

# Quality of Life and its Determinants in People with Epilepsy in Basrah, Iraq

Mohammed Shakir<sup>1</sup> and \*Jasim N. Al-Asadi<sup>2</sup>

## نوعية الحياة ومحدداتها عند المصابين بالصرع في البصرة، العراق

محمد شاكر، جاسم الأسدي

**الملخص:** الهدف: تقييم نوعية الحياة عند المصابين بالصرع وتقييم العوامل المختلفة التي تؤثر عليها. **الطريقة:** شملت هذه الدراسة 116 مريضاً من الذين يعانون من الصرع مع مجموعة ضابطة من 116 شخصاً من الأصحاء، وهي دراسة حالات وشواهد أجريت في عيادة طب الأعصاب في العيادة الخارجية للمستشفى العام بالبصرة في العراق. تم إجراء المقابلات مع استخدام استبيان خاص يشمل البيانات الاجتماعية والديموغرافية والخصائص السريرية (لمرضى الصرع فقط). تم تقييم نوعية الحياة باستخدام الصيغة القصيرة للمسح الصحي (SF-36). **النتائج:** أظهر مرضى الصرع بشكل عام نوع أدنى من الحياة بالمقارنة مع العينة الضابطة. وفي التحليل وحيد المتغير، كانت نوعية الحياة متدنية عند المرضى من كبار السن، والمنحدرين من المناطق الريفية، وذوي التعليم والدخل المنخفضين. وكذلك كان عدد نوبات الصرع وطول فترة الصرع من العوامل الهامة لتدني نوعية الحياة. كما أظهر تحليل التخوف متعدد المتغيرات أن العمر والمستوى التعليمي ومعدل الدخل وتيرة نوبات الصرع ومحددات كبيرة هامة لتحديد نوعية الحياة. **الخلاصة:** بعض العوامل الاجتماعية والديموغرافية، فضلاً عن العوامل السريرية كانت حاسمة في تحديد نوعية الحياة عند المصابين بمرض الصرع. وبناءً على تلك العوامل ينبغي على المهنيين الصحيين وضع استراتيجيات مختلفة لتحسين نوعية الحياة عند هؤلاء المرضى.

**مفتاح الكلمات:** بالغين، صرع، نوعية الحياة، وتحليل التخوف، حالة اجتماعية - اقتصادية، العراق.

**ABSTRACT: Objective:** The objective of this study was to assess the quality of life (QOL) in people with epilepsy and to evaluate various factors affecting their QOL. **Methods:** A total of 116 patients with epilepsy and a control group of 116 apparently healthy persons were included in this case-control study which was conducted at the neurology outpatient clinic of Basrah General Hospital, Iraq. An interview was performed with the use of a special questionnaire, which included data pertaining to socio-demographic characteristics, and clinical characteristics (for patients with epilepsy only). The QOL was assessed with the use of a Short Form (SF-36) health survey. **Results:** Epileptic patients showed lower overall QOL scores as compared to controls. In the univariate analysis, patients who were older, from rural areas, and with low education and income levels had lower overall QOL scores. Frequent seizures as well as increased duration of epilepsy were also significant factors associated with reduction in QOL scores. In the multivariate regression analysis, age, educational level, income and frequency of seizures were significant determinants of QOL. **Conclusion:** Certain socio-demographic factors as well as clinical factors were crucial in determining QOL in epilepsy patients. Recognition of these factors will lead health professionals to develop different strategies to improve the QOL of those patients.

**Keywords:** Adults; Epilepsy; Quality of life; Regression analysis; Socioeconomic status; Iraq.

### ADVANCES IN KNOWLEDGE

- Although there are numerous studies assessing the quality of life (QOL) of people with epilepsy from all over the world, similar studies from developing countries, especially Iraq, are sparse.
- This study most likely marks one of the first studies to assess the QOL in patients with epilepsy in Basrah, Iraq.
- It is necessary to ascertain the magnitude of the problem as a part of the systematic approach to challenges in epilepsy management.

### APPLICATION TO PATIENT CARE

- Information obtained from this study could lead to improvement in quality of care for people with epilepsy.
- The increased identification of patients' problems with daily functioning and well-being can guide management and lead to improvement in patients' QOL.

<sup>1</sup>Basrah Health Directorate, Basrah, Iraq; <sup>2</sup>College of Medicine, University of Basrah, Basrah, Iraq

\*Corresponding Author e-mail: alasadijasim1951@yahoo.com

**A**BOUT 45 MILLION PEOPLE WORLDWIDE suffer from epilepsy, with three-quarters of them living in poor countries, and more than 80% living in the tropics.<sup>1,2</sup> In 2005, the International League Against Epilepsy (ILAE) and the International Bureau for Epilepsy (IBE) defined epilepsy as 'a disorder of the brain characterised by an enduring predisposition to generate epileptic seizures and by the neurobiological, cognitive, psychological, and social consequences of this condition'.<sup>3</sup>

Epilepsy is associated with adverse social, physical, and psychological consequences which are reflected on the cognitive functioning and behavioural patterns of affected individuals.<sup>4</sup> A person with epilepsy faces uncertainty over the diagnosis of his or her condition, over its nature, and whether and when seizures will occur, how best seizures can be controlled, and whether they will ultimately remit.<sup>5</sup> Epilepsy is also a known stigmatising condition.<sup>6</sup> Because of its clinical uncertainty and stigmatisation, the impact of epilepsy on a person's quality of life (QOL) can be significant.<sup>7</sup>

The World Health Organization (WHO) defines QOL as individuals' perception of their position in life in the context of the culture and value systems in which they live, and in relation to their goals, expectations, standards and concerns. It is a broad-ranging concept affected in a complex way by the person's physical health, psychological state, level of independence, social relationships, personal beliefs, and their relationship to salient features of their environment.<sup>8</sup>

People with epilepsy are prone to poorer self-esteem and higher levels of anxiety and depression than people without epilepsy.<sup>9</sup> They are more likely to be under- or unemployed.<sup>10</sup> Lower rates of marriage and greater social isolation have been reported in adults with epilepsy as compared with others.<sup>11</sup> Some, though not all, people with epilepsy feel stigmatised by their condition.<sup>12</sup>

The relationship between the severity of epilepsy and its impact on QOL is complex and may be determined by a number of different factors.<sup>13</sup> QOL in patients with epilepsy is a function of an interaction of factors which include clinical variables (e.g. seizure frequency, severity, illness duration, treatment side effects, depression and anxiety), social disadvantages (e.g. divorce,

unemployment, social stigma, illness intrusion into social life), and family circumstances (e.g. family caregiver characteristics and social support).<sup>14-18</sup>

QOL is sensitive to distress in several domains of living, and a focus on its determinants can help to narrow down the domains in which interventions can be targeted to improve outcome and quality of care.<sup>19-21</sup> Current instruments that measure QOL for people with epilepsy have been developed and tested exclusively in the West; the questionnaires analyse multiple daily functions, which are dependent on culture, ethnicity, and economics. Limited data are available to guide QOL issues in developing countries' populations.

The level of, and factors affecting, QOL in patients with epilepsy in Basrah, Iraq, have not yet been addressed properly. Therefore, this case-control study was conducted to determine the QOL and its determinants among patients with epilepsy in Iraq.

## Methods

This case-control study was carried out in Basrah, Iraq, from June 2010 to March 2011. Epilepsy registers were not available, so epileptic patients who fulfilled the inclusion criteria and attended the neurology outpatient clinic of Basrah General Hospital (one of four major hospitals in Basrah Governorate) during the period of the study were recruited.

Participants were included if they satisfied the following criteria: 16 years of age or older; diagnosis of epilepsy for a minimum of one year; not having clinical features of mental retardation (assessed by a clinical judgment); no history of seizure within the last 24 hours, and no chronic illness or disability other than epilepsy. Patients were excluded from the study if they had symptomatic epilepsy or a systemic disease that may have affected their health status and QOL. A total of 116 epileptic patients were recruited.

Because no normative Short-Form 36 (SF-36) survey values for the general Iraqi population existed, 116 individuals (aged 16 years or older) who were not epileptic, and were free from chronic illnesses or disabilities were chosen by a simple random sampling as a control group. They were either relatives of epileptic patients, or patients who attended the outpatient clinic of Basrah General

**Table 1:** Socio-demographic characteristics of the study population

Characteristic	Epileptic Patients		Control Group		P value
	No.	%	No.	%	
<b>Age (years)</b>					
16–25	55	47.4	55	47.4	0.999
26–35	41	35.3	41	35.3	
≥36	20	17.3	20	17.3	
<b>Sex</b>					
Male	70	60.3	70	60.3	0.999
Female	46	39.7	46	39.7	
<b>Educational Level</b>					
Illiterate	17	14.7	18	15.5	0.995
Primary	42	36.2	39	33.6	
Intermediate	28	24.1	30	25.9	
Secondary	18	15.5	18	15.5	
University & above	11	9.5	11	9.5	
<b>Residence</b>					
Urban	54	46.6	58	50	0.694
Rural	62	53.4	58	50	
<b>Income</b>					
Low	33	28.4	14	12.1	0.003
Medium	50	43.2	50	43.2	
High	33	28.4	52	44.7	
<b>Employment</b>					
Employed	46	39.7	62	53.4	0.024
Unemployed	70	60.3	54	46.6	
<b>Marital Status</b>					
Married	51	44	83	71.6	0.001
Unmarried	65	56	33	28.4	
<b>Total</b>	<b>116</b>	<b>100</b>	<b>116</b>	<b>100</b>	

Hospital for conditions other than epilepsy. Both the control group and epileptic patients were matched for age, sex, and educational level.

A questionnaire was used to collect data about patients' socio-demographic status. Only the epileptic patients completed the clinical data section of the questionnaire. The socio-demographic data were age; sex; educational level; marital status; per capita monthly family income in Iraqi dinars (ID), which was classified as low (<100,000 ID ≈

<80 \$US), medium (100,000–250,000 ID ≈ 80–200 \$US), and high (>250,000 ID ≈ >200 \$US); residence, and employment (housewives and students were classified as unemployed). Clinical data included seizure frequency, number of antiepileptic drugs, and duration of epilepsy. QOL was assessed by the SF-36 health survey, which is widely used as a generic measure of health.<sup>22</sup>

The SF-36 has also proved a reliable and valid measure of health-related QOL, and has been used as an outcome indicator in numerous clinical trials and across various diagnostic groups, including with adults with epilepsy.<sup>23,24</sup> The SF-36 assesses 8 QOL domains: physical functioning (PF) - 10 items; role physical limitations (RP) - 4 items; bodily pain (BP) - 2 items; general health (GH) - 5 items; vitality (VT) - 4 items; social functioning (SF) - 2 items; role emotional limitations (RE) - 3 items, and mental health (MH) - 5 items. Each of the eight health concepts was measured on a scale of 0 to 100.<sup>22</sup>

A total QOL which represents the average of the sum of the eight subscales was calculated. The total QOL score was divided into four levels: a poor QOL was indicated by a score less than 40; a moderate QOL was indicated by a score of 40 to 60; a good QOL was indicated by a score of 61 to 80, and an excellent QOL was indicated by a score of more than 80.<sup>25</sup> Seizure frequency was classified according to the number of attacks in the last year: one or more attack per month, fewer than one attack per month, and no attacks in the last year.<sup>4,14</sup>

After an informed consent was obtained, cases and controls were interviewed by one of the authors. The study was approved by the Ethics and Research Committee of Basrah Health Directorate. Data were analysed using Statistical Package for the Social Sciences (SPSS), Version 15, (IBM, Chicago, Illinois, USA) and the results were presented as tables. For categorical variables, frequencies and percentages were reported. Differences between groups were analysed using Pearson's chi-squared test, or Fisher's exact tests for small samples (i.e. cells less than 5). For continuous variables, mean and standard deviation were used to present the data while analysis was performed using the Student's t-test or analysis of variance (ANOVA). A multiple regression analysis was used to identify significant predictors of changes in QOL. A P value of less than 0.05 was considered statistically significant.

**Table 2:** Comparison of QOL between epileptic patients and controls

QOL Subscale	Cases			Controls			P value
	Mean $\pm$ SD	95% CI		Mean $\pm$ SD	95% CI		
		Lower	Upper		Lower	Upper	
PF	61.8 $\pm$ 26.9	57.1	66.7	81.2 $\pm$ 13.3	78.9	83.5	<0.001
RP	36.7 $\pm$ 34.3	28.3	41.6	71.8 $\pm$ 28.6	66.4	76.5	<0.001
RE	39.6 $\pm$ 39	32.8	46.5	75.6 $\pm$ 26.9	70.7	80.2	<0.001
SF	55.4 $\pm$ 26.4	50.8	60.7	77.4 $\pm$ 30	73.4	80.9	<0.001
BP	47.6 $\pm$ 29.7	42.3	53.2	72.6 $\pm$ 18	69.5	75.7	<0.001
VIT	43.9 $\pm$ 20.5	40.2	47.5	62.7 $\pm$ 17.8	59.3	65.7	<0.001
MH	51.5 $\pm$ 18.5	48.3	55.1	66.7 $\pm$ 16.4	63.7	69.7	<0.001
GH	48.6 $\pm$ 16.9	45.4	51.8	69 $\pm$ 14.8	66.4	71.7	<0.001
<b>Total QOL Scores</b>	<b>47.9 <math>\pm</math> 18.1</b>	<b>44.4</b>	<b>51.3</b>	<b>71.7 <math>\pm</math> 10.2</b>	<b>69.9</b>	<b>73.5</b>	<b>&lt;0.001</b>

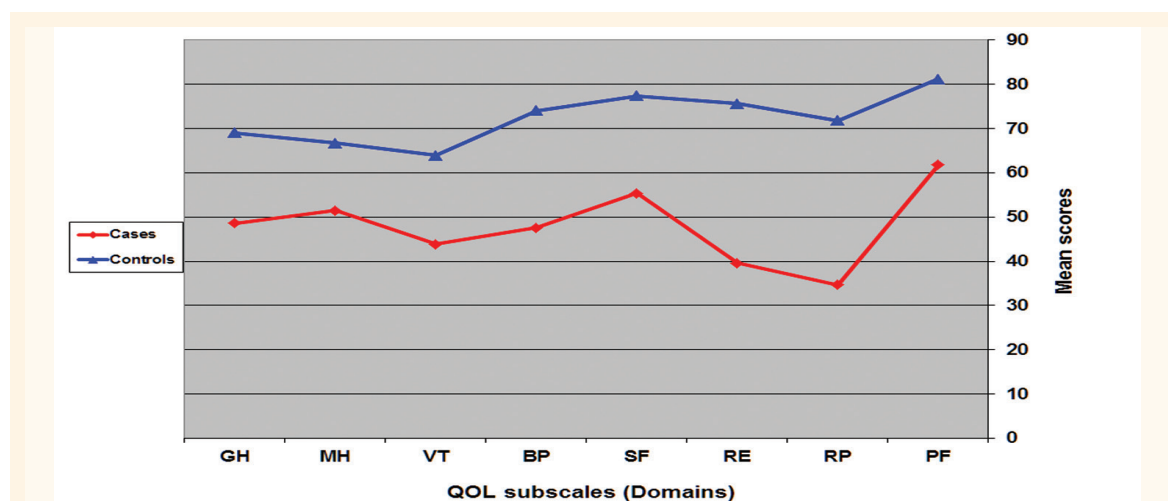
QOL = quality of life; SD = standard deviation; CI = confidence interval; PF = physical functioning; RP = role physical limitations; RE = role emotional limitations; SF = social functioning; BP = bodily pain; VIT = vitality; MH = mental health; GH = general health

## Results

Table 1 shows the distribution of socio-demographic characteristics between epileptic patients and the control group. No significant difference was observed between epileptic patients and the control group regarding residence ( $P > 0.05$ ), but there was a significant difference between the two groups regarding income, employment, and marital status ( $P < 0.05$ ). Regarding monthly family income, most of the epileptic patients (43.1 %) were medium income earners, while most in the control group (44.8 %) were high income earners. Unemployment was the most frequent occupational status (60.3 %) among

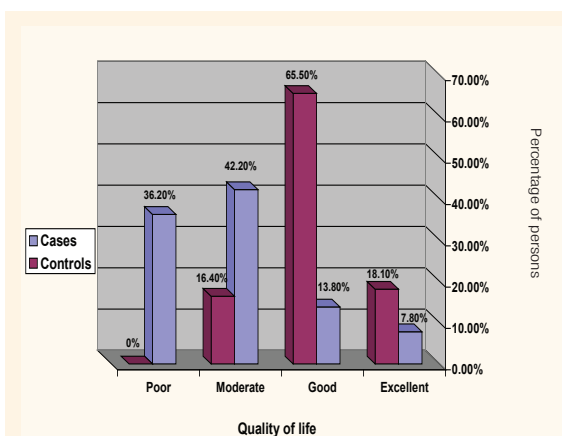
epileptic patients, and (56 %) were unmarried, while most in the control group were employed (53.4%) and 71.6% were married.

As shown in Table 2 and Figure 1, epileptic patients scored lower in all subscales of QOL as compared to control group. The differences were highly significant ( $P < 0.001$ ). The mean total QOL scores of epileptic patients was  $47.9 \pm 18.1$  as compared to  $71.7 \pm 10.2$  in the control group with a highly significant difference ( $P < 0.001$ ). Figure 2 shows a qualitative grouping of total QOL scores of epileptic patients and control group members. As shown in this figure, as compared to members of the



**Figure 1:** Comparison of QOL subscales (domains) between cases and controls.

QOL = quality of life; GH = general health; MH = mental health; VT = vitality; BP = body pain; SF = social functioning; RE = role emotional limitations; RP = role physical limitations; PF = physical functioning.



**Figure 2:** Comparison of quality of life between cases and controls.

control group, most epileptic patients had a poor to moderate QOL with a highly significant difference ( $P < 0.001$ ).

Of the epileptic patients, 43.1 % had had epilepsy for less than 5 years, while 36.2 % had had epilepsy for more than 10 years with a mean duration of 10.6 years. Of the epileptic patients, only 21.6 % were seizure free for the last year, and 82.7 % were on one antiepileptic drug.

As shown in Table 3, older epileptic patients had lower mean QOL scores ( $39 \pm 15.3$ ) as compared with younger age groups ( $55.9 \pm 18.3$ ). Patients with low educational levels and low income also had lower QOL scores, with a significant association. Patients who had had epilepsy for less than five years as well as those who had had epilepsy for more than 10 years had lower QOL scores ( $43.9 \pm 14.7$ ,  $47.9 \pm 18.1$ , respectively) as compared to  $60.3 \pm 19.7$  in those who had had epilepsy for 5–10 years, with a significant association. Patients who had been free of epileptic seizures for the last year had a better level of QOL as compared to those with more frequent seizures, with a highly significant association. Marital status, gender, employment, residency, and number of antiepileptic drugs had no significant influence on QOL among epileptic patients.

To examine the independent effect of the studied factors on the QOL of epileptic patients, a multiple regression analysis was performed [Table 4]. Income, age, education, and frequency of seizures were found to be the most independent and highly significant factors that predicted QOL of epileptic patients. They explained 54.7% of the variability in

QOL total scores. The excluded variables were sex, residency, marital status, employment, duration of the disease, and number of antiepileptic drugs.

## Discussion

The epileptic patients in this study were less likely to be married, more likely to be unemployed, and with a lower income as compared to the control group. This is consistent with other studies which found that people with epilepsy appear at greater risk of problems in relation to marriage, employment, and socio-economic status.<sup>26–28</sup>

The present study highlights the impact of epilepsy on the QOL of epileptic patients in Basrah. When compared with the epilepsy-free control group, patients with epilepsy reported a significantly lower QOL across all domains. Such a result is consistent with many previous studies that have been done in Iran, the Arabian Gulf, the Near East, Thailand, Norway, the UK, Russia, and Tunisia.<sup>14,18,29–32</sup> The epileptic patients' rather poor QOL may be explained by the disease's chronicity (the mean duration of patients' illness in this study was 10.6 years), a result which was reported by Sillanpää *et al.*, or because most of the epileptic patients in this study (78.4%) had not been seizure-free in the last year. Seizure frequency was described as one of the most relevant determinants of poor QOL.<sup>33,34</sup>

Similar to other studies, higher QOL scores in epileptic patients were associated with youth, and higher levels of education and family income.<sup>35–37</sup> It is reasonable to suggest that these factors increase the potential for social support, positive coping methods, and awareness of the disease.<sup>14,38</sup> Elderly people may have more difficulty in coping with epilepsy than do younger patients who have more physiological reserves and fewer responsibilities.<sup>39</sup> Education is an important indicator that may directly or indirectly influence QOL through its association with employment, higher social class, and economic status, or because well-educated patients are more aware of self-management practices and are better educated about the disease and also know that regular treatment can help patients avoid seizures and hence lead a normal life.<sup>40</sup>

Economic status was recognised as an important predictor of QOL in epileptic patients.<sup>41</sup> Having enough money is important to QOL not only to meet

**Table 3:** Quality of life (mean  $\pm$  SD) of epilepsy patients according to socio-demographic and clinical factors

Risk factor	n (%)	QOL Scores (Mean $\pm$ SD)	95% CI	P value
<b>Age (years)</b>				
16–25	55 (47.4)	55.9 $\pm$ 18.3	51.3 $\pm$ 16.1–61.2 $\pm$ 21.2	<0.001
26–35	41 (35.3)	41.8 $\pm$ 14.0	37.6 $\pm$ 11.3–46.7 $\pm$ 18.7	
$\geq$ 36	20 (17.3)	39 $\pm$ 15.3	32.6 $\pm$ 9.6–46.9 $\pm$ 18.9	
<b>Sex</b>				
Male	70 (60.3)	47.5 $\pm$ 18.6	42.3 $\pm$ 15.6–51.7 $\pm$ 20.9	0.784
Female	46 (39.7)	48.5 $\pm$ 17.6	43.4 $\pm$ 13.4–54.1 $\pm$ 21.2	
<b>Employment</b>				
Employed	46 (39.7)	45.4 $\pm$ 14.8	41.3 $\pm$ 11.4–49.8 $\pm$ 17.5	0.222
Unemployed	70 (60.3)	49.6 $\pm$ 19.9	44.9 $\pm$ 16.8–54.5 $\pm$ 22.7	
<b>Residency</b>				
Urban	54 (46.6)	51.7 $\pm$ 20.9	46 $\pm$ 18.3–57.3 $\pm$ 23.4	<0.05
Rural	62 (53.4)	44.6 $\pm$ 14.7	41.2 $\pm$ 11.9–48.4 $\pm$ 17.4	
<b>Education</b>				
Illiterate	17 (14.7)	42.9 $\pm$ 21.8	32.6 $\pm$ 14.4–53.9 $\pm$ 25.9	<0.001
Primary	42 (36.2)	41.9 $\pm$ 13.6	37.8 $\pm$ 11.5–45.9 $\pm$ 15.1	
Intermediate	28 (24.1)	47.2 $\pm$ 16	41.3 $\pm$ 1.5–53.1 $\pm$ 19.2	
Secondary	18 (15.5)	54.9 $\pm$ 14.9	49.3 $\pm$ 7.8–62.1 $\pm$ 19.7	
University+	11 (9.5)	68.6 $\pm$ 21.1	69.5 $\pm$ 3.1–87.5 $\pm$ 16.2	
<b>Income</b>				
Low	33 (28.4)	39.3 $\pm$ 10.4	35.9 $\pm$ 8.2–42.9 $\pm$ 15.2	<0.001
Intermediate	50 (43.2)	43.7 $\pm$ 15.7	39.2 $\pm$ 13.4–48.3 $\pm$ 18.4	
High	33 (28.4)	62.8 $\pm$ 19.2	56 $\pm$ 15.9–69.4 $\pm$ 21.7	
<b>Marital status</b>				
Married	51 (44)	45.4 $\pm$ 16.6	40.9 $\pm$ 13.1–50.2 $\pm$ 19.3	0.191
Unmarried	65 (56)	49.9 $\pm$ 19.2	45.1 $\pm$ 15.8–54.1 $\pm$ 21.9	
<b>Duration of Epilepsy (years)</b>				
<5				<0.01
5–10	50 (43.1)	43.9 $\pm$ 14.7	39.9 $\pm$ 10.9–48.1 $\pm$ 18.1	
>10	24 (20.7)	60.3 $\pm$ 19.7	52.9 $\pm$ 15.3–68.7 $\pm$ 22.7	
	42 (36.2)	47.9 $\pm$ 18.1	40.3 $\pm$ 15.2–51.2 $\pm$ 20.9	
<b>Frequency of seizures</b>				
$\geq$ 1/month				<0.001
<once/month	41 (35.3)	43.9 $\pm$ 13.2	39.9 $\pm$ 10.4–48.1 $\pm$ 15.4	
None in the last year	50 (43.1)	43.7 $\pm$ 17.8	38.5 $\pm$ 14.9–49.6 $\pm$ 20.8	
	25 (21.6)	62.7 $\pm$ 18.6	56.3 $\pm$ 14.1–70.1 $\pm$ 21.8	
<b>No. of anti-epileptic drugs</b>				
One	96 (82.8)	48.4 $\pm$ 17.8	44.6 $\pm$ 15.1–52.1 $\pm$ 20	0.543
Two or more	20 (17.2)	45.6 $\pm$ 20.2	37.3 $\pm$ 15.3–54.9 $\pm$ 23.9	

QOL = quality of life; CI = confidence interval; SD = standard deviation

people's basic needs, but also to allow participation in society and in holidays and hobbies, and to allow people to enjoy luxuries and be prepared for unexpected expenses and emergencies.

In univariate analysis, patients living in rural areas had significantly lower QOL scores as compared to those living in urban areas, but this association disappeared in multivariate analysis. The role of residence may have been confounded by the effect of the social and economic levels. It was reported that epilepsy and its sequelae were more

prevalent in patients with low social and economic levels.<sup>42</sup>

Current seizure activity was an independent clinical predictor of QOL. Even patients with infrequent seizures, who would generally be regarded as having good control, had a relatively compromised QOL as compared with those who were seizure-free. Guekht *et al.*, reported that patients with frequent seizures had low social contact and feelings of stigmatisation.<sup>32</sup>

Considerable emphasis has been placed on the

**Table 4:** Multiple regression analysis

Determinants	Beta-coefficient	P value	R <sup>2</sup>
Income	0.481	0.001	0.547
Age	-0.396	0.001	
Education	0.252	0.001	
Frequency of seizures	-0.248	0.002	

desirability of monotherapy. Many studies have shown that the prescription of multiple drugs can result in multiple adverse side effects and have a negative effect on QOL.<sup>14,18,25</sup> In the present study, no significant association was found between the number of drugs and QOL. However, epileptic patients who were taking one antiepileptic drug had a slightly higher QOL score than those on multiple drugs.

In contrast to some earlier reports, patients' gender, marital status, and duration of the disease did not have a significant association with total QOL in this study.<sup>43</sup> The association between duration of epilepsy and QOL which was identified in univariate analysis was no longer significant after multiple regression analysis. A possible explanation of this discrepancy in significance might be related to age as a potential confounder.

A few limitations must be addressed in our study. To generalise our results to all epileptic patients, a random sample of patients with epilepsy would have been suitable. But it has been reported that obtaining a random sample of people with epilepsy is complex and labour-intensive.<sup>14</sup> Furthermore, with this being a case-control study, certain limitations such as recall bias, the problem of selection and non-response bias may have been encountered. Recall bias can exist in obtaining information, as by asking the study population by the mean of the SF-36 instrument whether their work or other regular daily activities, during a previous period, were affected by their physical health. The recall bias in this study was at least reduced by asking respondents to specify the type of effect and limiting the recall period in the questionnaire form to the present time, except in one question about seizure frequency, in which the recall period extended to one year before.

Another source of possible bias is the non-response bias, but in this study the response rate was 100% because all the cases and controls were willing to participate in the study and the data were obtained by means of an interview. Age, sex,

and educational level as strong confounders were removed by the process of matching. The problem of selection was unlikely to have been eliminated totally.

We accept that this study may have had biased sampling as patients with serious physical or mental limitations were excluded from the study. Therefore, the results may be biased towards the opinions of people with slightly better general health. In addition, the availability of free antiepileptic drugs should have helped in the inclusion of many patients with a lower socio-economic status, but this assumption may not be true because Basrah General Hospital is a secondary referral hospital, so it receives people from different socio-economic levels. The control group cannot be claimed to be totally representative of the general population. They were selected in a random manner which is valuable within the framework of a case-control study, but does not allow the generalisability of the SF-36 results to the whole population. A final limitation of this study was that data concerning the type of epilepsy were not collected. Despite these limitations, the results are valuable in providing insights into how the QOL of people with epilepsy can be improved.

## Conclusion

Patients with epilepsy in Basrah, Iraq, had a poor QOL. In addition, the results confirm that many issues faced by people with epilepsy are common across cultural boundaries, emphasising the negative effects of epilepsy on patients' QOL. Age, educational level, income, and frequency of seizures were significant determinants of QOL. Our findings call for improved management of patients with epilepsy to become seizure-free through treatment by drugs with minimal side effects and offering them good social support, thus enabling them to accommodate their condition and maximise their QOL.

## ACKNOWLEDGEMENTS

The authors would like to thank the personnel of the neurology outpatient clinic of Basrah General Hospital in which the study was conducted for their kind help and cooperation. Our deep gratitude also goes to our study subjects who took the time to give us relevant information for the study.

## DECLARATION OF INTEREST

The authors declare that there are no competing interests, and also that there were no sources of funding for this study.

## References

- World Health Organization. Epilepsy: Social consequences and economic aspects. Geneva: World Health Organization. Fact Sheet No. 166, 2001.
- Lee SA, Yoo HJ, Lee BI. Factors contributing to the stigma of epilepsy. *Seizure* 2005; 14:157–63.
- Fisher RS, van Emde BW, Blume W, Elger C, Genton P, Lee P, et al. Epileptic seizures and epilepsy: Definitions proposed by the International League Against Epilepsy (ILAE) and the International Bureau for Epilepsy (IBE). *Epilepsia* 2005; 46:470–2.
- Motamedi G, Meador K. Epilepsy and cognition. *Epilepsy Behav* 2003; 4:S25–38.
- Baker GA. Assessment of quality of life in people with epilepsy: Some practical implications. *Epilepsia* 2001; 42:66–9.
- Suurmeijer T, Reuvekamp MF, Aldenkamp BP. Social functioning, functioning, psychological functioning and quality of life in epilepsy. *Epilepsia* 2001; 42:1160–8.
- Moffat C, Dorris L, Connor L, Espie CA. The impact of childhood epilepsy on quality of life. A qualitative investigation using focus group methods to obtain children's perspectives on living with epilepsy. *Epilepsy Behav* 2009; 14:179–89.
- World Health Organization, Division of Mental Health and Prevention of Substance Abuse. Measuring Quality of Life, World Health Organization Quality of Life Instruments. Geneva: World Health Organization, 1997.
- Collings JA. Epilepsy and well-being. *Soc Sci Med* 1990; 31:165–70.
- Collings J. Epilepsy and the experience of employment. A report of a national survey by the British Epilepsy Association. Leeds: British Epilepsy Association, 1992.
- Wada K, Kawata Y, Murakami T, Kamata A, Gang Zhu G, Mizuno K, et al. Sociomedical aspects of epileptic patients: Their employment and marital status. *Psychiatry Clin Neurosci* 2001; 55:141–6.
- Thomas SV, Nair A. Confronting the stigma of epilepsy. *Ann Indian Acad Neurol* 2011; 14:158–63.
- Coolings J. Psychosocial well-being and epilepsy: An empirical study. *Epilepsia* 1990; 31:418–26.
- Mrabet H, Mrabet A, Zouari B, Ghachem R. Health-related quality of life of people with epilepsy compared with a general reference population: A Tunisian study. *Epilepsia* 2004; 45: 838–43.
- Johnson EK, Jones JE, Seidenberg M, Hermann BP. The relative impact of anxiety, depression, and clinical seizure features on health-related quality of life in epilepsy. *Epilepsia* 2004; 45:544–50.
- Poochikian-Sarkissian S, Sidani S, Wennberg R, Devins GM. Seizure freedom reduces illness intrusiveness and improves quality of life in epilepsy. *Can J Neurol Sci* 2008; 35:280–6.
- Wheless JW. Intractable epilepsy: A survey of patients and caregivers. *Epilepsy Behav* 2006; 8:756–64.
- Baker GA, Jacoby A, Gorry J, Stalgis C, Monnet D. Quality of life of people with epilepsy in Iran, the Gulf, and Near East. *Epilepsia* 2005; 46:132–40.
- Ohaeri JU, Awadalla AW, Gado OM. Subjective quality of life in a nationwide sample of Kuwaiti subjects using the short version of the WHO quality of life instrument. *Soc Psychiatry Psychiatr Epidemiol* 2009; 44:693–701.
- Piperidou C, Karlovasitou A, Triantafyllou N, Dimitrakoudi E, Terzoudi A, Mavraki E, et al. Association of demographic, clinical and treatment variables with quality of life of patients with epilepsy in Greece. *Qual Life Res* 2008; 17:987–96.
- Ramaratnam S, Baker GA, Goldstein LH. Psychological treatments for epilepsy. *Cochrane Database Syst Rev* 2008; 16:CD002029.
- RAND Corporation. Medical Outcome Study 36-Item Short Form Survey Instrument (SF-36). Santa Monica, California: RAND Health, 2009.
- Jacoby A, Baker GA, Steen N. The SF-36 as a health status measure for epilepsy: A psychometric assessment. *Qual Life Res* 1999; 8:351–64.
- Freeman JA, Hobart JC, Langdon DW, Thompson AJ. Clinical appropriateness: A key factor in outcome measure selection: The 36-item short form health survey in multiple sclerosis. *J Neurol Neurosurg Psychiatry* 2000; 68:150–6.
- Rajabi F, Dabiran S, Hatmi Z, Zamani G. Quality of life of epileptic patients compared to general population of Tehran. *Acta Medica Iranica* 2009; 47:75–8.
- Ohaeri JU, Awadalla AW, Farah AA. Quality of life in people with epilepsy and their family caregivers: An Arab experience using the short version of WHO quality of life instrument. *Saudi Med J* 2009; 30:1328–35.
- Gopinath M, Sarma PS, Thomas SV. Gender-specific psychosocial outcome for women with epilepsy. *Epilepsy Behav* 2011; 20:44–7.
- Vibha P, Saddichha S, Akhtar S. Quality of life (QOL) and marital adjustment in epilepsy and comparisons with psychiatric illnesses. *Int J Psychosocial Rehabil* 2010; 14:105–12.
- Phabphal K, Geater A, Limapichart K, Satirapunya P, Setthawatcharawanich S. Quality of life in epileptic



- patients in Southern Thailand. *J Med Assoc Thai* 2009; 92:762–8.
30. Stavem K, Loge JH, Kaasa S. Health status of people with epilepsy compared with a general reference population. *Epilepsia* 2000; 41:85–90.
  31. Baker GA, Jacoby A, Buck D, Stalgis F, Monnet Y. Quality of life of people with epilepsy: A European study. *Epilepsia* 1997; 38:353–62.
  32. Guekht AB, Mitrokhina TV, Lebedeva AV, Dzugaeva FK, Milchakova LE, Lokshina OB, et al. Factors influencing on quality of life in people with epilepsy. *Seizure* 2007; 16:128–33.
  33. Sillanpää M, Haataja L, Shinnar S. Perceived impact of childhood-onset epilepsy on quality of life as an adult. *Epilepsia* 2004; 45:971–7.
  34. Bautista RE, Glen ET. Seizure severity is associated with quality of life independent of seizure frequency. *Epilepsy Behav* 2009; 16:325–9.
  35. Shetty PH, Naik RK, Saroja AO, Punith K. Quality of life in patients with epilepsy in India. *J Neurosci Rural Pract* 2011; 2:33–8.
  36. Edefonti V, Bravi F, Turner K, Beghi E, Canevini MP, Ferraroni M, et al. Health-related quality of life in adults with epilepsy: The effect of age, age at onset and duration of epilepsy in a multicentre Italian study. *BMC Neurol* 2011; 11:33–45.
  37. Mohammad MS, Hemeida SA, Rabah AM. Health status and quality of life in epileptic children and adolescents. *Egypt J Neurol Psychiat Neurosurg* 2010; 47:83–92.
  38. Buck D, Jacoby A, Baker GA, Ley H, Steen N. Cross-cultural differences in health-related quality of life of people with epilepsy: Findings from a European study. *Qual Life Res* 1999; 8:675–85.
  39. Pugh M, Copeland L, Zeber J, Cramer J, Amuan M, Cavazos J, et al. The impact of epilepsy on health status among younger and older adults. *Epilepsia* 2005; 46:1820–7.
  40. Joseph N, Ray A, Reshma BK, Bhat S, Herady M, Kumar A. Assessment of quality of life, stigma associated and self-management practices among patients suffering from epileptic seizures: A cross sectional study. *J Neurosci Behav Health* 2011; 3:91–8.
  41. Zhao Y, Wu H, Li J, Dong Y, Liang J, Zhu J, et al. Quality of life and related factors in adult patients with epilepsy in China. *Epilepsy Behav* 2011; 22:376–9.
  42. Meador KJ. Research use of the new quality-of-life in epilepsy inventory. *Epilepsia*. 1993; 34:S34–8.
  43. Djibuti M, Shakarishvili R. Influence of clinical, demographic, and socioeconomic variables on quality of life in patients with epilepsy: Findings from Georgian study. *J Neurol Neurosurg Psychiatry* 2003; 74:570–3.