that use of an alternative scoring method (like CES-D) which more closely approximates current diagnostic criteria for depression may improve the predictive power of the test (15).R. Haringsma et. al evaluated criterion validity with the Mini International Neuropsychiatric Interview (MINI), a clinical diagnostic interview based on DSM-IV. Sensitivity and specificity for various cut-off scores of CES-D were compared with the DSM-IV major depressive disorder. For MDD, the optimal cut-off score of CES-D was 25; the sensitivity was 85%, specificity 64%, and positive predicted value was 63% (16) .Parikh RM et.al in one study found sensitivity and specificity of the Center for Epidemiologic Studies Depression Scale (CES-D) as a screening instrument for post-stroke depression. With the cut-off point of 16, the CES-D was found to have a specificity of 90%, a sensitivity of 86% and a positive predictive value of 80% and thus may be considered as a potentially useful screening instrument for post-stroke depression (17).

Materials and Method

Subject

Subjects in the disease group, regardless of the type of seizures, were selected from the two centers to which they referred: 1) Iran Epilepsy Institution located in Tehran and, 2) Neurology Center in Rasool Akram Hospital. Inclusion criteria for this group were: 1) age, 18 or up; 2) patients with approved diagnosis ; 3) patient treatment with anticonvulsants; 4) patients who signed the approval from and participated in the research knowingly. Exclusion criteria for the disease group were: 1) patients with epilepsy co morbid with

other neurological disease; 2) history of systemic and medical diseases such as malignancies, congestion heart failure, stable electrolyte disturbance, thyroid disorder, hepatic or nephritic failure disease, diabetic disease, porphyria, endocrine disease, unknown syndrome, rheumatoid disease, AIDS and others systemic disorders; 3)drug dependency based on DSM-IV criteria. seventeen subjects with epilepsy were selected in the neurological center at Rasool Akram Hospital on Mondays from August to November, 2005; and 76 patients were selected at Iran's Epilepsy Institution. According to the method of selection in Iran's Epilepsy Institution, patients' files were evaluated and the registered patients with approved diagnosis were randomly selected. Then synchronized with Iran's epilepsy Institution, the subjects were informed to be present at the institution for the interview. With regards to the inlet and outlet criteria, the studied subjects who were selected included 60 patients with the above mentioned criteria. Then the control group was selected (from Jan. to Feb.2005). The subjects in this group were selected, based on inclusion and exclusion criteria, from the personnel of Rasool Akram Hospital and Iran's Psychiatric Institution: they were the same number as the patients' group (60).

Inclusion criteria for the control group were: 1) age 18 or up; and 2) patients who signed the approval from and participated in this research knowingly. Exclusion criteria for the control group include:1) patients with epilepsy; 2)history of systemic and physical disease (like exclusion criteria for the patients' group) ;3) with no drug dependency according to DSM-IV criteria. All the subjects were the same age and sex as the patients' group.

Procedures

Structured Clinical Interview for DSM- IV: research version (SCID-I)

SCID-I is a known semi structural interview that provide appropriate frame work for psychiatric disorders based on DSM-IV (18, 19). Implementation of SCID-I takes 15 to 25 minutes. Currently, SCID-1 is a golden standard instrument for many studies (20, 21).

Center for Epidemiological studies-Depression Scale

Center for Epidemiological Studies Depression Scale (CES-D) has been widely used in studies of late-life depression. In one study performed by malakouti and et.al in 2005, 10- item CES-D reliability was 0.81 with half -splitting method. The calculation of sensitivity (Sn) and specificity (Sp) at cut-off level 5 showed 84% and % Receiver Operation Curve 74 Analysis was confirmed these results. While the CES-D is convenient to use in most settings, it can present problems for epileptic respondents who may find the response format to be confusing, the questions emotionally stressful, and the time to complete burdensome. A briefer 10-item version has been proposed, but there are few data on its properties as a screening instrument (22).

Table 1: mean score of CES-D in epileptic and control group

mean score of CES-D	True positive	False positive	True negative	False negative
Epileptic group	6.2±2.3	5.7±2.5	1.4±0.7	0
Control group	6.43±2.2	4.5±1.8	0.7±0.7	1

Translation and back translation of CES-D were made by two of the authors, one of whom did not know the original English text. The final translation was fixed by consensus.

Then all the subjects went through a semi structured clinical interview for DSM-IV (SCID-I), that evaluates major psychiatric disorder in I axis, by one psychiatric, due to there isn't being any disturbance at the end of interview. Therefore, the entire studied patients completed the CES-D 10 items questionnaires along with an interview. In this stage, total scoring was done by a psychiatric resident who did not have any knowledge about the result of the SCID-1 interview. Then the result of the SCID-1 interview was compared with the score of the patients on the CES-D. Analysis was done using SPSS 12 software. In the two groups, cut-off point of CES-D scale was obtained using Receiver Operating Curve (ROC) analysis. Therefore, in two the groups, the rate of pseudo positive , false negative, true positive, true negative and positive predictive value were estimated with respect to the cut-off points.

Results

The number of participants in each group was 60. There were equal number of males and females in the both groups. The two groups were also matched on age; the mean difference was not significant by t-Test. The mean age was 31.0 (SD= 8.971) in patients and 31.2 (SD= 8.207) in controls.

Studying mood disorders with SCID-I interview, major depressive disorder was diagnosed any time in life in %33.3 of the cases while the frequency of the disorder in the control group (%15) was significantly lower by chi-square test (p=016) .After completion of CES-D (10 item) the result indicated that the mean sore in the epileptic group was 4±3.1 and in the control group was 2.5±2.4.

T-test analysis distinguished the mean score in the epileptic group further than in the control group. (CI:0.5 to 2.65)   )   The obtained results from CES-D and the result of SCID-I interview were evaluated using ROC analysis.

The optimal cut-off score of CES-D in the both groups was ≥3. Sensitivity, specificity and positive predicted values in the epileptic group were 86.4%, 55.3%and 60% ;and sensitivity, specificity, and positive predicted values in control group was 72.7% ,68.6%, 38.3%.

Then based on the cut off score of CES-D, the mean score of true positive (SCID-D(+), CES-D(+)), false

positive (SCID-D(-), CES-D(+)), true negative (SCID-D(-), CES-D(-)) false negative (SCID-D(+), CES-D(-)) in the epileptic group and the control group was determined (Table 1).

Discussion

Major Depression is one of the most common co morbid psychiatric disorders in patients with epilepsy (3, 23), but it is on clinical trial (4, 24). This affects the patients' life style and process of the disease. The ill person gets trouble with his sanitary and health care and increased the risk of suicide (25-28). Depression diagnosis in epilepsy has difficulties for different reason; one being lack of appropriate sensitivity and specificity of screening tools.

Patients with epilepsy are troubled with long term interviews and don't collaborate in psychiatric interviews.

In fact, the purpose of this study was to assess the ordinary tools (CES-D) which are accurate for screening major depression in patients with epilepsy.

In different studies, the capability of CES-D grading scale has been tested with ROC_S to determine major depression. Using low cut-off point results in increased sensitivity of CES-D 10 items in recognizing patients with epilepsy with major depression (87%-90%).

Irwin and et al, in a study, using CES-D 10 items for the aging population, obtained sensitivity and specificity of 87% and 97%, respectively (22).

In addition, in the Caracciolo study in neurological rehabilitation center, this test had approximately excellent sensitivity, specificity and positive predictive values (29, 30), and the results were similar to ours.

There were limitations in our study due to lack of appropriate tools and methods to review the content and final validity. In addition to high sensitivity in the screening and considering that this test was translated from the original questionnaire, it is likely that the knowledge and recognition were not the same in the two different cultures.

Conclusion

It seems that CES-D 10 items is an appropriate instrument for screening depression in patients with epilepsy particularly if using multistage(parallel or consecutive) screening system along with other methods. Parallel methods increase sensitivity and consecutive methods increase specificity of the test.

References

1. Kanner AM. Depression in epilepsy: a frequently neglected multifaceted disorder. *Epilepsy Behav* 2003; 4 Suppl 4: 11-19.
2. Musselman DL, DeBattista C, Nathan K I. Biology of mood disorders. In: Krishnan KR, Schatzberg AF, Nemeroff, CB, editor. *Textbook of psychopharmacology (2nd ed).* Washington, DC: The American Psychiatric Press; 1998. p. 549-588.
3. Kanner AM. Depression in epilepsy: prevalence, clinical semiology, pathogenic mechanisms, and treatment. *Biol Psychiatry* 2003; 54: 388-398.
4. Wiegartz P ,Seidenberg M, Woodard A, Gidal B, Hermann B. Co-morbid psychiatric disorder in chronic epilepsy: recognition and etiology of depression. *Neurology* 1999; 53: S3-8.
5. Ettinger AB, Weisbrot DM, Nolan EE, Gadow KD, Vitale SA, Andriola MR, et al. Symptoms of depression and anxiety in pediatric epilepsy patients. *Epilepsia* 1998; 39: 595-599.
6. American Psychiatric Association*. Diagnostic and statistical manual of mental disorders (4th ed.).* Washington, DC: American Psychiatric Association; 2005.
7. Hermann BP, Seidenberg M, Bell B. Psychiatric comorbidity in chronic epilepsy: identification, consequences, and treatment of major depression. *Epilepsia* 2000; 41 Suppl 2: S31-41.
8. Jacoby A, Baker GA, Steen N, Potts P, Chadwick DW. The clinical course of epilepsy and its psychosocial correlates: findings from a U.K. Community study. *Epilepsia* 1996; 37: 148-161.
9. O'Donoghue MF, Goodridge DM, Redhead K, Sander JW, Duncan JS. Assessing the psychosocial consequences of epilepsy: a community-based study. *Br J Gen Pract* 1999; 49: 211-214.
10. Edeh J, Toone B. Relationship between interictal psychopathology and the type of epilepsy. Results of a survey in general practice. *Br J Psychiatry* 1987; 151: 95-101.
11. Blum D, Reed M, Metz A. Prevalence of major affective disorders and manic/hypomanic symptoms in persons with epilepsy: a community survey. *Neurology* 2002; 58: A174.
12. O' Shea MF. Hypomania and epilepsy. *Br J Psychiatry* 1988; 15: 571.
13. Radloff LS. The CES-D Scale: A Self-Report Depression Scale for Research in the General Population. *Appl Psychol Meas* 1977; 1: 385-401.
14. Jones JE, Hermann BP, Woodard JL, Barry JJ, Gilliam F, Kanner AM, et al. Screening for major depression in epilepsy with common self-report depression inventories. *Epilepsia* 2005; 46: 731-735.
15. Schein RL, Koenig HG. The Center for Epidemiological Studies-Depression (CES-D) Scale: assessment of depression in the medically ill elderly. *Int J Geriatr Psychiatry* 1997; 12: 436-446.
16. Haringsma R, Engels GI, Beekman AT, Spinhoven P. The criterion validity of the Center for Epidemiological Studies Depression Scale (CES-D) in a sample of self-referred elders with depressive symptomatology. *Int J Geriatr Psychiatry* 2004; 19: 558-563.
17. Parikh RM, Eden DT, Price TR, Robinson RG. The sensitivity and specificity of the Center for Epidemiologic Studies Depression Scale in screening for post-stroke depression. *Int J Psychiatry Med* 1988; 18: 169-181.
18. Martin CS, Pollock NK, Bukstein OG, Lynch KG. Inter-rater reliability of the SCID alcohol and substance use disorders section among adolescents. *Drug Alcohol Depend* 2000; 59: 173-176.
19. Sartorius N, Janca A. Psychiatric assessment instruments developed by the World Health Organization. *Soc Psychiatry Psychiatr Epidemiol* 1996.۶۹-۵۵ :۳۱ ;
20. Segal DL, Kabacoff RI, Hersen M, Van Hasselt VB, Ryan CF. Update on the reliability of diagnosis in older psychiatric outpatients using the Structured Clinical Interview for DSM-III-R. *J Clin Geropsychol.* 1995; 1: 313–321.
21. Skre I, Onstad S, Torgersen S, Kringlen E. High interrater reliability for the Structured Clinical Interview for DSM-III-R Axis I (SCID-I). *Acta Psychiatr Scand* 1991; 84: 167-173.
22. Irwin M, Artin KH, Oxman MN. Screening for depression in the older adult: criterion validity of the 10-item Center for Epidemiological Studies Depression Scale (CES-D). *Arch Intern Med* 1999; 159: 1701-1704.
23. Blumer D. Psychiatric aspects of intractable epilepsy. *Adv Exp Med Biol* 2002; 497: 133-147.
24. Kanner AM, Barry JJ. The impact of mood disorders in neurological diseases: should neurologists be concerned? *Epilepsy Behav* 2003; 4 Suppl 3: S3-13.
25. Boylan LS, Flint LA, Labovitz DL, Jackson SC, Starner K, Devinsky O. Depression but not seizure frequency predicts quality of life in treatment-resistant epilepsy. *Neurology* 2004; 62: 258-261.
26. Gilliam F. Optimizing health outcomes in active epilepsy. *Neurology* 2002; 58: S9-20.
27. Jones JE, Hermann BP, Barry JJ, Gilliam FG, Kanner AM, Meador KJ. Rates and risk factors for suicide, suicidal ideation, and suicide attempts in chronic epilepsy. *Epilepsy Behav* 2003; 4 Suppl 3: S31-38.
28. Robertson MM. Suicide, parasuicide, and epilepsy. In: Engel JJr, Pedley TA, eds, editor. *Epilepsy: a comprehensive textbook.* New York: Lippincott-Raven; 1997. p. 2141–2151.
29. Beekman AT, Deeg DJ, Van Limbeek J, Braam AW, De Vries MZ, Van Tilburg W. Criterion validity of the Center for Epidemiologic Studies Depression scale (CES-D): results from a community-based sample of older subjects in The Netherlands. *Psychol Med* 1997; 27: 231-235.

30. Caracciolo B, Giaquinto S. Criterion validity of the center for epidemiological studies depression (CES-D) scale in a sample of rehabilitation inpatients. *J Rehabil Med* 2002; 34: 221-225.