

A randomized trial of a group based cognitive behavior therapy program for older adults with epilepsy: the impact on seizure frequency, depression and psychosocial well-being

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Abstract Few studies have examined the effectiveness of cognitive behavior therapy to manage seizures and improve psychosocial functioning in older adults with epilepsy. This study evaluated the efficacy of a 6 week group CBT program in community dwelling adults with epilepsy who were aged over 60 years. A total of 37 participants were randomly assigned to either a CBT group or a control group. Measures of depression, dysthymia, psychosocial functioning and seizure frequency were completed at pre and post intervention. Seizure frequency was significantly reduced in the CBT group compared to the control group (Cohen's d 0.63). The results suggest that the relationship between seizure frequency and psychological and psychosocial well being in older adults requires further investigation. Although there were no significant between group differences on measures of depression and psychosocial functioning, both the CBT and control groups improved significantly from baseline.

Keywords Epilepsy · Cognitive behavior therapy · CBT · Older adults

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Older adults with epilepsy are at increased risk of depression, impaired psychosocial function and reduced quality of life, especially when seizures are uncontrolled (McLaughlin et al. 2008a, b). Mechanisms which can induce seizures have been identified and documented in the literature, including emotional state, alcohol and drug use, poor temperature control, metabolic and hormonal imbalances, fatigue, and poor hydration (Aird 1983; Antebi and Bird 1993; Spector et al. 2000; Spector et al. 1994; Wolf 2002). A number of researchers have also investigated whether people with epilepsy can utilise this information to abort seizure genesis (Dahl 1992; Janszky et al. 2004; Spector et al. 1999; Spector et al. 2001). In recent years, psychological management of seizures has become an area of clinical interest and subsequent empirical research (Cull and Goldstein, 2002; Fenwick 1990; Goldstein 1997; Goldstein et al. 2003), however, no research has been directed specifically at older adults, although epilepsy is one of the most common neurological disorders of late adulthood, increasing in both incidence and prevalence after the age of 60 (Kotsopoulos et al. 2002).

Cognitive behavior therapy (CBT) for the treatment of epilepsy has been the focus of some research attention, both because of its amenity to a randomized controlled design and because of the postulated association of cognitive tasks on seizure activity. A recent study examined the effects of cognitive-motor tasks on electroencephalograph (EEG) discharges consistent with seizure activity (Matsuoka et al. 2005). These tasks showed an inhibitory effect on EEG discharges in 64% of the participants. These results concur with the seminal work of Fenwick (1991) and Fenwick and Brown (1989), who described the relationship between cognitions and seizures in their model of the “thinking epilepsies”. This model suggests that seizures may be precipitated or inhibited by a specific mental task which

activates or suppresses an epileptogenic area in the brain. Together with the more recent work of Matsuoka et al. (2005) this provides strong conceptual evidence to support the utilisation of a cognitive behavioral intervention.

CBT interventions have typically focused on two pathways to improve well being in people with epilepsy: firstly, focusing on the management of depressive symptoms and secondly, identifying and managing thoughts and behaviors that may trigger seizures. Evidence of the efficacy of CBT in reducing depression and improving psychosocial function in people with epilepsy remains inconclusive (Davis et al. 1984; Goldstein et al. 2003; Spector et al. 1999; Tan and Bruni, 1986). However, more robust evidence supports the utility of CBT as a method of reducing seizure frequency, with a number of studies reporting partial (Andrews et al. 2000; Gillham 1990; Goldstein et al. 2003; Pfafflin and May 2001; Schmid-Schonbein 1998; Spector et al. 1999) or complete seizure control (Andrews and Schonfeld 1992; Wolf and Okujava 1999; Reiter and Andrews 2000) in some participants.

A group CBT intervention based on the framework developed by Reiter et al. (1987) has been used in a number of studies (Andrews et al. 2000; Goldstein et al. 2003; Reiter and Andrews 2000). This program includes cognitive behavioral techniques aimed at identifying and managing seizure triggers as well as sessions focusing on the management of mood and stress. Group based treatments are effective, offer time and cost benefits and have been used extensively to enhance well-being in people with other medical conditions (Claar and Blumenthal 2003) as well as those with epilepsy (Spector et al. 1999). While no prior research has been conducted in a sample of older adults with epilepsy, CBT has been used successfully as a psychological intervention in older, non-epileptic populations (Dick et al. 1995).

Accordingly, the aim of this study was to examine the effects of a CBT program on seizure frequency, depression and psychosocial well-being in older adults with epilepsy.

Method

Participants

Participants were 37 community dwelling older adults with epilepsy (18 male, 19 female) who were able to attend weekly group sessions. Participants were recruited by mailouts of flyers to members of state and national epilepsy support organisations in Australia and to specialist medical practitioners and public hospitals with epilepsy clinics. All participants had a confirmed diagnosis of epilepsy from a general medical practitioner, neurologist, neurosurgeon or geriatrician. Seizure type was described as either partial

onset or generalised onset and was based on both patient report and examination of patient provided medical records. Inclusion in the study required that the person be aged 60 or older, have a Mini Mental State Examination (Folstein et al. 1975) score ≥ 24 , be English speaking and be able to provide information on their physical and medical status. This study was approved by the human ethics committee of the University of Queensland and all participants had the nature of the program fully explained to them and provided informed consent for participation.

Measures

Composite International Diagnostic Interview (CIDI)—Auto (WHO 1990) is a computerised, structured diagnostic interview for the assessment of mental disorders which provides diagnoses according to the accepted definitions of both the International Classification of Diseases, 10th Edition (ICD-10) and the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition (DSM-IV). During the CIDI-Auto interview, participants are asked a series of questions about symptoms of psychiatric disorders. Positive responses to some of the symptom questions are followed by questions from the Probe Flow Chart which determine whether the symptom is a possible psychiatric symptom that is not due to medication, drugs or alcohol or to physical illness or injury. If sufficient symptoms are indicated and these symptoms occur in a pattern that suggests a diagnosis may be present, participants are asked about the onset and recency of the particular symptoms they have described. For the purposes of this study, the interviewer requested information from participants on depressive and dysthymic symptomatology resulting in two variables *CIDI Depression* and *CIDI Dysthymia*. The CIDI-Auto has excellent inter-rater reliability ($\kappa = 1.00$) and test-retest reliability (1 month) of .55–.83 (Wittchen 1994), depending on diagnosis of disorder, and also demonstrates acceptable validity with an average kappa coefficient of .40 (Peters and Andrews 1995).

The *Geriatric Depression Scale (GDS)* (Yesavage et al. 1983) has been used extensively with older populations as a measure of depression. The GDS is a brief self-report questionnaire in which participants respond to 30 questions with a yes or no format. Scores are summed and the total used as a guide for assessing the presence of depression. Scores of 0–9 are considered normal, 10–19 indicates mild depression and 20–30 indicates severe depression. The GDS was found to have 92% sensitivity and 89% specificity when evaluated against diagnostic criteria. The validity and reliability of this instrument have been supported through both clinical practice and research.

Washington Psychosocial Seizure Inventory (WPSI) (Dodrill et al. 1980) is a self-rating scale that has been

extensively used in adult epileptic populations. The WPSI contains 132 items and measures psychosocial adjustment on eight scales, including an overall assessment of psychosocial functioning. Statements require a ‘true’ or ‘false’ response with higher scores indicating impairments in functioning and poorer adjustment. The scales are family background, emotional adjustment, interpersonal adjustment, vocational adjustment, financial status adjustment, adjustment to seizures, medicine and medical management and overall psychosocial functioning. The WPSI also contains a “Lie” scale that identifies subjects who under-report emotional distress and suffering. The WPSI has been extensively validated and proven reliable, it can distinguish people with epileptic seizures from normal controls or people with nonepileptic or pseudoseizures. Interrater reliability has been reported as $r = 0.94$ with a test–retest reliability of $r = 0.85$ (Dodrill et al. 1980; Dodrill and Batzel 1994). The WPSI has also shown acceptable internal consistency with reported Cronbach’s α of 0.73 (Dodrill et al. 1980; Dodrill and Batzel 1994). A reliability analysis for the WPSI was performed for this study, with a Cronbach’s α coefficient of .82 obtained.

Procedure

Using SPSS 12 for Windows Random Sampling (SPSS Inc 2003), the pool of 37 participants was randomly allocated to either a program group or a control group, with the final number being 18 in the program group and 19 in the control group. Six groups were formed, one of 7 participants and five of 6 participants each.

All participants were provided with a seizure diary, in which they could daily record details of seizure activity, associated situational or environmental factors and aspects of affect and cognition. To provide baseline information, seizure frequency was recorded in the seizure diary for the month prior to the intervention and, before the first group session, participants were interviewed and completed the CIDI, GDS and WPSI. Seizure recording continued throughout the intervention and was maintained until the 3-month follow up interview.

Program group participants attended six two-hour, weekly sessions based on the program used by Spector et al. (1999). A seminar room was provided for the sessions by a national epilepsy association. Treatment was administered in a standardized fashion using a standard treatment protocol manual. All group sessions were conducted by the same facilitator, a psychologist with particular expertise in the application of CBT and other behavioral strategies to people with epilepsy.

With increasing age come changes in cognitive abilities across many spheres, such as attention, memory and executive function (Pachana et al. 1998). In order to

accommodate these changes and in accordance with techniques of CBT developed for older adults (Dick et al. 1995), the program was altered to incorporate less content over fewer sessions with more opportunity to practice and the use of diaries and notebooks to facilitate memory.

The modified program was as follows: *Session 1*: Introduction, support and the use of self monitoring forms for seizures, and associated thoughts, emotions and behaviors; *Session 2*: The importance of a healthy physical and emotional lifestyle and medication issues; *Session 3*: Understanding epilepsy and identifying auras; identifying and avoiding triggers for seizures; *Session 4*: Identifying and controlling factors that trigger seizures—the use of CBT; *Session 5*: CBT and seizures; *Session 6*: Review, evaluation and discussion. Further details of the program are available in Online Resource 1.

Consistent with relaxation training guidelines (Payne 2000), the control group participants attended six one-hour, weekly sessions during which they were taught relaxation techniques and were provided with several relaxation exercises on audiotape. Details of the relaxation exercises are contained in Online Resource 2.

As completion of the whole battery of measures was a lengthy process for these older adults, at the end of the final intervention session, participants were only asked to complete the GDS and provide details of seizure frequency from their seizure diary. Follow up interviews were conducted individually 3 months after the end of the group sessions and participants were again asked to complete the CIDI, GDS and WPSI, and seizure frequency was recorded from the seizure diary.

At the completion of the study, a booklet detailing the techniques and strategies taught in the program sessions was mailed to all participants. No medication changes were made to any participants during the course of the group sessions or for the 3 months post-intervention.

Results

All analyses were performed using SPSS 12 for Windows (SPSS Inc 2003). Table 1 presents selected characteristics of the CBT program (program) group and the control group. There were no significant differences between the program and control groups on age ($t(35) = .077$, $P = .939$), age of onset ($t(35) = -.152$, $P = .880$), duration of epilepsy ($t(35) = .297$, $P = .768$), type of seizure ($\chi^2(1, n = 37) = .03$, $P = .858$) or number of medications ($t(35) = .1376$, $P = .178$).

A one-way analysis of variance was conducted on baseline measures to explore any differences between the groups on measures of depression and dysthymia (CIDI and GDS), psychosocial functioning (WPSI) and seizure

frequency. Table 2 depicts the mean scores on the variables for the program and control groups. There were no statistically significant differences between the groups on any of the variables.

A series of repeated measures ANOVAS compared the two groups on all the variables tested across either two or three assessments (WPSI and CIDI measures were taken only at baseline and 3 month follow up; GDS and seizure frequency were measured at baseline, immediately post-treatment and at 3 month follow up). Table 3 presents the mean scores and standard deviations for the two groups on the outcome measures for either two or three assessments.

Although there were no significant main effects for groups, there were statistically significant main effects for

time on the GDS ($F(2,34) = 12.24, P < .001, \eta^2 = .42$), CIDI dysthymia ($F(2,34) = 6.06, P < .05, \eta^2 = .15$), seizure frequency ($F(2,34) = 10.62, P < .001, \eta^2 = .38$), and three WPSI scales: adjustment to seizures ($F(2,34) = 43.14, P < .001, \eta^2 = .55$), emotional adjustment ($F(2,34) = 21.35, P < .001, \eta^2 = .38$) and the WPSI summative scale, overall psychosocial functioning ($F(2,34) = 13.00, P < .001, \eta^2 = .27$). Thus, participants in both groups reported significantly lower rates of depression, as measured by the GDS, and dysthymia, as measured by the CIDI, following the intervention. Seizure frequency was also significantly reduced, while WPSI scales of adjustment to seizures, emotional adjustment and overall psychosocial functioning improved significantly.

Table 1 Characteristics of CBT program group and control group participants

	Program group (n = 18)	Control group (n = 19)
Male	8	10
Female	10	9
Mean age	67.56 (SD = 7.27)	67.37 (SD = 7.46)
Mean age of epilepsy onset	39.00 (SD = 26.73)	40.32 (SD = 25.86)
Mean duration of epilepsy	28.56 (SD = 27.48)	25.89 (SD = 26.98)
Seizure type		
Generalized	8	9
Partial	10	10
Mean number of medications	1.78 (SD = .88)	1.42 (SD = .69)

Table 2 Summary of mean scores (SD) for program and control groups for baseline measures

	Program group (n = 18)	Control group (n = 19)
CIDI depression	1.94 (1.76)	1.68 (1.56)
CIDI dysthymia	2.78 (2.05)	3.21 (1.99)
GDS	12.50 (7.28)	11.37 (5.13)
WPSI family b'ground	3.17 (2.98)	2.63 (2.24)
WPSI emotional adjust.	14.17 (6.00)	12.05 (5.24)
WPSI interpersonal adjust.	6.67 (4.35)	4.89 (3.54)
WPSI vocational adjust.	3.22 (2.80)	3.16 (2.79)
WPSI financial status	2.56 (2.28)	2.37 (2.24)
WPSI adjust to seizures	6.44 (5.03)	4.00 (3.65)
WPSI medical m'ment	2.94 (2.53)	2.53 (2.22)
WPSI psychosocial func.	18.83 (10.76)	17.00 (8.31)
Seizure frequency per month	6.33 (6.62)	4.95 (7.43)

Table 3 Summary of outcome measure mean scores (SD) at assessment times of baseline, immediate post-treatment and 3-month follow up

	Program group (n = 18)			Control group (n = 19)		
	Baseline	Post-treatment	3 month follow up	Baseline	Post-treatment	3 month follow up
CIDI						
Depression	1.94 (1.76)		1.78 (1.56)	1.68 (1.57)		1.58 (1.39)
Dysthymia	2.78 (2.05)		2.22 (1.83)	3.21 (1.99)		2.89 (1.82)
GDS	12.50 (7.28)	11.39 (7.1)	10.33 (7.35)	11.37 (5.13)	10.58 (4.13)	9.74 (4.81)
WPSI						
Family b'ground	3.17 (2.98)		2.89 (2.35)	2.63 (2.24)		2.89 (2.23)
Emotional adjustment	14.17 (6.0)		12.83 (5.88)	12.05 (5.24)		11.63 (5.08)
Interpersonal adjustment	6.67 (4.35)		6.22 (4.57)	4.89 (3.54)		4.74 (3.33)
Vocational adjustment	3.22 (2.80)		3.11 (2.85)	3.16 (2.79)		3.00 (2.65)
Financial status	2.56 (2.28)		2.28 (2.19)	2.37 (2.24)		2.32 (2.45)
Seizure adjustment	6.44 (5.03)		4.28 (3.83)	4.00 (3.65)		3.11 (3.38)
Medical m'ment	2.94 (2.53)		2.67 (2.33)	2.53 (2.22)		2.42 (2.39)
Overall psychosocial score	18.83 (10.76)		17.67 (10.56)	17.00 (8.31)		16.26 (8.12)
Seizure frequency/month	6.33 (6.62)	3.68 (3.73)	1.39 (1.82)	4.95 (7.43)	5.00 (6.98)	4.42 (6.56)

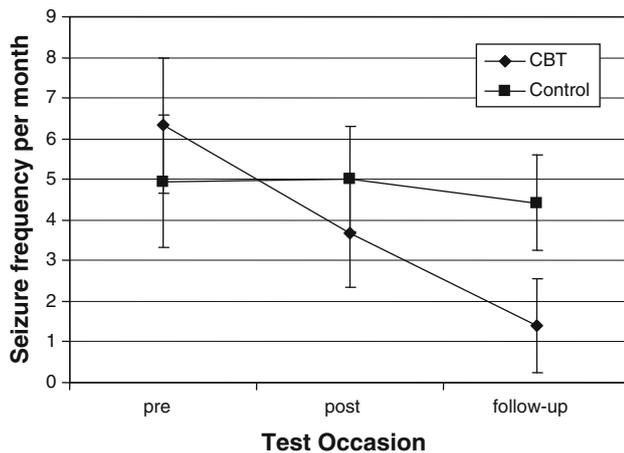


Fig. 1 Average seizure frequency (with standard error bars) as a function of group and testing occasion. *CBT* cognitive behavior therapy program; *Control* control group

There was a significant time \times group (intervention conditions) interaction obtained between the program group and the control group on seizure frequency: $F(2,34) = 5.56$, $P < .01$, Wilks' Lambda = .75. Decomposition of this interaction showed that, across time, seizure frequency decreased significantly in the program group relative to the control group (Cohen's $d = 0.63$). The interaction is illustrated in Fig. 1.

Discussion

The aim of this study was to explore the effectiveness of a CBT program in reducing seizure frequency, decreasing depression and improving psychosocial functioning in a sample of older adults with epilepsy. The results indicate that seizure frequency was significantly reduced in the program group compared with the control group. Additionally, there were significant improvements in measures of depression and psychosocial functioning demonstrated by both program and control groups. Thus, contrary to expectations, the control group also benefited from the intervention.

Seizure reduction has consistently been one of the primary goals of psychological treatments of epilepsy (Cull and Goldstein 2002), as frequent seizures have been associated with poorer outcomes on measures of psychological and social function. This holds true for older adults, as results from earlier analyses have indicated that more frequent seizures have a substantial negative impact on their quality of life and psychosocial well being (McLaughlin et al. 2008b). While seizure frequency was reduced in both the program and the control groups, seizure reduction in the program group was significantly greater than for the

control group. It should be noted that the participants in this study reported a relatively low frequency of seizures at baseline, with a mean monthly seizure incidence of 6.33 for the program group and 4.95 for the control group. Most previous studies have examined populations with severe, frequent, intractable seizures, with some samples reporting a baseline monthly mean seizure frequency ranging between 10.3 (Puskarich et al. 1992) and 35.5 (Goldstein et al. 2003). Interestingly, the WPSI summative scale of psychosocial functioning and the adjustment to seizures scale were also significantly improved in the two intervention groups, indicating that, in conjunction with improved seizure control, the participants in this study increased their overall psychosocial well being and exhibited a more effective adjustment to their epilepsy.

Improvements in measures of depression and dysthymia were also apparent in both the program and the control groups, although reductions in the clinical measure of depression failed to reach significance. Previous research has suggested that the most common presentation of depression in older adults with epilepsy is dysthymia (McLaughlin et al. 2008a). It may be that the GDS is unable to differentiate between the more subtle symptoms of depression and dysthymia and is reflecting a melioration of dysthymic symptoms only. Improvements in the symptoms of major depressive disorder may take longer to become apparent than the 3 months that comprised this intervention. Reflecting the improvements on scores of affective measures, scores on the WPSI scale of emotional adjustment were also diminished. The improvements in the measures of emotional state for both groups suggest that the content of the intervention may not be as meaningful for older adults with epilepsy as the intervention process itself.

While the CBT program was more successful in controlling seizures, the benefits accrued by the control group through their participation were also evident and it may be that there are elements consistent with both interventions that are effective. A similar finding was reported by Gillham (1990) in a counterbalanced comparison of two psychological treatment programs to reduce seizure frequency. Gillham (1990) concluded that the lack of differences apparent in outcomes was due to either similarities in the actions of the two treatments or the facilitation of coping skills in participants. It may be that a similar paradigm is in operation in the current study. The process of group participation, including socializing with same aged peers with similar conditions, may also facilitate improvements in well-being that are independent of program content.

There are a number of limitations to this study which should be considered when interpreting the results. As with all studies that rely on self-selection, sample selection may be biased and the participants may not be representative of

older persons with epilepsy. In addition, older people with epilepsy are not an homogeneous group, but have many differing etiologies, medication regimes, lifestyles, personalities and life experiences that may affect the study outcomes. The length and structure of the CBT program, which was applied over a 6-week period, with weekly group sessions, may have affected the outcome. Although modifications were made to accommodate age related changes, further slowing the delivery and increasing the length of the program may have enhanced the results. Further, although the length of the relaxation training was consistent with established guidelines, the discrepancy in therapeutic contact time may have affected the results.

Evaluating the effectiveness of psychological treatments for epilepsy remains complicated because of the difficulty in conducting controlled studies. However, although the existing body of evidence may be limited by methodology, it is compelling in the breadth and consistency of its data. Despite the preponderance of pharmaceutical treatments to control epilepsy, many people with epilepsy continue to suffer recurrent seizures. The CBT treatment paradigm lends itself to both clinical applications and future research in older adults, has no side effects and may have additional benefits that are yet to be quantified.

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