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Risk factors for psychological distress in community-treated epilepsy

Cameron J. Lacey [a,b,*], Michael R. Salzberg [a], Wendyl J. D'Souza [b]

[a] Department of Psychiatry, St Vincent's Hospital Melbourne, University of Melbourne, 59 Victoria Parade, Fitzroy, 3065 Melbourne, Victoria, Australia
[b] Department of Medicine, St Vincent's Hospital Melbourne, University of Melbourne, 59 Victoria Parade, Fitzroy, 3065 Victoria, Australia

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ABSTRACT

The study aimed to determine risk factors for psychological distress in a community-treated sample of patients with epilepsy. This study investigated the Tasmanian Epilepsy Register participants. Participants included were as follows: aged 13 years and over, able to complete the individual computer-assisted participant interview, and diagnosed with epilepsy following an epilepsy specialist review of the diagnostic epilepsy interview, which was interpreted using standardized diagnostic guidelines. Psychological distress was assessed with the Kessler-10 questionnaire. Risk factors were grouped into four domains: sociodemographic factors, disease-related factors, psychological factors, and treatment-related factors. High or very high levels of psychological distress were reported by 22% of the participants, with 7.8% having very high distress. The regression model showed that psychological distress was significantly associated with female gender ($F = 18.1$, $p < 0.001$), diabetes mellitus ($F = 8.7$, $p = 0.003$), intellectual disability ($F = 7.1$, $p = 0.06$), and not receiving phenytoin ($F = 5.1$, $p = 0.02$). While the model was significant ($F = 5.78$, $p < 0.001$), only 11% of the variance of the K-10 score was explained by these factors (adjusted R-squared = 0.11). This study identifies female gender and comorbid medical conditions as risk factors for psychological distress and the use of phenytoin as a protective factor. The few factors identified and the limited variance explained suggest that a focus on epilepsy-related variables is unlikely to explain key influences underlying psychiatric comorbidity in patients with epilepsy.

1. Introduction

The association between epilepsy and psychiatric comorbidity is well recognized with increased rates of a range of psychiatric disorders including depression, generalized anxiety disorder, and panic disorder [1]. Psychiatric comorbidity is associated with decreased quality-of-life, diminished medication adherence, poorer treatment outcomes, increased health service use, increased cognitive complaints, increased risk of other chronic diseases such as cardiovascular disease, and suicide [2–6].

The risk factors that contribute to psychological distress in patients with epilepsy remain unclear. Most research has been derived from hospital- or tertiary-based populations and is vulnerable to important sampling biases. For example, the rate of depression was found to be 58% in surgical patients [7] compared with 11% in community samples [8]. Furthermore, there are discrepancies in reported risk factors for psychiatric comorbidity between hospital-based samples and community studies. This may be due to the practical challenges of obtaining valid epilepsy-related variables in representative community-based studies with large sample sizes.

The Tasmanian Epilepsy Register (TER) is one of a handful of studies utilizing a sample of people with community-treated epilepsy, and initial results confirmed that the rate of psychological distress is greater than that in the general population [4]. The TER is a sufficiently large, well-classified sample of people with epilepsy to investigate risk factors for psychological distress which may inform efforts at reducing this important health disparity [9].

The study aimed to determine risk factors for psychological distress in a community-treated sample of patients with epilepsy and to determine if rates of psychological distress differ across treatment settings.

2. Methods

A description of the Tasmanian Epilepsy Register methodology has been previously published [10]. This study examined "psychological distress" in the TER population as revealed by the Kessler-10 (K-10) psychiatric screening tool. For convenience, the study used the term "psychological distress" to denote the symptoms assessed by the K-10 instrument [11]. The K-10 is an ideal measure to begin investigating psychiatric comorbidity as it captures most depressive and anxiety illness, has the advantages of brevity, and allows comparison with large community surveys that also employed this instrument [12]. While the concept of "psychological distress" includes both depression and anxiety disorders, research findings in the general population have

* Corresponding author at: Department of Psychological Medicine, University of Otago, Christchurch, PO Box 4345, Christchurch, New Zealand. Tel.: +64 3 3720400; fax: +64 3 3720407.
E-mail address: cameron.lacey@otago.ac.nz (C.J. Lacey).

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established that there is some overlap in risk factors for both conditions [13].

2.1. Inclusion criteria

The inclusion criteria for this study were the following: TER participants of at least secondary school age (13 years and over), able to complete the individual computer-assisted participant interview, and diagnosed with epilepsy following an epilepsy specialist (WD) review of the diagnostic epilepsy interview, which was interpreted using standardized diagnostic guidelines [14]. Participants who were unable to be interviewed due to intellectual disability or communication difficulties were excluded.

2.2. Psychological distress

Psychological distress was assessed with the K-10, a 10-question screening scale developed for the US National Health Interview Survey. The K-10 performs well in detecting DSM-IV anxiety and mood disorders (as validated by the Composite International Diagnostic Interview (CIDI)), with a high area under receiver operating characteristic curve (AUC) = 0.90. As in the Australian National Health Surveys [12], the K-10 total was grouped into the following levels of psychological distress: low (K-10 = 10–15), moderate (K-10 = 16–21), high (K-10 = 22–30), and very high (K-10 = 31–50) or as a dichotomous variable in which participants were classified as having either low–moderate or high–very high levels of psychological distress.

2.3. Risk factors

The classification proposed by Hermann et al. was modified to group potential risk factors divide into four domains [15].

2.3.1. Sociodemographic factors

Socioeconomic status was obtained from the participants' postcodes using the Index of Relative Socioeconomic Advantage/Disadvantage (SEIFA) 2001 developed by the Australian Bureau of Statistics [16]. This provides an estimate of each individual's socioeconomic status based on a measure of the relative social and economic well-being of the population of their postcode area taken as a whole. This, in turn, is derived from attributes such as the proportions in each area with low income, low educational attainment, high unemployment, and jobs in relatively unskilled occupations. High scores on the Index of Relative Socioeconomic Advantage/Disadvantage indicate higher socioeconomic status and less disadvantage. This study transformed SEIFA values into quintiles for the Tasmanian population as previously described in the Tasmanian Epilepsy Register methodology [10]. This study also examined the association with the three main geographical/administrative regions of Tasmania (Southern, Northern, and North-western) determined by participants' postcodes. Postcodes of participants were also used to determine their geographical remoteness using the Australian Standard Geographical Classification (ASGC) 'Remoteness Structure'. This measures the remoteness based on the physical distance to the nearest urban center [17] and is classified into the following: major cities of Australia, inner regional Australia, outer regional Australia, remote Australia, very remote Australia, and migratory.

2.3.2. Disease-related factors

Participants completed a detailed epilepsy diagnostic telephone questionnaire administered by trained interviewers. This provided detailed descriptive seizure data to enable an epilepsy specialist to determine the presence of epilepsy, seizure-onset type (generalized, focal, or uncertain), presence of an idiopathic generalized epilepsy (IGE) syndrome, age at onset of epilepsy, duration of epilepsy, seizure frequency, and antecedent epilepsy risk factors [14]. A diagnosis of epilepsy was made by blind interpretation on two occasions by an experienced epileptologist applying standardized guidelines [14]. The diagnostic interview was a modified version of two diagnostic questionnaires, each previously shown to have substantial to very high agreement with physician-based diagnoses in classifying seizure types and broad epilepsy-onset types [18,19]. This modified version showed almost perfect agreement in diagnosing epilepsy ($\kappa = 0.94$), seizure-onset types ($\kappa = 0.84$), simple or complex partial seizures ($\kappa = 0.87$), any generalized nonconvulsive seizure ($\kappa = 0.82$), IGE ($\kappa = 0.82$) and substantial agreement for secondarily generalized seizures ($\kappa = 0.74$), and generalized tonic–clonic seizures ($\kappa = 0.79$) [14]. The frequency of both convulsive and nonconvulsive seizures in the last 12 months was grouped into the following: none, less than monthly, or more than monthly.

The epilepsy diagnostic interview also elicited information about antecedent epilepsy risk factors including the presence of other medical conditions that have been associated with seizures. These included each participant's history of febrile convulsion, serious head injury before first seizure, cerebrovascular accident (CVA), brain tumor, brain surgery, meningitis or encephalitis, cerebral palsy, intellectual disability, multiple sclerosis, diabetes mellitus, coma, polio, and arteriovenous malformation (AVM). The presence of these conditions was summed into the variable "number of antecedent epilepsy risk factors".

2.3.3. Psychological factors

Although alcohol abuse results in psychiatric disorder by both neurobiological and psychological mechanisms, it will be considered here for convenience [20]. Alcohol use was assessed with the Alcohol Use Disorders Identification Test (AUDIT) questionnaire, which has been widely used to screen for hazardous and harmful drinking [21]. The AUDIT scores of eight or greater were considered positive for hazardous and harmful drinking [21].

2.3.4. Treatment-related factors

The Health Insurance Commission provided data on the individual anticonvulsant medications dispensed in the 12-month study period for each participant. These were recorded as dichotomous variables as well as combined into the total number of anticonvulsant medications. The Health Insurance Commission records "prescribing doctor provider type" for all prescriptions, and this utilizes the vocation speciality recorded with each doctor's medical registration information. For the 12-month study period, these data were used to estimate the setting in which the Tasmanian Epilepsy Register participants received their medical care as studies suggest that the medical practitioner writing anticonvulsant drug prescriptions is most likely to also be responsible for disease supervision and follow-up [22]. Patients receiving care from a general practitioner only were compared with those receiving care from a general practitioner and/or a specialist.

2.4. Statistical analysis

Univariate statistics were initially used to test for significant associations with psychological distress. The associations between K-10 total (continuous outcome) and predictor variables are presented using Spearman's rank correlation, independent *t* tests, and ANOVA tests for ordinal, dichotomous, and categorical variables, respectively. The associations between "high or very high" psychological distress (dichotomous outcome) and individual predictor variables utilized independent *t* tests, Mann–Whitney *U* test, and chi-squared test for continuous, ranked, and categorical variables, respectively. Boxplots show median, quartiles, range, and outliers (defined by 1.5 times the interquartile range outside the quartiles). General linear regression (SPSS© Version 19) was utilized to assess predictors of the level of psychological distress. Any predictor variable with a p value <0.1 was selected for inclusion in the linear regression.

This study was granted ethical approval by the University of Tasmania Human Research Ethics Committee.