Factors associated with hopelessness in epileptic patients

Maurizio Pompili, Gianluca Serafini, Marco Innamorati, Franco Montebovi, Dorian A Lamis, Mariantonietta Milelli, Manuela Giuliani, Matteo Caporro, Paolo Tisei, David Lester, Mario Amore, Paolo Girardi, Carla Buttinelli

Maurizio Pompili, Marco Innamorati, Franco Montebovi, Mariantonietta Milelli, Paolo Girardi, Department of Neurosciences, Mental Health and Sensory Organs, Suicide Prevention Center, Sant’Andrea Hospital, Sapienza University of Rome, 00189 Rome, Italy
Gianluca Serafini, Mario Amore, Department of Neuroscience, Rehabilitation, Ophthalmology, Genetics, Maternal and Child Health, Section of Psychiatry, University of Genoa, 16100 Genoa, Italy
Dorian A Lamis, Department of Psychiatry and Behavioral Sciences, Emory University School of Medicine, SC 29208, United States
Manuela Giuliani, Matteo Caporro, Paolo Tisei, Carla Buttinelli, Department of Neurological Science, Neurological Unit, S. Andrea Hospital, University La Sapienza, 00189 Rome, Italy
David Lester, The Richard Stockton College of New Jersey, Galloway, NJ 08205, United States

Author contributions: All authors contributed to this manuscript.
Correspondence to: Maurizio Pompili, MD, PhD, Department of Neurosciences, Mental Health and Sensory Organs, Suicide Prevention Center, Sant’Andrea Hospital, Sapienza University of Rome, 1035-1039, Via di Grottarossa, 00189 Rome, Italy. maurizio.pompili@uniroma1.it
Telephone: +39-06-33775675
Fax: +39-06-33775342
Received: August 14, 2014
Peer-review started: August 15, 2014
First decision: September 16, 2014
Revised: October 1, 2014
Accepted: October 14, 2014
Article in press: October 16, 2014
Published online: December 22, 2014

AIM: To investigate factors related to hopelessness in a sample of epileptic patients, including measures of depression and quality of life (QOL).

METHODS: Sixty-nine participants were administered the following psychometric instruments: Beck Depression Inventory- II, Beck Hopelessness Scale (BHS), and QOL in Epilepsy (QOLIE)-89. Patients were dichotomized into two categories: those affected by epilepsy with generalized tonic-clonic seizures vs those having epilepsy with partial seizures.

RESULTS: The groups differed on the QOLIE Role Limitation/Emotional dimension. Patients with generalized seizures reported more limitations in common social/role activities related to emotional problems than patients with other types of epilepsy (89.57 ± 25.49 vs 72.86 ± 36.38; t63 = -2.16; P < 0.05). All of the respondents reported moderate to severe depression, and 21.7% of patients with generalized seizures and 28.6% of patients with other diagnoses had BHS total scores ≥ 9 indicating a higher suicidal risk. The study did not control for years of the illness.

CONCLUSION: Patients with generalized seizures reported more limitations in common social/role activities related to emotional problems compared to patients with other types of seizures. Patients at increased suicide risk as evaluated by the BHS were older than those who had a lower suicidal risk. Future studies are required to further investigate the impact of hopelessness on the outcome of epileptic patients.

© 2014 Baishideng Publishing Group Inc. All rights reserved.

Key words: Epilepsy; Hopelessness; Suicide risk; Emotional problems; Social/role activities

Core tip: The present study assessed factors associated with hopelessness, depression, and quality of life in a sample of 69 epileptic patients using standardized psychometric instruments. All of the participants reported moderate to severe depression, and 25% of the patients had Beck Hopelessness Scale total scores ≥ 9 indicating a higher suicidal risk. Although the study did not control for years of the illness which may limit the generalizability of findings, patients with generalized seizures experienced more limitations.
in common social/role activities due to emotional problems than those with other types of seizures.

Pompili M, Serafini G, Innamorati M, Montebovi F, Lamis DA, Milelli M, Giuliani M, Caporro M, Tisei P, Lester D, Amore M, Girardi P, Buttinelli C. Factors associated with hopelessness in epileptic patients. World J Psychiatr 2014; 4(4): 141-149 Available from: URL: http://www.wjgnet.com/2220-3206/full/v4/i4/141.htm  DOI: http://dx.doi.org/10.5498/wjp.v4.i4.141

INTRODUCTION

Epilepsy is associated with a substantial economic burden, significant mortality and a dramatic decline in work productivity[1]. Epilepsy affects approximately 3 million people in the United States, with 140000 new cases[2,3] diagnosed every year. In European countries, epilepsy affects approximately 0.9 million children and adolescents (estimated prevalence: 4.75 per 1000) with 1.9 million cases reported in Europeans aged 20-64 years (estimated prevalence: 6 per 1000) and 0.6 million in those with 65 years and higher (estimated prevalence: 7 per 1000)[4]. A recent report in Europe[5] calculated an estimated 2.6 million individuals affected by epilepsy, costing 13.8 billion Euros in the year 2010.

Several studies have suggested that epilepsy is a severely disabling brain condition. Ding et al[6] calculated the Years Lived with Disability (YLD) according to a prevalence survey of epilepsy in 66393 individuals recruited in rural Chinese provinces and epilepsy mortality data. Epilepsy accounted for 1.41 lost years of life and 0.67 YLDs per 1000 in the population. The population of rural China, therefore, lost 2.08 per 1000 Disability Adjusted Life Years related to epilepsy. Leonardi et al[7] argued that the global burden of epilepsy should be recognized as a fundamental public health need since epilepsy was responsible for approximately 0.5% in terms of the global diseases burden worldwide in the year 2000.

One third of individuals with epilepsy have more than one seizure per month, and a satisfactory control of seizures is achieved in no more than 65%-70% of cases. Individuals who report being “seizure free” are usually those without medical and psychiatric comorbidities[8] and/or with a high quality of life (QOL)[9,10]. One of the most relevant challenges for clinicians is improving the QOL in epileptic patients. In the effort to reduce the subjective burden of this disorder and the associated psychosocial impairment, most of research has focused on patients suffering from refractory seizures[10-18]. QOL and its predictors among patients with different types of epilepsy have been widely analyzed only by a few studies.

Several biological and psychosocial variables may influence QOL and subjective well-being. It has been suggested that hopelessness is closely related to depression, and hopelessness has been frequently reported in studies as strongly associated with suicidal behaviors[15,17] as well as with medical illnesses, particularly terminal cancer[18-21].

Hopelessness predisposes patients with psychiatric disorders to suicidal behavior and has been identified as a relevant risk factor for suicide, particularly in individuals with serious mental disorders[16,22-24]. The QOL may be significantly altered by hopelessness and negatively influenced by poor psychosocial adjustment[25-27], resulting in increased suicidal risk. Therefore, hopelessness represents a critical risk factor and may be predictive of perceived lower QOL[28-30].

Attitudes toward epilepsy and self-efficacy have been found to be independent predictors of depressive symptoms. However, it has been suggested that the reduced self-efficacy related to seizure management may not influence the association between attitudes towards epileptic patients and depressive symptoms[31]. As previous studies reported that hopelessness is a predictor of future suicide behaviors in patients with mood disorders[12,23] and poor QOL[14,20] in epileptic patients, the present study was designed to evaluate the role of risk factors associated with hopelessness on the QOL in a sample of epileptic patients.

MATERIALS AND METHODS

Participants

Individuals were volunteers for the study and provided written informed consent. The hospital’s Institutional Review Board approved the study. Sixty-nine consecutive patients with epilepsy (31 men and 38 women) were admitted to the Department of Neurological Science, Neurological Unit, Sant’Andrea Hospital of Rome (Italy) between January 2010 and December 2010. The main socio-demographic and clinical characteristics of the sample are summarized in Table 1. The mean age of participants was 38.86 ± 15.99 years (36.65 ± 16.25 for men and 40.66 ± 15.76 for women; z = 1.04; P = 0.30). The majority of the patients was affected by partial seizures (64.6%) while 35.4% of them suffered from generalized tonic-clonic seizures.

Patients had to meet the following inclusion criteria: (1) they had a clinically established diagnosis of epilepsy with generalized tonic-clonic or partial seizures; (2) they were admitted consecutively as outpatients over a 12-mo period at the Department of Neurological Science, Neurological Unit, Sant’Andrea Hospital of Rome (Italy); (3) they were older than 18 years of age; and (4) they gave signed voluntary consent to participate in the research.

Exclusion criteria were: (1) a diagnosis of dementia or delirium; (2) positive psychotic symptoms (delusions

| Table 1 Sociodemographic characteristics of the sample (n = 69) |
|-----------------|-----------------|
| n (%)           |                 |
| Men             | 44.9%           |
| Age (mean ± SD) | 38.86 ± 15.99   |
| Epilepsy        |                 |
| Generalized seizures | 35.4%   |
| Partial seizures | 64.6%           |

WJP | www.wjgnet.com 142  December 22, 2014 | Volume 4 | Issue 4 |
and hallucinations; (3) illiteracy or inability to perform the evaluation; and (4) an inability to provide informed consent.

**Measures**

The patients were administered the Beck Depression Inventory-II (BDI-II), the Beck Hopelessness Scale (BHS), and the QOL in Epilepsy Inventory-89 (QOLIE-89).

**BDI-II:** The BDI-II is a 21-item self-report instrument evaluating the presence/severity of depressive symptoms during the previous 14 days. Each item is scored from 0 to 3 in order to evaluate symptom severity, with total scores ranging from a 0 to 63. A score of ≥ 14 is suggestive of mild depression, while a score of ≥ 20 is suggestive of moderate to severe depression. Internal consistency and concurrent validity have been documented in clinical/non-clinical samples.

**BHS:** The BHS is a 20-item self-report scale assessing hopelessness/negative attitudes concerning coming events. The scale evaluates feelings about the future, loss of motivation, and expectations for the future. Subjects are requested to endorse a pessimistic sentence or deny an optimistic sentence. Research has documented an association between the BHS total score and depressive symptoms, suicidal intent, and suicidal ideation. Furthermore, Beck et al. conducted a follow-up study on 1958 outpatients and reported that those with higher BHS total scores (≥ 9) were 11 times more likely to complete suicide than the outpatients with lower BHS total scores. Thus the BHS seems to be a useful predictor of eventual suicidal behavior. An Italian version of the BHS has been validated by Pompili et al.

The present study used the cutoff score of ≥ 9 to distinguish those patients at high risk for suicide.

**QOLIE-89:** The QOLIE-89 was developed based on the Epilepsy Surgery Inventory-55 and the Medical Outcomes Health Survey Short Form-36. It has 89 items assessing the following 17 dimensions of Health Related QOL (HRQOL): Health Perceptions, Overall QOL, Physical Functions, Role Limitations due to Physical Problems, Role Limitations due to Emotional Problems, Pain, Work/Driving/Social Functions, Energy/Fatigue, Emotional Well-Being, Attention/Concentration, Health Discouragement, Seizure Worry, Memory, Language, Medication Effects, Social Support, and Social Isolation. There are three additional items concerning sexual relations, changes in health, and overall health. Each subscale score was converted into a scale of 0-100 points, with higher scores indicative of a better level of functioning and higher QOL.

**Statistical analysis**

Statistical analyses were carried out with SPSS 17.0 for Windows. Differences between the groups of patients with different severity of hopelessness and different diagnoses were evaluated using t-tests for dimensional variables and one-way Fisher exact tests for 2 × 2 contingency tables. Significant variables at the bivariate analyses were then included in a logistic regression model as potential predictors. The groups of patients with different levels of hopelessness were included in the analysis as the dependent variable. The associations between variables are described as OR with confidence intervals and significance levels.

**RESULTS**

**Differences between diagnostic groups**

Table 2 presents the differences between those patients with generalized seizures vs those patients with partial seizures (including those who had secondarily generalized seizures). The two groups differed only on the QOLIE Role Limitation/Emotional dimension. Patients with generalized seizures reported more limitations in common social/role activities related to emotional problems as compared to patients with other diagnoses.

**Differences between high-risk group vs low-risk group**

On the BHS, 28.6% of the patients with partial seizures and 21.7% of those generalized seizures had a score ≥ 9. Differences between the two groups of patients were categorized by hopelessness severity (i.e., high vs low BHS total scores) are presented in Table 3. Patients with high BHS: (1) were older (50.53 ± 15.36 vs 35.04 ± 14.37, P < 0.01); (2) reported more severe depressive symptoms on the BDI-II (38.24 ± 8.53 vs 27.46 ± 5.88, P = 4.84, P < 0.001); (3) had lower scores on the QOLIE Health Perception subscale (55.63 ± 15.04 vs 48.53 ± 25.72, P < 0.01); (4) had lower scores on the Overall QOL (54.85 ± 14.10 vs 72.52 ± 17.03, P = 3.69, P < 0.001); (5) had lower scores on the Role Limitation Physical subscale (57.65 ± 37.34 vs 78.08 ± 31.25, P = 2.23, P < 0.05); (6) had lower scores on the Role Limitation Emotional subscale (52.94 ± 39.96 vs 86.92 ± 26.83, P = 3.27, P < 0.01); (7) had lower scores on the Pain subscale (64.56 ± 31.24 vs 81.88 ± 22.92, P = 2.46, P < 0.05); (8) had lower scores on the Energy/Fatigue subscale (48.53 ± 21.05 vs 66.22 ± 20.13, P = 3.11, P < 0.01); (9) had lower scores on the Emotional Wellbeing subscale (49.41 ± 18.27 vs 73.08 ± 17.64, P = 4.76, P < 0.001); (10) had lower scores on the Memory subscale (55.08 ± 26.84 vs 71.43 ± 25.39, P = 2.27, P < 0.05); (11) had lower scores on the Social Isolation subscale (71.18 ± 27.59 vs 88.65 ± 17.60, P = 2.45, P < 0.05); (12) had lower scores on the Changes in Health subscale (48.53 ± 25.72 vs 67.31 ± 27.36, P = 3.24, P < 0.05); and (13) had lower scores on the Overall Health subscale (55.63 ± 15.04 vs 72.50 ± 19.29, P = 3.21, P < 0.01).
In order to assess those factors associated with higher hopelessness when controlling for the effect of other variables, variables significant at the bivariate level were included as predictors in a logistic regression model with patients having higher hopelessness vs those with lower scores on the BHS serving as the dependent variable (Table 4). Given that the diagnostic groups were associated with different levels of limitations in common social/role activities related to emotional problems, we also included the interaction between these variables in the model.

The multivariate model fits the data well ($\chi^2$ = 45.89; $P < 0.001$), explaining 76% of the variability (Nagelkerke $R^2$ = 0.76). Patients with higher BHS scores (compared to those with lower BHS scores): (1) were 1.23 times more likely to be older ($P < 0.05$); (2) were 1.27 times more likely to have lower scores on the Overall score QOL of the QOLIE-89 ($P < 0.05$); (3) were 1.26 times more likely to report higher scores on the Energy/Fatigue subscale ($P < 0.05$); and (4) were 1.18 times more likely to report lower scores on the Emotional Wellbeing subscale ($P < 0.05$). It is important to note that depression severity failed to reach statistical significance in the prediction of hopelessness when controlling for the effect of other variables (OR = 1.34; $P = 0.07$). Thus, higher hopelessness is associated with some dimensions of QOL and age, while depressive symptomatology, as measured by the BDI-II, does not have an effect on hopelessness.

### DISCUSSION

In the present study, patients with higher hopelessness scores, as assessed by BHS, were older and reported more severe depression on the BDI-II as compared to those with lower hopelessness scores. Moreover, after multivariate analyses, the patients with higher scores on the BHS were more likely to have lower scores on the Overall QOL score of the QOLIE-89, more likely to report higher scores on the Energy/Fatigue and Emotional Wellbeing subscales, and more likely to be older compared to those with lower hopelessness scores. Contrary to our expectations, depression severity failed to reach statistical significance in the prediction of hopelessness when controlling for the effects of other variables. This non-significant finding is most likely related to the fact that all the patients reported moderate to severe depression.

An association between epilepsy and major depression

---

### Table 2 Differences between diagnostic groups (generalized seizures vs partial seizures)

|                           | Partial seizures | Generalized seizures | t-tests (DF: 67) | Significance |
|---------------------------|------------------|----------------------|------------------|-------------|
| **Age**                   |                  |                      |                  |             |
|                           | 40.81            | 36.35                | 1.06             | 0.30        |
| Men (%)                   |                  |                      |                  |             |
|                           | 35.7%            | -                    |                  | 0.09        |
| BHS                       |                  |                      |                  |             |
|                           | 6.86             | 4.05                 | 1.27             | 0.21        |
| BDI-II ≥ 9                |                  |                      |                  |             |
|                           | 28.6%            | -                    |                  | -           |
| BDI-II ≥ 21               |                  |                      |                  |             |
|                           | 100%             | -                    |                  | -           |
| QOLIE-89                  |                  |                      |                  |             |
| Health Perception         |                  |                      |                  |             |
|                           | 68.55            | 19.63                | 0.45             | 0.66        |
| Overall QOL               |                  |                      |                  |             |
|                           | 66.12            | 23.07                | -1.67            | 0.10        |
| Physical function         |                  |                      |                  |             |
|                           | 85.48            | 22.14                | 0.24             | 0.81        |
| Role limitations due to physical problems | |                      |                  |             |
|                           | 84.13            | 21.19                | 0.54             | 0.59        |
| Role limitations due to emotional problems | |                      |                  |             |
|                           | 72.86            | 36.38                | -2.16            | 0.05        |
| Pain                      |                  |                      |                  |             |
|                           | 81.79            | 23.09                | 1.72             | 0.09        |
| Work/driving/social function |              |                      |                  |             |
|                           | 84.18            | 13.94                | 0.06             | 0.96        |
| Energy/fatigue            |                  |                      |                  |             |
|                           | 83.99            | 11.37                | -0.9             | 0.37        |
| Emotional wellbeing       |                  |                      |                  |             |
|                           | 63.62            | 21.98                | -1.85            | 0.07        |
| Attention/concentration   |                  |                      |                  |             |
|                           | 72.70            | 17.04                | -0.77            | 0.08        |
| Health discouragement     |                  |                      |                  |             |
|                           | 77.38            | 21.98                | -0.08            | 0.94        |

BHS: Beck Hopelessness Scale; BDI-II: Beck Depression Inventory-II; QOL: Quality of life; QOLIE-89: Quality of life in Epilepsy-89; DF: Degree of freedom.
has often been reported, and epileptic patients frequently show depressive symptoms, but a recent systematic review and meta-analysis of nine studies including 29891 patients with epilepsy reported a global prevalence of actual/past-year depression of only 23.1%. The high prevalence of depression found in our patients could be due to the fact that depression was diagnosed using a self-report instrument rather than clinical assessment. Significant heterogeneity in the results of ascertaining depression using different methods has been reported.

Overall, the current findings were only partially in line with those of Jehi et al., who analyzed data from 1931 subjects affected by drug-resistant and medically-controlled epilepsy during one year of follow-up and found that depression, together with seizure severity, was a major predictor of QOL in epileptic patients. Likewise, Lehrner et al. reported that depression significantly predicted QOL in 56 patients with temporal lobe epilepsy. Boylan et al. found that in a sample of 122 patients with refractory epilepsy, scores on the BDI were able to explain 51% of the total variance of the QOLIE-31 scores, and only depression significantly predicted QOL. Gilliam et al. reported that depression severity and adverse effects related to antiepileptic

| Table 3 Differences between patients with scores of 9 or higher on the Beck Hopelessness Scale and patients with lower scores |
|-----------------|--------------|----------|----------|-----------|-----------------|-----------|
|                 | Lower hopelessness | Mean   | SD       | t-tests (DF: 67) | Significance |
| Age             |              | 35.04   | 14.37   | -3.80          | 0.001        |
|                 | Higher hopelessness | 50.53   | 15.36   |                |              |
| Men (%)         | Lower hopelessness | 50.0%   | -       | -              | 0.11         |
|                 | Higher hopelessness | 29.4%   | -       |                |              |
| Generalized seizures | Lower hopelessness | 37.5%   | -       |                | 0.39         |
|                 | Higher hopelessness | 29.4%   | -       |                |              |
| BDI-II          | Lower hopelessness | 27.46   | 5.88    | -4.84          | 0.001        |
|                 | Higher hopelessness | 38.24   | 8.53    |                |              |
| QOLIE-89        | Health Perception | Lower hopelessness | 72.52   | 18.93   | 3.14          | 0.01         |
|                 | Higher hopelessness | 55.64   | 20.14   |                |              |
| Overall QOL     | Lower hopelessness | 70.25   | 17.03   | 3.69          | 0.001        |
|                 | Higher hopelessness | 54.85   | 14.10   |                |              |
| Physical function | Lower hopelessness | 87.31   | 20.47   | 1.73          | 0.09         |
|                 | Higher hopelessness | 76.77   | 25.86   |                |              |
| Role limitations due to physical problems | Lower hopelessness | 78.08   | 31.25   | 2.23          | 0.05         |
|                 | Higher hopelessness | 57.65   | 37.34   |                |              |
| Role limitations due to emotional problems | Lower hopelessness | 86.92   | 26.83   | 3.27          | 0.01         |
|                 | Higher hopelessness | 52.94   | 39.96   |                |              |
| Pain            | Lower hopelessness | 81.88   | 22.92   | 2.46          | 0.05         |
|                 | Higher hopelessness | 64.56   | 31.24   |                |              |
| Work/driving/social function | Lower hopelessness | 84.39   | 13.32   | 0.25          | 0.81         |
|                 | Higher hopelessness | 83.48   | 13.45   |                |              |
| Energy/fatigue  | Lower hopelessness | 66.22   | 20.13   | 3.11          | 0.01         |
|                 | Higher hopelessness | 48.53   | 21.05   |                |              |
| Emotional wellbeing | Lower hopelessness | 73.08   | 17.64   | 4.76          | 0.001        |
|                 | Higher hopelessness | 49.41   | 18.27   |                |              |
| Attention/concentration | Lower hopelessness | 79.29   | 21.80   | 0.86          | 0.39         |
|                 | Higher hopelessness | 74.25   | 18.25   |                |              |
| Health discouragement | Lower hopelessness | 81.35   | 17.49   | 1.47          | 0.16         |
|                 | Higher hopelessness | 69.41   | 31.91   |                |              |
| Seizure worry   | Lower hopelessness | 63.33   | 22.50   | 1.99          | 0.051        |
|                 | Higher hopelessness | 51.23   | 19.23   |                |              |
| Memory          | Lower hopelessness | 71.43   | 25.39   | 2.27          | 0.05         |
|                 | Higher hopelessness | 55.08   | 26.84   |                |              |
| Language        | Lower hopelessness | 79.69   | 23.12   | 1.63          | 0.11         |
|                 | Higher hopelessness | 69.18   | 22.88   |                |              |
| Medication effects | Lower hopelessness | 78.21   | 25.58   | -0.43         | 0.67         |
|                 | Higher hopelessness | 81.21   | 22.77   |                |              |
| Social support  | Lower hopelessness | 75.24   | 20.448  | 1.73          | 0.09         |
|                 | Higher hopelessness | 64.71   | 25.76   |                |              |
| Social isolation | Lower hopelessness | 88.65   | 17.60   | 2.45          | 0.05         |
|                 | Higher hopelessness | 71.18   | 27.59   |                |              |
| Change in health | Lower hopelessness | 67.31   | 27.36   | 2.49          | 0.05         |
|                 | Higher hopelessness | 48.53   | 25.72   |                |              |
| Sexual relations | Lower hopelessness | 63.73   | 28.86   | 1.50          | 0.14         |
|                 | Higher hopelessness | 51.47   | 29.94   |                |              |
| Overall Health  | Lower hopelessness | 72.50   | 19.29   | 3.21          | 0.01         |
|                 | Higher hopelessness | 55.63   | 15.04   |                |              |

BDI-II: Beck Depression Inventory-II; QOL: Quality of life; QOLIE-89: Quality of life in Epilepsy-89; DF: Degree of freedom.
medications were independent predictors of health status in a study of 205 outpatients with controlled and uncontrolled seizures. Luoni et al. found that depressive symptoms were powerful predictors of HRQOL in patients with pharmacoresistant epilepsy. Many other studies have documented that depression is a significant predictor of QOL in epileptic patients.[12,14,43,46-52].

Consistent with the present findings, occasional researchers have found depressive symptoms to be unrelated to epilepsy. For example, Attarian et al. did not find an association between depression severity and seizure rate in 143 epileptic outpatients.

In our study, patients with higher BHS total scores were more likely to have significant limitations and impairments in QOL as reported on the QOLIE-89. It is possible that poorly controlled seizures and their medical consequences may contribute to hopelessness that may reduce QOL and increase the risk for suicide in patients with epilepsy. In keeping with the findings from Jehi et al.[44], definitive conclusions concerning the eventual bidirectional association between hopelessness/depression and epilepsy are not easy to be drawn given the existence of spurious correlations from potential third variables. For example, both hopelessness/depression and epilepsy may be associated with reduced neurotrophic factors activity and altered signalling pathways related to neurotoxic effects such as hippocampal atrophy and memory/learning impairment.[45].

After multivariate analyses, the results indicated that those patients in our study who had generalized seizures reported more limitations in common social/role activities related to emotional problems compared to those patients with other types of seizures. This is consistent with the results of the study by Luoni et al.[45] who found that generalized seizures negatively predicted the “seizure worry” score according to the validated Italian version of the QOLIE-31. Tracy et al.[48] reported that, in a sample of 435 patients with predominant (56%) generalized seizures, the BDI-II score was the single reliable predictor of Emotional Well-Being subscale scores, explaining 37% of its variance in a general linear model.

In our study, 21.7% of the patients with generalized seizures and 28.6% of the patients with other diagnoses reported BHS total scores ≥ 9, indicating a higher suicidal risk. We have also found in a previous study that 26% of the total sample of patients affected by temporal lobe epilepsy had high levels of hopelessness as well as an elevated risk of committing suicide[57]. Furthermore, Pompili et al.[53,55], in a meta-analytic analysis of research, found that suicide is more frequent both in epileptic patients and in those with epilepsy who have been surgically treated compared to the general population. Clearly, suicide in epilepsy is a significant and frequent event. This underlines the importance of identifying factors that increase suicide risk in an effort to reduce the risk. Interestingly, it has been reported that suicide mortality among epileptic patients is roughly the same as mortality due to epilepsy, suggesting that deaths by suicide are typically not included in global mortality epilepsy rates.[55]. Mortality rates in subjects with epilepsy are, therefore, presumably underestimated if they do not include deaths related to suicide.

In the present study we also found that older patients with epilepsy are at higher suicide risk when compared to younger patients. We hypothesize that epileptic patients develop higher hopelessness as they grow older about their current status and future life. However, older patients have been exposed to the illness for a longer period of time compared to younger patients. Our study did not control for years of illness limiting our ability to speculate about the association between the age of the patients with epilepsy and their hopelessness levels.

**Limitations**

One limitation of the present study is that we did not control for seizure severity. Subjects who are “seizure-free” often report having high QOL that resembles that of the general population[58,59] although, in some of these individuals, comorbid mental disorders, in particular depression impair subjective wellbeing.[47,51,56,59]. Several
researchers have reported a negative association between seizure severity and QOL, and patients in whom seizures are controlled effectively using antiepileptic drugs/surgery may be more likely to experience an improvement in health-related QOL. Seizure severity and other seizure-related variables have been found to be strong predictors of psychiatric comorbidity and depression.

Furthermore, the two groups of patients (those affected by epilepsy with generalized tonic-clonic seizures vs those having epilepsy with partial seizures) are not similar and a healthy control group was not available.

Other limitations include the small size of the present sample and the scarcity of information concerning seizure refractoriness, the number of psychoactive medications being taken, and seizure frequency. Further additional studies, including larger samples of patients with epilepsy, are required to investigate the complex relationship between depression, hopelessness, and QOL in epileptic patients. In addition, we were not able to ascertain the specific cause of the epilepsy (there are epilepsy subtypes that may be induced by external stimuli such as fever, toxin exposure, psychological distress).

In addition, we had insufficient information concerning seizure severity, seizure frequency, age at onset of seizures, duration of the illness, or number/type of psychotropic drugs, and so we were not able to evaluate the impact of these disease-variables on levels of hopelessness and QOL scores.

The patients were administered self-report measures that were not validated using an additional psychiatric examination, exposing the present findings to possible recall bias. In addition, the cross-sectional nature of this research further limits the generalization of the present findings. Lastly, all respondents reported moderate-severe depression, and this high prevalence of depression may indicate that the sample was highly selective and not representative of patients with epilepsy in general. However, the questionnaires were completed when the patients were admitted as outpatients for a seizure with no intervening period between seizure occurrence and mood evaluation.

Given the methodology which was used in the present study, a causal interpretation of the association between variables is not possible. Prospective follow-up studies using more advanced methodologies are required in order to make causal inferences about directional and developmental pathways underlying the variables involved in epilepsy.

Despite the limitations of the study, the current findings are consistent with existing results in the literature suggesting that, among patients with epilepsy, patients with higher hopelessness are more likely to have impairments in QOL compared to those with lower levels of hopelessness. Hopelessness in individuals with epilepsy needs to be identified as soon as possible in order to improve the QOL and reduce the burden of the disease. Prevention efforts to address recognized risk factors for suicidality are also needed for patients with epilepsy. Further prospective studies, including larger samples, should be carried out to investigate the complex nature of the relationship between hopelessness and the QOL in patients with epilepsy.

REFERENCES
1 World Health Organization. Fact sheet N°999. Geneva, 2009. [Cited 2012 April 18]. Available from: URL: http://www.who.int/mediacentre/factsheets/fs999/en/
2 Epilepsy Foundation. Epilepsy and seizure statistics. Landover, MD, Epilepsy Foundation, 2012. [Cited 2012 April 28]. Available from: URL: http://www.epilepsyfoundation.org/about/statistics.cfm
3 Hirtz D, Thurman DJ, Gwinn-Hardy K, Mohamed M, Chaudhuri AR, Zulutsky R. How common are the “common” neurologic disorders? Neurology 2007; 68: 326-337 [PMID: 17261678 DOI: 10.1212/01.wnl.0000278071.91524.4d]
4 Forsgren L, Beghi E, Oun A, Sillanpää M. The epidemiology of epilepsy in Europe - a systematic review. Eur J Neurol 2005; 12: 245-253 [PMID: 15804240 DOI: 10.1111/j.1468-1331.2004.00992.x]
5 Olesen J, Gustavsson A, Svensson M, Wittchen HU, Jönsson
Pompili M et al. Hopelessness and epilepsy

B. The economic cost of brain disorders in Europe. Eur J Neurol 2012; 19: 155-162 [PMID: 22175760 DOI: 10.1111/j.1468-1311.2011.03590.x]

6 Ding D, Hong Z, Wang WZ, Wu JZ, de Boer HM, Pilipko L, Sander JW. Managing the disease burden due to epilepsy by disability adjusted life year in rural China. Epilepsia 2006; 47: 2032-2037 [PMID: 17201700 DOI: 10.1111/j.1528-1167.2006.00820.x]

7 Leonardi M, Ustun TB. The global burden of epilepsy. Epilepsia 2002; 43 Suppl 6: 21-25 [PMID: 12190974 DOI: 10.1046/j.1528-1157.2002.01611.x]

8 Leidy NK, Eliaxauser A, Vickrey B, Means E, William MK. Seizure frequency and the health-related quality of life of adults with epilepsy. Neurology 1999; 53: 162-166 [PMID: 10485535]

9 Stavem K, Loge JH, Kaasa S. Health status of people with epilepsy compared with a general reference population. Epilepsia 2000; 41: 85-90 [PMID: 10643929 DOI: 10.1111/j.1528-1157.2000.00130.x]

10 Bautista RE, Glen ET, Wldyuka PS, Shetty NK. Factors associated with utilization of healthcare resources among epilepsy patients. Epilepsy Res 2008; 79: 120-129 [PMID: 18339521 DOI: 10.1016/j.epleyrres.2008.01.003]

11 Harden CL, Maroof DA, Nikolov B, Fowler K, Sperling M, Liporace J, Pennell P, Labar D, Herzog A. The effect of seizure severity on quality of life in epilepsy. Epilepsy Behav 2007; 11: 208-211 [PMID: 17604229 DOI: 10.1016/j.yebeh.2007.05.002]

12 Kanner AM, Barry JJ, Gilliam F, Hermann B, Meador KJ. Anxiety disorders, subsyndromic depressive episodes, and major depressive episodes: do they differ on their impact on the quality of life of patients with epilepsy? Epilepsy Res 2010; 51: 1152-1158 [PMID: 20477847]

13 Loring DW, Meador KJ, Lee GP. Determinants of quality of life in epilepsy. Epilepsy Behav 2004; 5: 976-980 [PMID: 15582847]

14 Tracy JI, Dechant V, Sperling MR, Cho R, Glosser M. The association of mood with quality of life ratings in epilepsy. Neurology 2007; 68: 1101-1107 [PMID: 16988068 DOI: 10.1212/01.wnl.0000242582.83632.73]

15 Beck AT, Weissman A, Lester D, Trexler L. The measurement of pessimism: the hopelessness scale. J Consult Clin Psychol 1974; 42: 861-865 [PMID: 4456473 DOI: 10.1037/h0037562]

16 Kim CH, Jayathilake K, Meltzer HY. Hopelessness, neurocognitive function, and insight in schizophrenia: relationship of objective and subjective indicators of health. Schizophr Res 2006; 82: 241-249 [PMID: 16642265 DOI: 10.1016/j.schres.2005.12.844]

17 Chocinov HM, Hack T, Hassard T, Kristjanson LJ, McClement S, Harlos M. Dignity therapy: a novel psychotherapeutic intervention for patients near the end of life. J Clin Oncol 2005; 23: 5520-5525 [PMID: 16110012 DOI: 10.1200/JCO.2005.08.9911]

18 Steptoe A, Marmot M. Burden of psychosocial adversity and vulnerability in middle age: associations with biobehavioral risk factors and quality of life. Psychosom Med 2003; 65: 1029-1037 [PMID: 14645782 DOI: 10.1097/00006842-200309000-00003]

19 Yip PS, Cheung YB. Quick assessment of hopelessness: a cross-sectional study. Health Qual Life Outcomes 2006; 4: 13 [PMID: 16509984 DOI: 10.1186/1477-7525-4-13]

20 Wagner JL, Smith G, Ferguson PL, Horton S, Wilson E. A hopelessness model of depressive symptoms in youth with epilepsy. J Pediatr Psychol 2009; 34: 89-96 [PMID: 18539619 DOI: 10.1093/jpepsy/jsn052]

21 Pompili M, Innomaratori M, Rhimer Z, Gonda X, Serafini G, Akiskal H, Amore M, Niolu C, Sher L, Tatarelli R, Perugi G, Girardi P. Cyclothymic-depressive-anxious temperament pattern is related to suicide risk in 346 patients with major mood disorders. J Affect Disord 2012; 136: 405-411 [PMID: 22177743 DOI: 10.1016/j.jad.2011.01.011]

22 Pompili M, Rhimer Z, Akiskal H, Amore M, Gonda X, Innomaratori M, Lester D, Perugi G, Serafini G, Telesforo L, Tatarelli R, Girardi P. Temperaments mediate suicide risk and psychopathology among patients with bipolar disorders. Compr Psychiatry 2012; 53: 280-285 [PMID: 21641589 DOI: 10.1016/j.compsych.2011.04.004]

23 Giovagnoli AR, Avanzini G. Quality of life and memory performance in patients with temporal lobe epilepsy. Acta Neurol Scand 2000; 101: 295-300 [PMID: 10987316 DOI: 10.1034/j.1600-0404.2000.90257a.x]

24 Strine TW, Kobau R, Chapman DP, Thurman DJ, Price P, Balluz LS. Psychological distress, comorbidities, and health behaviors among U.S. adults with seizures: results from the 2002 National Health Interview Survey. Epilepsia 2005; 46: 1133-1139 [PMID: 16026567 DOI: 10.1111/j.1528-1167.2005.00326.x]

25 Beck AT, Steer RA, Brown CK. Manual for the Beck Depression Inventory-II. San Antonio, TX: Psychological Corporation, 1996

26 Pompili M, Tatarelli R, Rogers JR, Lester D. The Hopelessness Scale: a factor analysis. Psychol Rep 2007; 100: 375-378 [PMID: 17564211 DOI: 10.2466/prl.100.2.375-378]

27 Devinsky O, Vickrey BG, Cramer J, Perrine K, Herrmann B, Meador K, Hays RD. Development of the quality of life in epilepsy inventory. Epilepsia 1995; 36: 1089-1104 [PMID: 7875351]
1. Vickers BG, Hays RD, Graber J, Rausch R, Engel J, Brook RH. A health-related quality of life instrument for patients evaluated for epilepsy surgery. Med Care 1992; 30: 299-319 [PMID: 15568790 DOI: 10.1097/00005650-199204000-00002]

2. Fiest KM, Dykeman J, Fatten SB, Wiebe S, Kaplan GG, Maxwell CJ, Bulloch AG, Jette N. Depression in epilepsy: a systematic review and meta-analysis. Neurology 2013; 80: 590-599 [PMID: 23175727 DOI: 10.1212/WNL.0b013e31827b1ae0]

3. Jehi L, Tesar G, Obuchowski N, Novak E, Najm I. Quality of life in 1931 adult patients with epilepsy: seizures do not tell the whole story. Epilepsy Behav 2011; 22: 723-727 [PMID: 22019018 DOI: 10.1016/j.yebeh.2011.08.039]

4. Lehrner J, Kalchmayr R, Serles W, Olbrich A, Pataraia E, Aull S, Bacher J, Leutmezer F, Gröppel G, Deeteke L, Baumgartner C. Health-related quality of life (HRQOL), activity of daily living (ADL) and depressive mood disorder in temporal lobe epilepsy patients. Seizure 1999; 8: 88-92 [PMID: 10222990 DOI: 10.1016/S0961-6914(99)00027-2]

5. Boylan LS, Flint LA, Labovitz DL, Jackson SC, Starnier K, Devinsky O. Depression but not seizure frequency predicts quality of life in treatment-resistant epilepsy. Neurology 2004; 62: 258-261 [PMID: 14745064]

6. Gilliam FG, Barry JJ, Hermann BP, Meador KJ, Vahle V, Kanner AM. Rapid detection of major depression in epilepsy: a multicentre study. Lancet Neurol 2006; 5: 399-405 [PMID: 16632310 DOI: 10.1016/S1474-4422(06)70415-X]

7. Luoni C, Bisulli F, Canevini MP, De Sarro G, Fattore C, Galimberti CA, Gatti G, La Neve A, Muscas G, Specchio LM, Striano S, Perucca E. Determinants of health-related quality in life in pharmacoresistant epilepsy: results from a large multicenter study of consecutively enrolled patients using validated quantitative assessments. Epilepsia 2011; 52: 2181-2191 [PMID: 22136077 DOI: 10.1111/j.1528-1167.2011.03325.x]

8. Gilliam F. Optimizing health outcomes in active epilepsy. Neurology 2002; 58: 59-20 [PMID: 11971128]

9. Park SP, Song HS, Hwang YH, Lee HW, Suh CK, Kwon SH. Differential effects of seizure control and affective symptoms on quality of life in people with epilepsy. Epilepsy Behav 2010; 18: 455-459 [PMID: 20591744 DOI: 10.1016/j.yebeh.2010.05.021]

10. Perrine K, Hermann BP, Meador KJ, Vickers BG, Cramer JA, Hays RD, Devinsky O. The relationship of neuropsychological functioning to quality of life in epilepsy. Arch Neurol 1995; 52: 997-1003 [PMID: 7575228 DOI: 10.1001/archneur.1995.0054034009017]

11. Suurmeijer TP, Reuevkamp MF, Aldenkamp BP. Social functioning, psychological functioning, and quality of life in epilepsy. Epilepsia 2001; 42: 1160-1168 [PMID: 11580765 DOI: 10.1046/j.1528-1157.2001.07900.x]

12. Taylor RS, Sander JW, Taylor RJ, Baker GA. Predictors of health-related quality of life and costs in adults with epilepsy: a systematic review. Epilepsia 2011; 52: 2168-2180 [PMID: 21883177 DOI: 10.1111/j.1528-1167.2011.03325.x]

13. Whatley AD, Dilorio CK, Yeager K. Examining the relationships of depressive symptoms, stigma, social support and regimen-specific support on quality of life in adult patients with epilepsy. Health Educ Res 2010; 25: 575-584 [PMID: 20167608 DOI: 10.1093/her/cyp001]

14. Marchetti VA, Lordan GV, Catapano G, Cunnane CS, De Nardis GP, Di Cosimo V, Perucca E. Determinants of health-related quality of life in patients with epilepsy. Seizure 2001; 10: 298-301 [PMID: 11971128 DOI: 10.1016/S1054-1311(01)00083-0]

15. Kimiskidis VK, Triantafyllou NI, Karazizou E, Gatzonis S, Fountoulakis KN, Siatouni A, Loucaidis P, Pseflogianni D, Vlaidhids N, Kaprinis GS. Depression and anxiety in epilepsy: the association with demographic and seizure-related variables. Ann Gen Psychiatry 2007; 6: 28 [PMID: 17971199 DOI: 10.1186/1744-859X-6-28]

16. Pompili M, Girardi P, Tatarelli G, Angelletti G, Tatarelli R. Suicide after surgical treatment in patients with epilepsy: a meta-analytic investigation. Psychol Rep 2006; 98: 323-338 [PMID: 16796084 DOI: 10.2466/pr0.98.2.323-338]

17. Pompili M, Girardi P, Tatarelli R. Death from suicide versus mortality from epilepsy in the epilepsies: a meta-analysis. Epilepsy Behav 2006; 9: 641-648 [PMID: 17011240 DOI: 10.1016/j.yebeh.2006.06.019]

18. Pompili M, Girardi P, Ruberto A, Tatarelli R. Suicide in the epilepsies: a meta-analytic investigation of 29 cohorts. Epilepsy Behav 2005; 7: 305-310 [PMID: 15996526 DOI: 10.1016/j.yebeh.2005.05.010]

19. Gilliam F, Necimovic H, Sheline Y. Psychiatric comorbidity, health, and function in epilepsy. Epilepsy Behav 2003; 4 Suppl 4: S26-S30 [PMID: 14654425 DOI: 10.1016/j.yebeh.2003.10.003]

20. Kwon OY, Park SP. What is the role of depressive symptoms among other predictors of quality of life in people with well-controlled epilepsy on monotherapy? Epilepsy Behav 2011; 20: 528-532 [PMID: 21354863 DOI: 10.1016/j.yebeh.2011.01.010]

21. Baker GA, Jacoby A, Buck D, Stalgis C, Monnet D. Quality of life of people with epilepsy: a European study. Epilepsia 1997; 38: 353-362 [PMID: 9070599 DOI: 10.1111/j.1528-1167.1997.tb01128.x]

22. McLachlan MS, Rose KJ, Derry PA, Bonnar C, Blume WT, Girvin JP. Health-related quality of life and seizure control in temporal lobe epilepsy. Ann Neurol 1997; 41: 482-489 [PMID: 9124805 DOI: 10.1002/ana.410410411]

P- Reviewer: Vance DE, Verrotti A  S- Editor: Ji FF  L- Editor: A  E- Editor: Liu SQ
