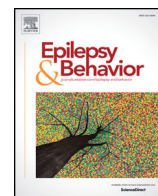




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The efficacy of a short-term multidisciplinary epilepsy program

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ABSTRACT

Rationale: Epilepsy is more than having seizures. Therefore, specialized epilepsy centers in Germany offer multidisciplinary programs for inpatients with pharmacoresistant epilepsies. This monocentric study evaluated the efficacy of a short-term program that is based on a biopsychosocial model of health and conceptualized by occupational therapists, physical therapists, neuropsychologists, and social workers.

Methods: Of the 1573 patients treated between 2008 and 2014, 1339 were rated using a 7-tiered predefined category system. Outcome domains are compliance, affect, activity, autonomy, communication, fine motor skills, and mobility. Based on a total score, the patients were classified as impaired, functional, or highly functional. Functionality at baseline and changes after the treatment were analyzed and related to demographics, medical, and neuropsychological data.

Results: At baseline, 80.8% of the patients were rated as impaired according to the total score. Impairments were predominantly observed in the domains affect, autonomy, and communication. A better total score at baseline was significantly related to a better neuropsychological functioning and a lower number of concurrent antiepileptic drugs. After the intervention 50.3% of the patients showed significant improvements regarding the total score. Compliance, activity, and affect were the most responsive domains.

Conclusion: This study provides promising results with regard to the efficacy of a short-term multidisciplinary epilepsy program. Positive effects could be achieved referring to compliance, activity, and affect. The findings support the relevance of such programs. Subsequent research should focus on the transfer to everyday life.

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1. Introduction

People with epilepsy are often affected by psychosocial impairments [1–3]. This in turn is usually associated with restrictive quality of life [4–6]. Therefore the treatment of epilepsy should be extended to issues apart from seizures and seizure frequency, especially if seizures cannot be fully controlled. This is why, in Germany, specialized epilepsy centers can offer a short-term multimodal treatment for inpatients with pharmacoresistant epilepsy. The treatment is implemented in the German Related Group-system (G-DRG). It is based on a biopsychosocial model of health and includes multidisciplinary therapies such as occupational and physical therapy as well as psychological-behavioral treatment, neuropsychological training, and social work. At the Department of Epileptology in Bonn such a program has been established in 2008.

While a few studies have investigated the efficacy of psychosocial or educational programs for people with epilepsy an evaluation of a short-term multimodal program for inpatients has not yet been evaluated. The existing literature on psychosocial and educational interventions for adult patients with epilepsy has been reviewed in two relevant systematic Cochrane reviews on care delivery and self-management

strategies [7,8]. These reviews include articles about self-management education, specialist nurse practitioners, strategies to improve patient compliance, behavioral interventions, alternative care delivery in outpatient clinics as well as guideline implementation and patient information. In addition, there are studies addressing the efficacy of self-management interventions [9–12], behavioral therapy [13,14], specialized nursing [15], and guideline implementation [16]. Altogether, a significant positive effect of psychosocial interventions for patients with epilepsy can be concluded from these studies.

In Germany, the efficacy and outcome determinants of psychosocial and educational programs for patients with epilepsy have been evaluated in two relevant studies so far. The first study is about the efficacy of an educational treatment program for patients with epilepsy called MOSES [17]. The results demonstrate that MOSES significantly improves knowledge about epilepsy, coping with epilepsy, seizure frequency, and tolerance of antiepileptic drug therapy. The second study addresses changes of coping strategies in patients with pharmacoresistant epilepsy in a course of a ward-based treatment with a holistic therapeutic approach [18]. The results of this study show that the holistic therapeutic approach has a positive influence on coping strategies of patients. It increases problem-focused coping and decreases emotion-focused coping or avoidance-oriented coping. Both studies demonstrate the long-term effects of psychosocial and educational intervention programs for people with epilepsy.

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Taking this as the background for the present study, we evaluated (1) the efficacy of a short-term multidisciplinary program for inpatients with epilepsy and (2) which factors determine the outcome of such an intervention. Approval of the efficacy of the onward multimodal and multidisciplinary short-term intervention would be important for the justification and eventual modification of such programs in epilepsy.

2. Methods

2.1. Intervention

The short-term multidisciplinary program is conceptualized as a modular therapeutic treatment from occupational and physical therapists as well as neurologists, psychologists, and social workers. The treatment requires that at least three of the above mentioned professions work with the patient. For the most of the patients (23.1%), the therapeutic modules are carried out daily eight times for at least 1.5 h/day. On average, the duration in the clinic was round about 11 days (SD: 7.74 days). In detail, the program includes many different interventions like education/training of cognitive functions (e.g., attention, executive functions, memory strategies, and language), exercises in physical fitness and motor coordination for increasing the patients mobility, therapeutic counseling for a better coping with the disease and its consequences, information about metacognition for a better understanding of the cognitive processes in the brain and the influence of lesions, epilepsy, and antiepileptic drug therapy on cognition, education of seizure documentation for the monitoring of the disease and treatment effects, education in strategies for seizure self-control and reducing provoking factors, mindfulness training for relaxation, and advice in social law for a better assistance or vocational rehabilitation. Decisions for specific interventions depend on the individual needs of each patient and are defined in weekly meetings by the multidisciplinary team. The diverse interventions are examples for individual treatment options. Table 1 shows the assignment of interventions to the domains of functionality in which they should achieve a better outcome.

2.2. Instrument and data analysis procedures

Each patient was evaluated by the same professional at the beginning and at the end of hospitalization. In total, 3 staff members were involved in the rating during the study period. One professional was an occupational therapist, one was a remedial pedagogue, and one was a rehabilitation pedagogue. There were no differences in coding between the 3 raters, because every professional uses the same rating scale with the same operationalization of behavior. Furthermore, there was no significant difference between the ratings of the professionals in regard to the outcome. Based on behavioral observations during the own diagnostic process and in therapeutic interactions with other healthcare employees and other patients, the following domains were assessed on a 7-tiered bipolar rating scale (Supplementary material Appendix 1, Table 1): compliance, affect, activity, communication, mobility, fine motor

Table 1
Assignment of interventions to outcome dimensions.

Interventions	Domains of functionality
Education/training of cognitive functions (e.g., attention, executive functions, memory strategies, and language)	Autonomy, communication
Exercises in physical fitness and motor coordination	Mobility, activity, fine motor skills, affect
Therapeutic counseling and information about metacognition	Compliance, affect
Education of seizure documentation	Compliance, autonomy
Education in strategies for seizure self-control	Autonomy
Mindfulness training for relaxation	Affect
Advice in social law	Autonomy

skills, and autonomy of patients. The rating ranged from -3 (completely impaired) over 0 (normal functionality) to $+3$ (functionally gifted) and was performed according to predefined behavioral criteria for each step. The domains were analyzed separately and summed up as a total score. Compliance represents the degree of patient adherence to the treatment. Affect represents the mood of patients. Activity represents the degree of action and own initiative to manage daily demands. Communication represents the degree of ability to interact verbal or nonverbal to other people. Mobility represents the degree of physical fitness. Fine motor skills represent the degree of coordination ability of fingers and hands. Autonomy represents the degree of independence from assistance.

The demographics and medical data were collected from the medical files. The neuropsychological data based on results of the neuropsychological tests. The tests measured intelligence quotient (IQ) via a short form of the Hamburg-Wechsler-Intelligenztest für Erwachsene - Revision (HAWIE-R, Wechsler Adult Intelligence Scale - Revision), attention via d2, verbal memory via Verbaler Lern- und Merkfähigkeitstest (VLMT, Verbal Learning and Memory Test), figural memory via Diagnosticum für Cerebralschädigung - Revision (DCS-R, Diagnosticum for Cerebral Damage), language ability via Token Test, spatially-visually functioning via Leistungsprüfsystem (LPS, Performance Testing System) subtest 7 (mental rotation), and depressive mood via the Beck Depression Inventory (BDI I). The tests and their references are described in previous articles [19–21].

Statistical analysis comprised the evaluation of frequencies of rated impairments at baseline and follow-up. For this purpose, the information of the ratings was condensed into three categories: impaired (<0), functional ($=0$), and highly functional (>0).

The data were analyzed with SPSS Statistics version 24. Significant change between baseline and follow-up was analyzed using the ordinal Wilcoxon tests for dependent samples and with frequency statistics based categorical data of change. Therefore total score, compliance, affect, activity, communication, mobility, fine motor skills, and autonomy of all patients were rated at the beginning (t1) and the end (t2) of hospitalization. Improved or worsened performance was concluded when there was a respective change of one step in the 7-tiered rating scale from baseline to follow-up (e.g., from -2 at t1 to -1 at t2). Finally, stepwise multiple linear regression analysis was carried out to find determinants of a positive therapy response. Here gender, age, education, employment status, seizure type, duration of seizures, frequency of seizures, severity of seizures, medication, and neuropsychological impairments were included as independent variables.

3. Results

3.1. Descriptive results

Within a survey period from September 2008 to October 2014 a total of 1573 inpatients participated in the short-term program. From these participants a number of 234 patients had to be excluded from the study because of missing data. Therefore a sample of 1339 patients was included in the analysis. Demographic and clinical data of these patients are listed in Table 2.

3.2. Baseline

At baseline, most of the patients (80.8%) were rated as impaired in regard to the total score (Fig. 1). In detail, more than half of the patients were rated as impaired in the domains communication (65.7%), affect (63.3%), and autonomy (57.8%); exactly half of patients were rated as impaired in mobility (50.0%), and less than a half of patients were rated as impaired in fine motor skills (48.2%), activity (35.7%), and compliance (27.9%).

A significant determinant for a better total score rating by the professionals at baseline is a better neuropsychological functioning ($r =$

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