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EPIDEMIOLOGY OF EPILEPSY IN TASMANIA

A thesis presented in partial fulfilment of the requirements

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Abstract

Background

Better understanding of the demographic distribution of epilepsy and the prevalence of ‘more specific forms of epilepsy’ in community-based settings would improve our understanding of this disorder at the population level. Although we now have good estimates of epilepsy prevalence for most countries, we still lack knowledge on its demographic distribution by age, ethnicity, region, and socioeconomic status. In addition, no studies to date have reported the prevalence of epilepsy syndromes using patient interview outside a hospital setting. This thesis provides the first community-based estimates of the prevalence of the most common clinical group of epilepsies presumed to have a genetic basis – The Idiopathic Generalised Epilepsies (IGE) - by patient and witness interview.

Methods

This thesis has involved conducting five pieces of new research: (i) a series of reviews and analyses of descriptive data on epilepsy prevalence, particularly focusing on the critical methodological issues of ascertainment, diagnosis and classification of epilepsy for epidemiological purposes; (ii) the validation of a modified diagnostic epilepsy questionnaire adapted for administration in population studies; (iii) recruitment of a community-based cohort – The Tasmanian Epilepsy Register (TER) - through the Australian national prescription database; (iv) estimation of the overall prevalence and distribution of self-reported treated epilepsy in Tasmania by imputation methods; (v)

estimation of the prevalence and distribution of IGE in Tasmania by telephone interviewing.

Results

My modified diagnostic questionnaire, administered by telephone interviewing and interpreted with standardized guidelines, demonstrated excellent agreement with an epilepsy specialist's clinical assessment in diagnosing the presence of epilepsy ($\kappa = 0.94$), seizure-onset types ($\kappa = 0.84$), simple or complex partial seizures ($\kappa=0.87$), any generalized non-convulsive seizure ($\kappa=0.82$), and IGE ($\kappa = 0.82$). Although still substantial, agreement was not as close for secondarily generalized seizures ($\kappa = 0.74$), and generalized tonic-clonic seizures ($\kappa = 0.79$).

7541 patients treated with antiepileptic drugs (AEDs) in the preceding year in Tasmania were eligible for recruitment through the Australian national prescription database. After three mail contacts, 54.0% responded, with 43.6% who indicated treatment for epilepsy representing 86.0% of total possible epilepsy cases by imputation ($n=2063$) in Tasmania. 1180 agreed to participate in the TER, 90.0% of participants received their AEDs either exclusively from their general practitioner (70.9%) or in combination with a medical specialist (19.1%) in the preceding twelve months. The adjusted treated epilepsy prevalence was 4.36 per 1000 (95% CI 4.34, 4.39); this was: lower in women (prevalence ratio 0.92 (95% CI 0.84, 1.00); greater with increasing age ($p < 0.001$); similar in the three main geographical regions; and similar by categories of socioeconomic status based on postcode of residence.

Following enrolment, 959/1083 (88.6%) eligible TER participants completed the diagnostic telephone interviewing, with partial epilepsy classified in two thirds, and generalised epilepsy in slightly more than one-fifth. IGE was observed in 20.3%, with tonic-clonic seizures (17.03%) and the absence epilepsies combined (11.01%) being the most common IGE seizure types and syndromes respectively. The estimated prevalence of IGE was 0.89 per 1000; is highest between the ages of 20-39 years and in females, but was similar between Tasmanian regions and socio-economic groups. IGE prevalence beyond childhood related to refractory childhood or adolescent disease rather than older-onset cases, and was characterised by the presence of myoclonic and tonic-clonic seizures. Generalised seizures, but not IGE, were less prevalent in southern Tasmania.

Conclusions

Utilising the design approach described in this thesis may provide an alternative to neurological assessment, and when coupled with case ascertainment through prescription data, can provide a valid estimate of the prevalence of 'more specific forms of epilepsy' in countries with high access to health services. The observed pattern of high elderly epilepsy prevalence, is similar to patterns in recent studies in other developed countries, and has important implications for future planning of health services in these countries. IGE represents a considerable proportion of community-treated disease with important aetiological and prognostic determinants occurring at the seizure rather than syndrome level of classification.

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Table of contents

Abstract

Acknowledgements

List of Figures

List of Tables

Abbreviations

Chapter One: Introduction	1
1.1 Background	1
1.2 Objectives	4
1.3 Thesis Organisation	5
Chapter Two: Methodological issues in measuring the prevalence of epilepsy II:	
Case ascertainment	8
2.1 Introduction	9
2.2 Stigma	9
2.3 Institutionalised residents	13
2.4 Medical sources	20
2.5 Community sources	37
2.6 Multiple sources	43
2.7 Capture-recapture methods	43
2.8 Comparative studies	44
2.9 Summary	47
Chapter Three: Methodological issues in measuring the prevalence of epilepsy I:	
Classification and diagnosis	49
3.1 Introduction	49
3.2 Methodological issues in classification	49
3.3 Methodological issue in diagnosis	61
3.4 Questionnaires	70
3.5 Summary	94
Chapter Four: The prevalence of epilepsy, seizures and idiopathic generalized epilepsy – A summary of the literature	95
4.1 Introduction	95
4.2 The prevalence of epilepsy	95
4.3 The distribution of epilepsy	99
4.4 The prevalence of seizures, epilepsy-onset type and epilepsy syndromes	108
4.5 Summary	124

Chapter Five: The diagnosis of seizures, epilepsy and Idiopathic Generalised Epilepsy by computer-assisted-telephone-interviewing using standardised diagnostic guidelines - A validation study	125
5.1 Introduction	125
5.2 Methods	127
5.3 Results	132
5.4 Discussion	138
Chapter Six: The Tasmanian Epilepsy Register – A community-based cohort: Background and methodology for patient recruitment from the Australian national prescription database	144
6.1 Introduction	144
6.2 Methods	145
6.3 Results	156
6.4 Discussion	159
Chapter Seven: The prevalence and distribution of treated epilepsy - A community-based study in Tasmania, Australia	168
7.1 Introduction	168
7.2 Methods	169
7.3 Results	172
7.4 Discussion	175
Chapter Eight: The prevalence and distribution of the Idiopathic Generalized Epilepsies and their seizures in Tasmania, Australia	186
8.1 Introduction	186
8.2 Methods	187
8.3 Results	189
8.4 Discussion	200
Chapter Nine: Conclusions	206
9.1 Introduction	206
9.2 Summary of major findings	206
9.3 Limitations of the data	208
9.4 Implications	212
9.5 Concluding remarks	216
References	217
Appendices	238

List of Figures

Figure 2.1:	Case ascertainment methods in epilepsy prevalence studies from 1923-2007 (n=115)	19
Figure 2.2:	Studying people with seizures (disease) versus patients with diagnosed epilepsy (illness)	30
Figure 2.3:	Prevalence of epilepsy by country, region, and ethnic groups from various sources (Davenport 1923)	38
Figure 3.1:	Flow diagram for classification of seizures and epilepsy in epidemiologic studies from Hauser et al 1991	50
Figure 3.2:	Frequency of generalised seizure types by age of onset (absence = 16, myoclonic = 182, tonic clonic = 93) (Senanayake 1993)	67
Figure 4.1a:	The lifetime prevalence of epilepsy from studies in Africa (n=19)	96
Figure 4.1b:	The lifetime prevalence of epilepsy from studies in Latin America (n=12)	97
Figure 4.1c:	The lifetime prevalence of epilepsy from studies in Eastern Mediterranean (n=4)	97
Figure 4.1d:	The lifetime prevalence of epilepsy from studies in Europe (n=23)	97
Figure 4.1e:	The lifetime prevalence of epilepsy from studies in North America (n=13)	98
Figure 4.1f:	The lifetime prevalence of epilepsy from studies in Asia & Oceania (n=16)	98
Figure 6.1a:	Map of Australia	146
Figure 6.1b:	Map of Tasmania	147
Figure 6.2:	Summary of patient recruitment and participation onto the Tasmanian Epilepsy Register	158
Figure 7.1:	Prevalence of epilepsy by imputation methods.....	174
Figure 7.2:	The prevalence of treated epilepsy in Tasmania by five-year-age-groups	174
Figure 8.1:	The prevalence of Idiopathic Generalised epilepsy by age-group (n=175)	194
Figure 8.2:	Idiopathic Generalised Epilepsy by age at onset (n=159)	194
Figure 8.3:	The prevalence of IGE (n=175) and generalised seizure types by age-group (n=348)	195
Figure 8.4:	The prevalence of IGE and generalised seizure types by region	195

List of Tables

Table 2.1:	Case ascertainment methods in epilepsy prevalence studies from English-language publications from 1923-2007 (n=115)	14
Table 3.1:	Definitions for epilepsy used in prevalence studies: 1923-2007 (n=115)	53
Table 3.2:	Definitions of ‘active’ epilepsy used in prevalence studies: 1923-2007 (n=115)	54
Table 3.3:	Proportion of unclassifiable seizures in epilepsy prevalence Studies from 1923-2007 (n=115)	64
Table 3.4:	Main validated epidemiological protocols for epilepsy prevalence studies	72
Table 3.5:	Validity of screening questionnaires used in epilepsy prevalence study	76
Table 4.1:	Frequency of seizure onset-types in epilepsy prevalence studies from 1923-2007 (n=61)	110
Table 4.2:	The frequency of generalized seizure types in epilepsy prevalence studies from 1923-2007.....	117
Table 4.3:	The frequency of seizure and ‘syndromes’ in studies prior to The International League Against Epilepsy Syndrome 1989 Classification System	122
Table 4.4:	The frequency of the Idiopathic Generalised Epilepsies based on the International League Against Epilepsy Syndromes Classification 2003	123
Table 5.1:	Demographic features and disease characteristics of study participants (n=99)	133
Table 5.2:	Diagnostic agreement for the presence of epilepsy, seizures, seizure-onset types [§] , and the idiopathic generalized epilepsy syndrome from telephone interviews versus epilepsy specialists’ assessment	135
Table 5.3:	Sensitivity, specificity, positive predictive value, negative predictive value and Youden’s Index (YI) for the presence of epilepsy, seizures, seizure-onset type [§] , and idiopathic generalized epilepsy from telephone interviews versus epilepsy specialists’ assessment	137
Table 6.1:	“Reportable” anticonvulsant medications* supplied in Tasmania between 1 st July 2001 and 30 th June 2002	150
Table 6.2:	Comparison of HIC sample versus Register participants for anticonvulsant provider type in Tasmania between July 1 st 2001 and June 30 th 2002	159
Table 6.3:	Demographic features by age, gender, region and socio-economic status of the Tasmanian population, Register participants, responders and non-responders	160
Table 7.1:	Response to the Health Insurance Commission mail invitations	177

Table 7.2:	The effect on prevalence estimates of different disease disclosure among non-responders between crude and imputed prevalence estimates	177
Table 7.3:	Estimated prevalence of treated epilepsy in Tasmania by age-group, gender, region and SEIFA	178
Table 7.4:	Observed percentage and estimated prevalence of epilepsy treated with concurrent antiepileptic drug medications in Tasmania between July 1 st 2001 and June 30 th 2002	179
Table 8.1:	Demographic features by age, gender, region and SES of the Tasmanian Epilepsy Register and diagnostic telephone interviewing respondents	191
Table 8.2:	Frequency of broad epilepsy syndromes by diagnostic telephone interviewing of Tasmanian Epilepsy Register participants (n=955)	192
Table 8.3:	Frequency of Idiopathic Generalised Epilepsy Syndromes and generalised seizures by diagnostic telephone interviewing of Tasmanian Epilepsy Register participants (n=955)	192
Table 8.4:	Estimated prevalence and distribution of Idiopathic Generalised Epilepsy by age, gender, region and SES in Tasmania, Australia	196
Table 8.5.1:	Estimated prevalence and distribution of absence seizures by age, gender, region and SES in Tasmania, Australia	197
Table 8.5.2:	Estimated prevalence and distribution of myoclonic seizures by age, gender region and SES in Tasmania, Australia	198
Table 8.5.3:	Estimated prevalence and distribution of tonic-clonic seizures by age, gender, region and SEIFA in Tasmania, Australia	199

Abbreviations

AED	Anti-epileptic drug
BMEI	Benign Myoclonic Epilepsy of Infancy
CAE	Childhood Absence Epilepsy
CATI	Computer-assisted-telephone-interviewing
CDC	Centers for Disease Control
CTB	Computed Tomography of the Brain
EEG	Electroencephalogram
EMA	Epilepsy with Myoclonic Absences
FDG-PET	Fluoro-deoxyderibose glucose positron emission testing
SPECT	Single photon emission computerized tomography
FRACP	Fellow of the Royal Australasian College of Physicians
GEFS+	Generalised Epilepsy with Febrile Seizures Plus
GPRD	The General Practice Research Database
GTCS	Generalised tonic clonic seizures
HIC	Health Insurance Commission
ICEBERG	The International Community-based Research Group
IGE	Idiopathic Generalised Epilepsy
IGEUn	Idiopathic Generalised Epilepsy not otherwise specified
ILAE	International League Against Epilepsy
JAE	Juvenile Absence Epilepsy
JS	Jeavons's Syndrome
JME	Juvenile Myoclonic Epilepsy
MAE	Epilepsy with Myoclonic Astatic seizures
MRI	Magnetic resonance imaging
MRIB	Magnetic resonance imaging of the brain
NGPSE	National General Practice Study on Epilepsy
NHIS	National Health Interview Survey
NHMRC	National Health and Medical Research Council (Australia)
NHS	National Health Service
NHSCR	National Health Service Central Register
NHNN-GPLS	The National Hospital for Neurology and Neurosurgery General Practice Linkage Scheme
NPV	Negative Predictive Value
OREp	Osservatorio Regionale per l'Epilessia
PPV	Positive Predictive Value
SSCI	Semi-structured seizure classification interview
SEIFA	Socio-economic status index for postcode area
SENS	Sensitivity
SNES	The Sicilian Neuroepidemiology Study
SPEC	Specificity
TER	Tasmanian Epilepsy Register
UK	United Kingdom
WHO	World Health Organisation
YI	Youden's Index