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A STUDY TO COMPARE QOL OF LIFE EPILEPSY SURGERY PATIENTS WITH HYPERTENSION, DIABETES, HEART DISEASE AND DEPRESSIVE SYMPTOMS PATIENTS IN OP.

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Epilepsy is a group of diseases characterized by epileptic seizures. Epileptic seizures are events that can differ from brief and nearly unnoticeable to lengthy times of forceful shaking. To equate the HRQOL of epilepsy surgery patients with hypertension, diabetes, heart disease, depression patients. The questionnaire gathered demographic data, data on seizure type and frequency, and employed precoded and open questions. This health related standard of life involve measures of Hypertension, DM, Heart disorders and depression, effect of epilepsy, overall quality of life, and health status. These scales have been found to be reliable and well founded in patients with both refractory epilepsym 29 and epilepsy in remission. For purposes of analysis patients were randomized in four categories; seizure free postoperatively (SF), less than 10 seizures per year postoperatively (S<10), more than 10 seizures per year postoperatively (S>10), inappropriate for surgery and organized medically , This study equated the differences in QALE for those who had diabetes, hypertension, heart disease, or stroke to those have epilepsy surgery. The suggested method can be specifically useful when examining responsibilities for common chronic diseases over time and at the local level for program planning and assessment. this small retrospective study has shown that health related quality of life is related to postoperative seizure status. However, prospective studies are required to elucidate the role of other factors such as preoperative status and changes in psychosocial status with postoperative duration. Satisfactory studies should be prospective and longitudinal, comparing patients' preoperative and postoperative seizures and psychological status. To produce meaningful statistical data multicentre collaboration will be essential. Resultant data might assist in the construction of specified quantitative targets for *Healthy People 2020* objectives and setting priorities for prevention in a given population as well as in sociodemographic subgroups.

1. INTRODUCTION

Epilepsy that occurs as a result of other issues may be preventable.[1] Seizures are controllable with medication in about 70% of cases.[2] Inexpensive options are often available.[3] In those whose seizures do not show reaction to medication, then surgery, neurostimulation, or dietary changes may be examined.[3][4] Not all cases of epilepsy are lifelong, and many people upgrade to the point that therapy is no longer needed.[5]. Epilepsy is identified by a long-term risk of repeated seizures.[6] These seizures may present in several ways depending on the part of the brain included and the person's age.[7][8] The most common type (60%) of seizures are spasmodic.[9] Of these, one-third begin as generalized

seizures from the start, attacking both halves of the brain.[10] Two-thirds begin as focal seizures (which affect one half of the brain) which may then advanced to generalized seizures.[11] The remaining 40% of seizures are non-spasmodic. An example of this type is the absence seizure, which presents as a decreased level of awarness and usually lasts about 10 seconds.[12][13]Focal seizures are often introduced by certain experiences, known as auras.[14] They involve sensory (visual, hearing, or smell), psychic, autonomic, and motor phenomena.[15] Jerking activity may start in a specific muscle group and spread to surrounding muscle groups in which case it is known as a Jacksonian march.[16] Automatisms may occur, which are non-consciously-generated activities and mostly simple repetitive movements like smacking of the lips or more complex activities such as attempts to pick up something.[17]

To equate the HRQOL of epilepsy surgery patients with hypertension, diabetes, heart disease, depression patients

MATERIALS AND METHODS:

The questionnaire gathered demographic data, data on seizure type and frequency, and employed precoded and open questions. This health related quality of life model included measures of Hypertension, DM, Heat disease and depression, impact of epilepsy, overall quality of life, and health status.These scales have been found to be reliable and valid in patients with both refractory epilepsym 29 and epilepsy in remission. For purposes of analysis patients were placed in four categories; seizure free postoperatively (SF), less than 10 seizures per year postoperatively (S<10), more than 10 seizures per year postoperatively (S>10), unsuitable for surgery and managed medically (NSurg). We chose these seizure frequencies as similar definitions have been used previously in studies reporting the results of epilepsy surgery. To be classified as seizure free, patients had to have been seizure free for at least the year immediately before the censor date. Before the study we had planned to subdivide patients with postoperative seizures into those with auras only and those with attacks similar to the preoperative type, on the basis that auras may have less impact on quality of life.18 However, the numbers of patients reporting postoperative auras only was too small for suitable statistical analysis,and,therefore,auras were treated as seizures and classified accordingly.This may have artificially decreased the psychological scale scores for patients having recurrent seizures postoperatively.

STATISTICS:

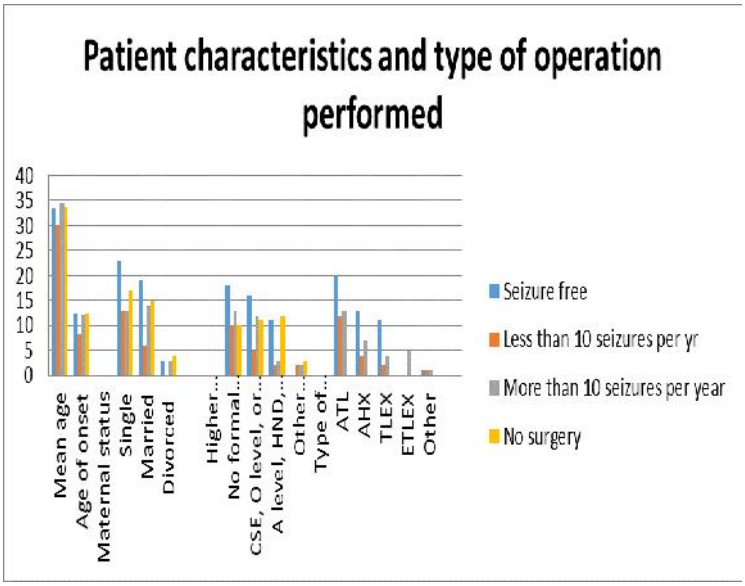
As the numbers in the groups are small, median scores and quartile ranges are quoted unless otherwise stated. The data were analyse during Arcus Procomputer software.Tests of significance used were the Mann-Whitney U test with accurate probabilities corrected for ties, Kendall's ô b correlation coefficient corrected for ties and continuity corrected, and the Kruskal-Wallis one way analysis of variance (ANOVA) with multiple comparisons if significant differences were detected. For categorical variables odds ratios (ORs) with exact 95% confidence intervals (95% CIs) relative to the NSurg group were calculated, unless otherwise stated. Information was missing on some of the scales; this is indicated by * in the text.

RESULTS AND DISCUSSION:

Fifty four of 100 patients undergoing surgery and 36 of 70 (51%) patients unsuitable for surgery reoccurred questionnaires that were acceptable for analysis. Nine questionnaires were unacceptable for analysis; seven because of incomplete data and two which were completed by careers and, therefore, included subjective information only. Overall, 45 (47.9%) patients were seizure free postoperatively. Twenty of 45 (44.4%) patients having anterior temporal lobectomies, 13 of 24 (54.2%) having amygdalohippocampectomies, 11 of 17 (64.7%) having temporal lesionectomies, and one of eight (12.5%) having extratemporal surgery were seizure free

Table 1: Patient characteristics and type of operation performed.

	Seizure free	Less than 10 seizures per yr	More than 10 seizures per year	No surgery
Mean age	33.5	30.1	34.5	33.6
Age of onset	12.4	8.17	12.2	12.4
Maternal status				
Single	23	13	13	17
Married	19	6	14	15
Divorced	3	0	3	4
Higher qualification	18	10	13	10
No formal qualification	16	5	12	11
CSE, O level, or equivalent	11	2	3	12
A level, HND, or degree	0	2	2	3
Other unspecified				
Type of operation				
ATL	20	12	13	
AHX	13	4	7	
TLEX	11	2	4	
ETLEX	0	0	5	
Other	1	1	1	



QUALITY OF LIFE OUTCOME

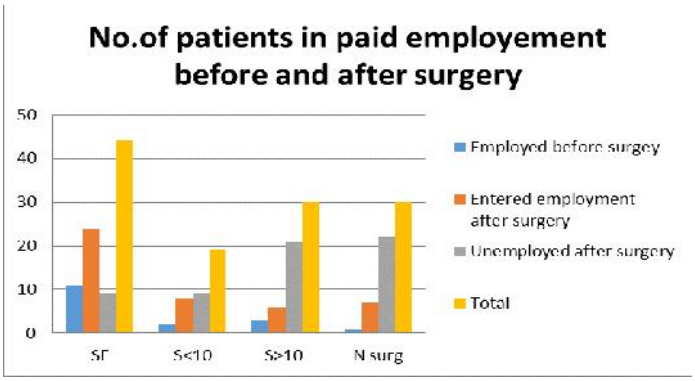
Patients in the seizure free group had significantly better scores than those having greater than 10 seizures per year or those who were deemed unacceptable for surgery. There were no differences between the S>10 and NSurg groups. On all calculations the scores of patients with less than 10 seizures per year were between the SF and NSurg or S>10 groups. On the anxiety scale scores differed significantly between all groups. On the depression scale scores for both the SF and S<10 groups were better than the S>10 or NSurg groups. Mastery scores were significantly better in SF than in any of the other groups. The SF patients were least stigmatized with only 35.6% of patients reporting positive stigma scores, compared with 57.9%, 67.9% and 77.8%intheS<10,S>10*,and NSurg patients respectively. Self-esteem was significantly higher in the SF than S>10 or NSurg with the S<10 achieving intermediate scores. Epilepsy had least impact on the SF group and feelings of wellbeing (affect balance) were greatest in SF and S<10 groups. Similarly self-reported general health and overall quality of life were best in the SF group and worst in the S>10 and NSurg groups.

EMPLOYMENT AND DRIVING

Eleven of 44 seizure free patients reported being in paid employment before surgery compared with only six of 79 in the other three groups combined (OR 5.82, 95% CI 21.0 – 1.75) (table 4). The proportions of patients unemployed before surgery who entered employment after surgery or investigation for surgery were 24/33 (73%) SF and 8/17 (47%) S<10 compared with 6/27 (22%) S>10 and 7/29 (24%) NSurg. There was no difference in preoperative educational attainment that is, proportion of patients obtaining no qualifications, CSE or "O"level equivalents or "A"levels or degrees between the outcome groups (÷2 6 df = 8.33, P = 0.22). Similarly, there was no difference in qualifications obtained between employed or unemployed patients in the group as a whole (÷2 2 df = 0.32,P = 0.85).Twenty of 45 (46%) seizure free patients obtained driving licences after surgery.

Table 2: No.of patients in paid employement before and after surgery.

	SF	S<10	S>10	N surg
Employed before surgey	11	2	3	1
Entered employment after surgery	24	8	6	7
Unemployed after surgery	9	9	21	22
Total	44	19	30	30



OUTCOME AND POSTOPERATIVE DURATION

There was a weak but significant correlation indicating falling impact of epilepsy scores with increasing postoperative duration (ô b=−0.23, Z=1.996, P=0.046). On the remainder of the quality of life scales there was no relationship between result and postoperative duration (table 5). However, there was a liability for postoperative duration to be longer in seizure free patients who were in well paid employment (median duration = three years) compared with those unemployed (mediandurat ion=2.5 years; Mann-Whitney U = 83.5, P = 0.07). Similarly, the median postoperative duration was one year longer in those driving (median = three years) compared with those not driving (median = two years; Mann-Whitney U = 333.5, p =0.011).

Diabetes Mellitus

In 2010, 18-year-old diabetic persons were supposed to live 53.8 years while nondiabetic persons of the same age were supposed to live 62.8 years. This 9.0-year difference was the individual-level loss in life anticipation due to diabetes mellitus. The corresponding QALE for 18-year-old diabetic and nondiabetic persons were 43.4 and 54.5 years, respectively. Therefore, the diabetes-related QALE loss for an 18-year-old diabetic person was 11.1 years. Of the 11.1 years of QALE loss, about two thirds (66.2% or 7.3 years) was due to death. QALE loss to diabetes decreased gradually with age, going from 11.1 years at age 18 years to 3.0 years at age 85 years. The stable decline suggests that diabetes significantly affects patients' health during both early adulthood and later adulthood. The diabetes-related QALE loss differed somewhat between men and women . Diabetic women lost 3.9 (95% confidence interval 3.3–4.5) more years of QALE to diabetes than diabetic men did (12.9 vs. 9.0 years in QALE loss; $P < 0.0001$). The trend of QALE loss shows that diabetes-related QALE was relatively unchanged between 2010-2016. This is because 1) life expectancy for both diseased and non diseased had

increased (from 50.7 to 53.8 vs. from 59.7 to 62.8 years, respectively) and 2) HRQOL scores for both diseased and nondiseased also had decreased .

Table 3: Life expectancy (LE), quality-adjusted life expectancy (QALE), and individual and population loss in LE and QALE due to diabetes, hypertension, heart disease at 18 y of age

	n*	HRQOL†	Life expectancy	SE	QALE	SE	% QALE lost to mortality
Total population	403,841	0.876	61.1	0.03	52.6	0.02	
By disease status							
Diabetes							
Yes	47,284	0.781	53.8	0.25	43.4	0.23	
No	356,238	0.885	62.8	0.2	54.5	0.16	
LE/QALE loss			9	0.09	11.1	0.15	66.2
Population LE/QALE loss			1.7	0.17	1.9	0.15	72.2
Hypertension							
Yes	154,627	0.829	59.3	0.23	48.4	0.19	
No	248,526	0.896	62.4	0.2	54.8	0.17	
LE/QALE loss			3.1	0.29	6.3	0.24	40.7
Population LE/QALE loss			1.3	0.17	2.2	0.15	48.1
Heart diseases							
Yes	35,004	0.718	55.3	0.26	43.4	0.3	
No	365,426	0.885	62.1	0.2	53.8	0.17	
LE/QALE loss			6.8	0.29	10.3	0.32	54.1
Population LE/QALE loss			1	0.18	1.2	0.15	72.1

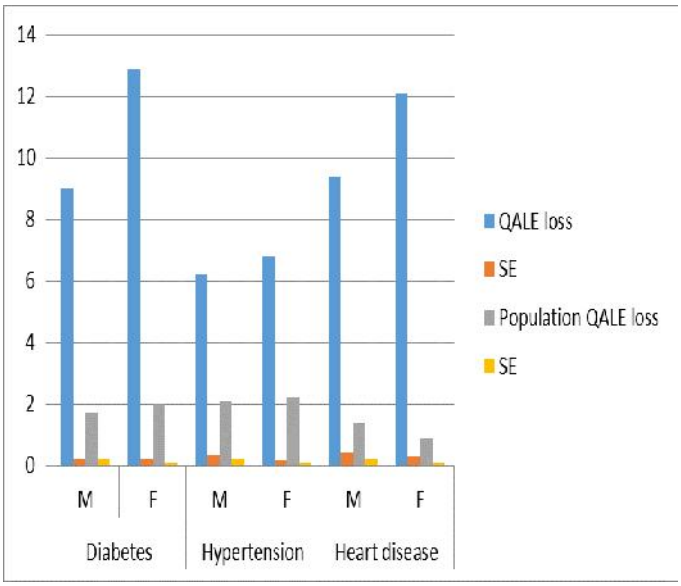
Table 4: Individual quality-adjusted life expectancy (QALE) loss and population QALE loss due to diabetes, hypertension, heart disease, at different ages.

	DM		HTN		Heart disease	
	Value	SE	Value	SE	Value	SE
At age (y)	QALE loss					
18	11.1	0.15	6.3	0.24	10.3	0.32
25	10.8	0.14	6	0.24	10.2	0.29
35	10	0.11	5.2	0.23	9.3	0.25
45	8.9	0.09	4.3	0.22	7.9	0.22
55	7.3	0.07	3.3	0.22	5.9	0.21
65	5.5	0.06	2.3	0.2	4.3	0.19
75	4	0.05	1.3	0.15	2.7	0.12
85	3	0.04	0.9	0.03	2.1	0.04
At age (y)	Population QALE loss					
18	1.9	0.15	2.2	0.15	1.2	0.15
25	1.9	0.15	2.2	0.15	1.2	0.15
35	1.9	0.14	2.1	0.14	1.3	0.15
45	1.9	0.14	2	0.14	1.3	0.14

55	1.7	0.14	1.8	0.14	1.3	0.14
65	1.4	0.13	1.3	0.13	1.1	0.13
75	1	0.09	0.7	0.1	0.9	0.1
85	0.7	0.02	0.5	0.03	0.7	0.02

Table 5: Gender differences in individual quality-adjusted life expectancy (QALE) loss and population QALE loss due to diabetes, hypertension, asthma, heart disease, and stroke at 18 y of age

Diseases	Sex	QALE loss	SE	Population QALE loss	SE
Diabetes	M	9	0.2	1.7	0.21
	F	12.9	0.2	2	0.11
Hypertension	M	6.2	0.33	2.1	0.21
	F	6.8	0.19	2.2	0.11
Heart disease	M	9.4	0.42	1.4	0.22
	F	12.1	0.31	0.9	0.11



At the population level, diabetes caused in adult population to lose 1.9 years of QALE starting at age 18 years in 2016. The population QALE loss also declined with age, but at a smaller rate and only for those aged 55 years and older, indicating that diabetes prevalence was significantly higher among older populations (3.2% for those younger than 55 years and 5.8% for those 55 years or older). The burden of diabetes for the population had increased significantly, from 1.0 year of population QALE loss in 2010 to 1.9 years of population QALE loss in 2016, an 84% increase.This is different from the trend of individual-level QALE loss. Such an increase in the burden of diabetes to the population paralleled the increases in the prevalence of diabetes for US adults, from 4.5% to 8.9%, a 95% increase. Like the individual-level burdens, more than two-thirds (72.2% or 1.3 years) of the population QALE loss was due to mortality. Because the state prevalence of diabetes varies greatly, the difference in state-level population QALE loss due to diabetes also varied greatly State population quality-adjusted life expectancy (QALE) loss due to diabetes, hypertension, asthma, heart disease, and stroke for 18-y-old US adults, 2009.

Hypertension

Although QALE loss for persons diagnosed with hypertension was the lowest among the five diseases, the population QALE loss due to hypertension was the highest due to its substantially higher prevalence of hypertension .Like diabetes, the individual-level hypertension-related QALE loss declined gradually with older ages. The population hypertension-related QALE loss also declined at a smaller rate and only after age 45 years. The hypertension prevalence was 6.5% for those younger than 45 years versus 22.7% for those 45 years or older. Also, like diabetes, the individual-level hypertension-related QALE loss did

not change much during the study period, but the population QALE loss had increased significantly since 2010, from 1.7 in 2010 to 2016, a 29% increase. Such an increase in population QALE loss paralleled the increasing prevalence of hypertension from 21.6% to 29.2%, a 35% increase. Unlike the other diseases, less than half of the QALE loss and population QALE loss could be attributed to mortality alone, probably because the hazard ratio of dying for people with hypertension was only 1.06, which was substantially smaller than those for the other four diseases (all ≥1.3). Also, the gender differences in the burden of hypertension, both at the individual and the population levels, were very small. Like the other diseases we evaluated, hypertension-related population QALE loss of the states was highly related to the state prevalence. States with the most hypertension-related population QALE loss were West Virginia (3.3), Mississippi (3.2), Kentucky (3.0), Arkansas (2.9), and Oklahoma (2.7). About half (R^2 = 53%) of the between-state variation in population QALE loss due to hypertension can be explained by the state hypertension prevalence.

Heart Disease

Data on the burden of heart disease (coronary heart disease and myocardial infarction) for the whole nation were available only for 5 years, 2010-2013. Therefore, there is not enough data to draw any conclusion regarding the trend of heart disease. The population QALE loss, however, had declined 1.6% annually since 2005 and in 2009, heart diseases contributed 1.2 years of population QALE loss. For those reporting heart disease, QALE was 43.4 years, 10.3 years less than for those without heart disease. More than three-quarters (75.8%) of heart disease patients were aged 55 years and older. Therefore, the population-level QALE losses due to heart diseases were nearly unchanged between the ages 18 and 55 years. Nearly all the population QALE loss due to heart disease occurred after age 55 years (age-specific data are available on request) because 75% of the heart disease occurred after age 55 years, and the prevalence of heart disease for those aged 55 years and older was 14.5%, much higher than the 2.1% prevalence rate of those aged 54 years or younger. Unlike the other four diseases, heart disease had contributed more population QALE losses for men (1.4 years) than for women (0.9 years) because of much higher prevalence of heart disease among men (7.3% compared with 4.9% among women). In this study we administered a health related quality of life model to patients undergoing surgery for epilepsy and compared the results with those for patients found to be unsuitable for surgery. It is a retrospective, cross sectional study and some of the analysis groups have small numbers; therefore, the results should be interpreted with some caution. However, similar methodology has been used in other published studies of postoperative quality of life.19 The groups were similar in seizure characteristics; all patients had complex partial or secondarily generalized tonic-clonic seizures, but, because of the small numbers, assessment of outcome was limited to total seizure frequency only. The control group (NSurg) had seizures similar in frequency and nature to those undergoing surgery. In this postal questionnaire 47.9% of our respondents were completely seizure free in the year before censor date, and a further three patients had experienced at least two years of freedom from seizures after surgery but then relapsed. One patient in the S<10 group and four in the S>10 group had auras only, 53.2% would fall into class I of Engel's classification,7 whereas a further 20% with less than 10 seizures per year would probably fall into class II. Therefore, overall our figures are representative of other studies. The study disclosed that quality of life in various psychosocial domains is significantly better in seizure free patients than those who continue to have frequent seizures after surgery for epilepsy or who are unsuitable for surgery. Quality of life in patients with reduced numbers of seizures seems improved but to a lesser degree. These results are at odds with previous studies, which have suggested that improved psychosocial status after surgery is dependent on being completely seizure free. Rausch and Crandall, using measures including degree of dependency, work performance and family and non-family relationships, found that improvements

were dependent on freedom from seizures one year after surgery. Hermann et al combined generic measures with the Washington psychosocial seizure inventory (WPSI) to obtain an overall psychosocial outcome and again found improvements in the seizure free group only, six to eight months after surgery. Using the WPSI alone, Seidman-Ripley also found improvements in seizure free patients postoperatively, but noted a possible deterioration in patients who continued to have seizures with reduced frequency compared with their preoperative baseline status. Two of the above studies used the WPSI, a psychosocial measure designed for epilepsy, which has been criticized because it refers to fixed events in the past which will not change with any outcome, and also because its for yes or no answers which may not be sensitive to change.15 The use of generic measures, the short duration of follow up, and generally small numbers, may explain the inability to detect differences in patients with reduced frequency of seizures in the above studies. We attempted to compare outcome using a control population of medically treated patients. Only two other studies have used this format, and only one study used a validated health related quality of life measure. Guldvog and Loyning, in a large study, found no improvement after surgery using measures of educational status, social status, marital status, need for aid in daily activities, or need to be looked after34;measures which may be dependent on postoperative duration and which neglect the wider areas of quality of life. Recently, the results from 248 patients who underwent evaluation for surgery at University of California, Los Angeles between 1974 and 1990, have been reported using the ESI 55.19 Overall,scoresonfiveof11scalesoftheESI55 (seizure targeted health perceptions, social function, pain, role limitations caused by physical problems, and role limitations caused by emotional problems) significantly improved, with no difference on the other six scales (emotional wellbeing, cognitive function, role limitations caused by memory problems, overall quality of life, physical function, and energy) in the surgery group compared with the non-surgery group. The ESI 55 has already been found capable of distinguishing between diVerent outcome groups based on seizure frequency. The failure to detect a greater diVerence compared with medically treated controls in the latest study probably reflects combining the various outcome groups to give an overall surgery group figure. We were unable to analyse our patients with auras only because the numbers were too small. In a previous study using the ESI, 55 patients with auras only were found to perform similarly to patients with less than 10 seizures per year after surgery, with scores intermediate between seizure free patients and those having more than 10 seizures per year. At least four patients in our S>10 group had auras only; including them in this group may have impaired our ability to distinguish between the S<10 and S>10 groups and, therefore, underestimated the differences in quality of life outcome. All the scales we used detected differences between the groups but the patterns of improvement were not the same on all the scales[18]. The mastery scale disclosed small but significant differences between the seizure free and all other groups. This differs from a previous study suggesting that mastery does not change after surgery even in seizure free patients. In that study, assessment was performed only six months postoperatively, and, therefore, the patients could be still expected to be coming to terms with freedom from seizures. The mastery scale we used considers wider issues and is likely to be more sensitive. The same mastery scale, used in a placebo controlled trial,29 detected a significant difference in favour of patients receiving a novel antiepileptic drug. Furthermore, on intuitive grounds, patients gaining relief from unpredictable adverse events—that is, seizures—would be expected to feel a greater degree of control. Similarly it is not surprising that levels of stigma are lower in these free group than in the other three groups. Perceived stigma36 may not resolve until epilepsy is completely cured, thence removing the label of “epileptic.” Psychiatric and psychological morbidity is an important problem in epilepsy, with clinically significant anxiety and depression being common[19]. 37 Previous postoperative studies have reported improved depression and reduction in psychological distress but only in patients who were

seizure free, those with 75% or less reduction in seizures showed no improvement. By contrast, this study identified improvements in psychological well-being, notably anxiety and depression, in both the seizure free and S<10 groups. Unemployment is a major problem in people with chronic epilepsy6 38 especially in areas where competition for jobs is fierce. Gainful employment is a good predictor of overall wellbeing6 and patient satisfaction postoperatively, and, therefore, represents an important outcome for patients. Furthermore, in defining the proportion of patients likely to become productive members of society, it should be considered as an important measure of the cost effectiveness of epilepsy surgery programmes[20]. Some studies have reported that, although "vocational adjustment"15 and working capacity34 may improve, rates of new employment do not One of the most interesting findings in this study was the difference in employment rates in each group. Seizure free patients were more likely to have been employed before surgery than in the other outcome groups, suggesting that they may be less disabled by their seizures and, therefore, would be more likely to have better postsurgery outcome. However, significantly more previously unemployed people obtained employment in the seizure free group compared with the other groups after surgery, consistent with findings from a recent American study.42 The overall employment figure of 80% in the seizure free group is comparable with recently reported employment rates of 79% for men and 64% for women in people with well controlled epilepsy and similar to rates found in the general population.43 The finding of better preoperative employment rates in patients who become seizure free implies that other factors influence employability. Clearly baseline preoperative status should be measured in future studies to further elucidate the relation between seizures and health related quality of life. Outcomes such as driving are potentially important outcome measures, as driving and transport are often cited as major problems,44 which are likely to influence many other aspects of quality of life in people with epilepsy. There is a lag phase of at least 18 months between becoming seizure free and obtaining a driving licence in the United Kingdom. The finding of significantly longer outcome duration in seizure free patients who were driving compared with those who were not, suggests that the figure of 45% obtaining driving licences may increase with further follow up. There is a lag between improvement in seizure control and reduced levels of anxiety and depression in medically treated patients attending a specialist clinic.45 Somewhat surprisingly we failed to show a direct relation between duration of postoperative seizure freedom and any of the psychological measures other than impact of epilepsy. However, the driving and employment data from this and other studies46 suggest a lag between freedom from seizures and the tangible psychosocial benefits thereof. Furthermore, the nature of this study (retrospective cross sectional) and the few seizure free patients makes it difficult to make categorical statements about the importance of duration of postoperative freedom from seizures but demands that long term psychosocial follow up should be the focus of future prospective studies.

CONCLUSION:

In conclusion, this study compared the differences in QALE for those who had diabetes, hypertension, heart disease, or stroke to those have epilepsy surgery. The proposed method can be particularly useful when examining burdens for common chronic diseases over time and at the local level for program planning and evaluation. This small retrospective study has shown that health related quality of life is related to postoperative seizure status. However, prospective studies are required to elucidate the role of other factors such as preoperative status and changes in psychosocial status with postoperative duration. Satisfactory studies should be prospective and longitudinal, comparing patients' preoperative and postoperative seizures and psychological status. To produce meaningful statistical data multicenter collaboration will be essential. Resultant data might assist in the construction of specified quantitative targets for *Healthy People 2020* objectives and setting

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