



## Epilepsy-related clinical factors and psychosocial functions in pediatric epilepsy



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### ABSTRACT

**Purpose:** The aim of this study was to identify the different influencing patterns of demographic and epilepsy-related variables on various aspects of psychosocial function in pediatric epilepsy.

**Method:** Five hundred ninety-eight patients with pediatric epilepsy between the ages of 4 and 18 years (boys = 360, 60% and girls = 238, 40%) and their parents participated in the study. Parents completed the Social Maturity Scale (SMS), the Korean version of the Child Behavior Checklist (K-CBCL), and the Korean version of the Quality of Life in Childhood Epilepsy Questionnaire (K-QOLCE) to assess daily living function, behavior, and quality of life. The Children's Global Assessment Scale (CGAS) was completed by clinicians to assess general adaptive function. Demographic variables, such as age and sex of child, and epilepsy-related clinical variables, including seizure type, seizure frequency, duration of epilepsy, and number of medications, were obtained from medical records. **Results:** Demographic and epilepsy-related clinical variables had a strong influence (22–32%) on the cognition-related domain such as general adaptive function, school/total competence, and quality of life for cognitive function while a comparatively smaller effect (2–16%) on the more psychological domain including behavioral, emotional, and social variables. Younger age, shorter duration of illness, and smaller number of medications showed a strong positive impact on psychosocial function in pediatric epilepsy, particularly for adaptive function, competence, and quality-of-life aspects.

**Conclusion:** Given the wide range of impact of demographic and clinical variables on various facets of psychosocial functions, more specific understanding of the various aspects of factors and their particular pattern of influence may enable more effective therapeutic approaches that address both the medical and psychological needs in pediatric epilepsy.

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### 1. Introduction

Pediatric epilepsy is a biologically based risk factor for childhood and adolescent psychopathology and family adjustment problems [1]. Studies of the psychosocial impact of epilepsy have shown an association

between emotional/behavioral problems and childhood epilepsy [2,3]. It has been postulated that the psychosocial impact of epilepsy is multi-dimensional [4]. Therefore, a diverse assortment of risk factors has been studied as possible predictive factors of the psychosocial adaptive function in children with epilepsy [5].

Multiple risk factors may explain the higher prevalence of psychiatric problems in children with epilepsy [5], but there has been a wide variation in their effect on psychosocial function. Confounding factors in these studies may be the variations in methodology, sample characteristics, and time of measurement. For example, for methodological differences, higher rates of psychopathology are identified in

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structured psychiatric interviews compared with self-reported instruments [6]. In relation to sample characteristics and time of measurement, higher rates of psychopathology are reported in clinical samples recruited from medical centers [7,8] compared with unselected community or population-based studies [9], in patients with chronic epilepsy [10,11] compared with those with new-onset epilepsy [12,13], and in cross-sectional studies [7,8,14] compared with longitudinal studies [15]. Additionally, factors associated with epilepsy, including neurodevelopmental issues and psychosocial variables, may have mediating effects on the results and make it more difficult to discover clinical and therapeutic implications [1].

Despite these differences in study methodologies, most of the literature agrees that children with epilepsy have a three to nine times higher risk of psychopathology compared with healthy controls and children with non-CNS chronic illnesses [16].

The risk factors for psychosocial impact in children with epilepsy can be categorized into three groups of variables: demographic variables, epilepsy-related clinical variables, and psychological variables. Demographic risk factors, such as the child's age and sex, have not been consistently associated with psychopathology in children with epilepsy [17–20]. Some studies have found no association between psychosocial function and seizure variables [10,21], while others report an association between seizure frequency [22], antiepileptic drug (AED) polytherapy [23], type of AED [24], and duration of illness [22]. An association between frequent poorly controlled seizures and behavioral problems has been seen repeatedly [20].

Although there is a large amount of literature demonstrating a higher prevalence of emotional and behavioral problems in children with epilepsy, there is a scarcity of studies that explain this association in such a way as to have clear therapeutic implications [1]. Therefore, in this study, we evaluated the particular influential relationship of demographic and epilepsy-related clinical variables on various aspects of psychosocial function in pediatric epilepsy.

## 2. Methods

### 2.1. Sample and methods

The candidates were patients with childhood epilepsy and their parents who had visited the neurological clinics from eight general hospitals in South Korea. The study was completed over a period of three months. Patients' parents were recruited for the evaluations of their children with epilepsy. Exclusion criteria included previously diagnosed brain tumor or a neurodegenerative disorder. At the time of the patient's clinic or office visit, the parent or legal caregiver was approached by a member of the clinic staff and informed of the study. A set of questionnaires was given to the parent or legal caregiver to complete.

This study considered the demographic variables including age and sex of children with epilepsy and the clinical variables including duration of epilepsy, seizure frequency, and the number of medications as influencing factors. General adaptive function, school/social competence, behavioral problems, and quality of life were considered as factors that constitute the psychosocial function of children with epilepsy.

### 2.2. Assessment tools (Table 1)

The questionnaires included the Social Maturity Scale (SMS), the Korean version of the Child Behavior Checklist (K-CBCL), and the Korean version of the Quality of Life in Childhood Epilepsy Questionnaire (K-QOLCE). These parent-completed instruments assess daily living function, behavior, and quality of life. The Children's Global Assessment Scale (CGAS) was completed by the clinician to assess for general adaptive function. The demographic variables, such as age and sex of the child, and the epilepsy-related clinical variables, such as seizure type, seizure frequency, duration of epilepsy, and number of medications, were obtained from the medical records.

**Table 1**  
The tools for psychological assessment.

Domain	Scales
General adaptive function	Children's Global Assessment Scale (CGAS) Social Maturity Scale (SMS)
Behavioral problems and social and school competence	Korean version of the Child Behavior Checklist (K-CBCL)
Quality of life	Korean version of the Quality of Life in Childhood Epilepsy Questionnaire (K-QOLCE)

#### 2.2.1. Children's Global Assessment Scale (CGAS)

The Children's Global Assessment Scale (CGAS) is designed for use with children from four to six years of age [25] and assesses the severity of psychiatric disturbance and social disability. It has a range of 1 to 100 and provides anchor point descriptions of behavioral function. Empirically derived cutoff points are 61 for definite pathology and 71 for probable pathology [26]. For the present study, scores 60 or below were considered to be in the clinically significant range.

#### 2.2.2. Social Maturity Scale (SMS)

The Korean version of the Social Maturity Scale is based on the Vineland Social Maturity Scale, fifth version, and has been validated for the Korean population [27]. The scale with 117 items can be used from birth up to the age of thirty. Raw scores are converted to an age equivalent score (expressed as social age: SA) and a social quotient (SQ). For our study, scores below 80 for SQ were considered to be in the clinically significant range.

#### 2.2.3. Korean version of the Child Behavior Checklist (K-CBCL)

The Korean version of the Child Behavior Checklist (K-CBCL) has been validated in Korean children and adolescents [28]. This parent-completed questionnaire consists of 118 behavior-related statements with a standardized *t* score (mean = 50, SD = 10) which consists of a social competence scale and a behavior problem scale. On the internalizing and externalizing scales, *t* scores greater than 64 (92nd percentile) were considered to be in the clinically significant range. For the behavior problem scales, *t* scores greater than 70 (98th percentile) and, on the competence scales, *t* scores lower than 36 (98th percentile) were considered to be in the clinically significant range.

#### 2.2.4. Korean version of the Quality of Life in Childhood Epilepsy Questionnaire (K-QOLCE)

The QOLCE questionnaire is used to evaluate the quality of life of children with epilepsy aged 4–18 years. The Korean version of the QOLCE questionnaire has been validated for Korean children with epilepsy [28]. Items are rated on a five-point Likert scale, which are used to calculate the 16 subscale scores ranging from 0 (low functioning) to 100 (high functioning), with higher scores indicating a higher level of quality of life. In this study, the eight composite scores used were physical function, emotional well-being, cognitive function, social function, behavior, general health, general quality of life, and total quality of life. Scores below 50 were considered to be in the clinically significant range.

### 2.3. Statistical analyses

Statistical analysis was performed using the Statistical Package for the Social Sciences for Windows (SPSS version 20.0). Descriptive statistics were used to evaluate the clinical characteristics, and *t*-test and correlation analysis were performed to evaluate the group differences and the relationships among variables. Correlations were examined between dependent variables such as general adaptive function, social/school competence, emotional/social behavioral problems, quality of life, and independent variables such as age, sex, seizure frequency, duration of epilepsy, and the number of medications.

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