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Growth parameters and childhood epilepsy in Hai District, Tanzania: A community-based study

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Summary
Aim: This cross-sectional study examined whether growth parameters were associated with epilepsy in children living in a rural community in sub-Saharan Africa (SSA).
Materials and methods: A cross-sectional study was performed in the Hai District Demographic Surveillance Site (HDSS), Tanzania in which 6—14 year old children with epilepsy (CWE) were identified. Age matched controls were randomly selected from the Hai census database for comparison. Anthropometric measurements were used to assess the nutritional status of the children and body mass index (BMI) calculated. Associations between social, demographic and nutritional factors and epilepsy were assessed using multivariable logistic regression.
Results: 112 CWE were identified and were compared with 113 controls. There was no significant difference in the BMI between cases and controls (*T*-test, *p*-value of 0.117). Amongst cases,

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there were no significant associations between BMI and motor difficulties, antiepileptic drug use, cognitive or behavioural problems, early-onset epilepsy or seizure frequency. In the whole group, BMI was significantly associated with socio-economic status ($p = 0.037$) and age.
Discussion: There was no significant difference found between CWE and matched controls with respect to nutritional status. This suggests that there is no causal association between under nutrition and epilepsy in this community. Nutritional assessment is still important as part of the comprehensive care of CWE.

Introduction

The World Health Organization (WHO) has identified epilepsy as a health priority given that it is one of the commonest chronic neurological disorders worldwide and that about 85% of affected children live in resource-poor countries (WHO, 2004). It is has been postulated that epilepsy in children may be caused in part by malnutrition (Crepin et al., 2007). However the link between nutritional status and epilepsy is likely to be complex as many factors may be involved such as associated motor and feeding difficulties, infectious diseases and the effect of antiepileptic drugs (AED). One early study from sub-Saharan Africa (SSA) found a positive association between malnutrition and epilepsy in a population which included both adults and children although the authors concluded that it was not possible to determine the direction of the association (Crepin et al., 2007). A large survey using questionnaires for people with epilepsy across Africa reported malnutrition in 25% of those less than 15 years old (Quet et al., 2011). Significant risk factors for undernutrition were found to be younger age, poor state of general health, history of adverse perinatal events, cognitive impairment and early age of onset of epilepsy. A recent review of other studies of epilepsy and malnutrition worldwide has highlighted the possibility of a two-way relationship between malnutrition and epilepsy although there is insufficient evidence to characterize this further (Crepin et al., 2009). There has been no previous study from SSA using matched controls to examine the link between malnutrition and epilepsy in childhood, which is when most epilepsy begins.

Materials and methods

Study area and population

We conducted a cross-sectional study of epilepsy in an established demographic surveillance site (DSS) in Hai District, Northern Tanzania. (Burton et al., 2012a) In this study we identified all 6—14 year old children with epilepsy (CWE) living in the district following a household census conducted in early 2009. Age-matched controls were randomly selected from the Hai census database for comparison.

Definitions

Epilepsy was defined according to the epidemiological definition of the International League Against Epilepsy (ILAE), whereby epilepsy is characterized by the onset of at least two unprovoked seizures spaced at least 24 h apart in the last 5 years (ILAE, 1993). Children taking antiepileptic drugs (AEDs) were also considered as having active epilepsy.

Criteria for inclusion and exclusion

During the January 2009 census, a nine-item, previously validated questionnaire to detect possible cases of epilepsy was administered to all households in the Hai DSS (Placencia et al., 1992). Details of children who responded positively to one or more questions in the screening questionnaire, together with those identified by trained enumerators as likely to have epilepsy, were collected (Burton et al., 2012b). Cases of epilepsy were defined as children with active epilepsy aged 6—14 years who were resident in Hai at the time of the census. Those children for whom consent was refused or who were below 6 years of age (to eliminate any children with febrile seizures) were excluded.

Cognitive and behavioural assessment

From February 2010 to June 2010, all children in the epilepsy group and all children in the comparison group were recalled for assessment (Burton et al., 2011). The Rutter questionnaire was used to assess behaviour in cases and controls (Rutter, 1967). Cognitive function was assessed using the Good Enough Harris Drawing Test (Harris and Pinder, 1977); this was chosen because of its good reliability and validity compared with other cognitive tests (Gayton et al., 1974).

Controls

Controls were drawn from a random sample selected from all the children aged 6—14 years who were resident in Hai at the time of the census. Controls were identified through the census and group matched to cases by age (±1 year), sex and village. From this list of eligible children, with a likely refusal rate of 25%, we estimated we needed 186 to give at least one control for each case.

Assessment

All children had a clinical assessment using a standardized proforma and were examined physically. Their height was measured standing against a wall or lying flat on a bed using a semi-rigid tape measure, their weight was measured using a standard weighing scale and mid upper arm circumference was measured at the mid-point between the shoulder