Reprinted from the German Journal of Psychiatry · http://www.gjpsy.uni-goettingen.de · ISSN 1433-1055

Psychiatric Comorbidity and Quality of Life in People with Epilepsy

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Abstract

Background: There is scant data on psychiatric co-morbidity and quality of life in people with epilepsy from low and middle income countries.
Methods: We compared psychiatric co-morbidity and quality of life in 80 people with epilepsy, 80 people with bronchial asthma and 80 healthy controls, using a Structured Clinical Interview schedule (SCID-DSM IV patient version) and the World Health Organisation Quality of Life inventory (WHO-QOL BREF) and assessed the impact of psychiatric co-morbidity on quality of life. We further evaluated people with epilepsy with the Quality of Life in Epilepsy-31 item inventory (QOLIE-31) and for risk factors for psychiatric co-morbidity.
Results: Significantly greater proportions of people with epilepsy had a co-morbid psychiatric disorder (28.7%) than those with bronchial asthma (13.8%, OR 1.53, p = 0.02) or healthy controls (11.3%, OR 3.18, p = 0.006). Complex partial seizures, frequent or recent seizures, poor drug compliance, anticonvulsant poly-pharmacy, a family history of psychiatric disorder, and a history of febrile seizures were significantly associated with psychiatric co-morbidity in people with epilepsy. They also reported poorer quality of life than those with asthma or controls, as did people with psychiatric disorders and those with low income in all groups.
Conclusions: Psychiatric co-morbidity is common in people with epilepsy and is associated with potentially modifiable clinical variables. It is under-diagnosed and contributes to poorer quality of life (German J Psychiatry 2010; 13 (2): 79-85).

Keywords: Psychiatric comorbidity, epilepsy, quality of life

Received:
Revised version:
Published: 21.6.2010

Acknowledgements: This study was supported by an intramural research grant from the Fluid Research Fund of the Christian Medical College, Vellore.

Introduction

People with epilepsy are more likely than the general population to have co-morbid psychiatric disorders that include anxiety, depression, interictal and chronic psychoses, personality disorders, aggression and mental retardation, with reported rates in chronic epilepsy ranging from 19 % to 62% (Hermann et al., 2000; Van der Feltz , 2002; Gaitatziz, 2004). A recent selective review reported the prevalence of various psychiatric disorders in persons with epilepsy was 24-74% for mood disorders, 30% for depression, 10–25% for anxiety disorders 2–7% for psychoses and 1–2% for personality disorders (Gaitatziz, 2004).

In recent population based surveys, the12 month prevalence of mental health disorder was 23.5% (95% CI 15.8–31.2) and the lifetime prevalence was 35.5% (95% CI 25.9–44.0) (Tellez-Zenteno et al., 2007). Depression is the commonest psychiatric condition reported in people with epilepsy, and in selected populations such as patients with temporal lobe epilepsy, or in those with refractory epilepsy, lifetime prevalence ranges between 8% and 48% with a mean estimate of

Table 1. Socio-demographic details of the sample

Variable	Epilepsy (N=80)	Asthma (N=80)	Controls (N=80)
Mean age(S.D) in years	30.3 (8.7)	33.4 (10.2)	30.4 (8.4)
Male (%)	45 (56.3)	45 (56.3)	44 (55)
Rural (%)	50 (62.5)	55 (68.8)	52 (65)
Income < 2000 rupees per month	47 (58.8)	22 (27.5)*	25 (31.3)***
Married	49 (61.3)	61 (76.3)**	59 (73.8)
Education <6yrs	34 (42.5)	46 (57.3)	39 (48.8)
Employed	39 (48.8)	46 (57.5)	44 (55)

Odds ratio and 95% confidence intervals for:
* Epilepsy versus asthma: OR 3.75, 95% CI 1.84 -7.71; p = 0.000
*** Epilepsy versus controls: OR 3.13, 95% CI 1.56 – 6.33; p = 000
** Epilepsy versus asthma: OR 0.49, 95% CI 0.23 -1.03, p = 0.04

30% across studies (Hermann et al., 2000); the prevalence may be lower in unselected population surveys that use validated screening instruments as opposed to self-reports (Tellez-Zenteno et al., 2007). Even though psychiatric co-morbidity is common in epilepsy, it is under-recognised and under-treated, both in adult and paediatric patients in speciality epilepsy centres as well as in community based epilepsy services The consequences of unrecognised and untreated depressive disorders are many including a higher suicide rate and poorer overall quality of life in these patients (Hermann et al., 2000).

Table 2. Psychiatric co-morbidity in people with epilepsy, asthma and healthy controls

Variable	Epilepsy (N= 80)	Asthma (N = 80)	Controls (N = 80)
Prevalence of psychiatric co-morbidity *	23 (28.7%) [CI 20–39.5%]	11(13.8%) [CI 7.9–23%]	9 (11.3%) [CI 6–20%]
Psychiatric diagnoses (%)	**N= 23**	**N = 11**	**N = 9**
Major depressive disorder	12 (52.2)	7 (63.6%)	7 (63.6)
Dysthymia	4 (5.0)	4 (5.0)	0
Previous depressive episode(s)	4 (17.4)	0	2 (22.2)
Psychosis	3 (3.8)	0	0
Treatment for psychiatric disorder	11 (47.8)	3 (27.3)	0

*Prevalence of psychiatric co-morbidity in:
People with epilepsy versus those with asthma= OR 1.53, 95% CI 1.07 - 6.09; p = 0.02
People with epilepsy versus controls = OR 3.18, 95% CI 1.28 – 8.11; p = 0.006
People with asthma versus controls = OR 1.26, 95% CI 0.45 -3.55; p = 0.63
CI= 95% confidence intervals

Assessment of quality of life generally includes measurement of functioning in several areas, including physical, psychological, social and vocational domains. Quality of life assessments in epilepsy are preferably done using questionnaires that address the special problems peculiar to epilepsy, such as the quality of life in epilepsy-31 item scale (QOLIE-31) (Cramer et al., 1998).

In this study we compared the prevalence of co-morbid psychiatric disorders and quality of life in people with epilepsy with matched healthy controls and in people with bronchial asthma, another chronic illness with exacerbations that requires long term medication. We attempted to determine the factors contributing to psychiatric comorbidity in epilepsy and to assess the impact of psychiatric co-morbidity on quality of life.

Methods

The study was conducted in the epilepsy and asthma clinics of this secondary and tertiary care, teaching and referral hospital in South India from July 2001 to June 2002. We estimated that a sample size of 80 people with epilepsy would be required, assuming a 30% prevalence of psychiatric co-morbidity in people with epilepsy and 10 % in a control group with a power of 80 % and alpha error of 5 %.

We recruited 80 patients with seizure disorder, 80 healthy controls matched for age (+/- 2 years) and sex, and 80 patients with bronchial asthma.

Consecutive patients who satisfied inclusion criteria in the epilepsy and asthma clinics were referred to the first author by the treating doctors for detailed interviews. People with epilepsy were recruited if they were aged 16 years to 60 years, with an established diagnosis of epilepsy and a history of at least 1 seizure in the last 5 years. We excluded people with moderate mental retardation or with major neurological illness. People with bronchial asthma attending the asthma clinic, with no history of seizures were recruited into the study after the diagnosis of asthma was confirmed by a chest physician. Information was obtained by direct clinical interviews as well as going through the case records. The first author also recruited and interviewed age and sex matched healthy relatives of patients attending the epilepsy clinic as controls after ensuring that they had never had a seizure or an asthmatic attack.

We used a semi-structured proforma to collect socio-demographic details. For people with epilepsy, clinical variables such as seizure duration, type and frequency of seizures, type of treatment, seizure control and family history of psychiatric disorder were ascertained from medical notes supplemented by interview of subjects and their relatives. The International Classification of Epilepsies (ILAE-1981) was used to classify seizure types. We used the Structured Clinical Interview schedule for DSM-IV 2002 patient version (First et al., 2002) to assess psychiatric co-morbidity in all subjects. We assessed quality of life in all groups using the

WHO Quality of Life scale (WHOQOL- BREF) , a 26 question version of the WHOQOL-100 assessment that was developed by the WHOQOL Group in 15 international field centres in an attempt to develop a quality of life assessment that would be applicable cross-culturally. The WHOQOL-BREF assess quality of life in four domains: physical, psychological, social and environmental; the domain scores demonstrated good discriminant validity, content validity, internal consistency and test-retest reliability, and correlated at around 0.9 with the WHOQOL-100 domain scores. A vernacular version of the WHOQOL- BREF has been validated in India (Saxena et al., 1998). For people with epilepsy, we also used the Quality of Life in Epilepsy-31 item scale (QOLIE-31), which assesses specific domains such as emotional well being, social functioning, energy/fatigue, cognitive functioning, seizure worry, medication effects and overall quality of life to assess epilepsy specific issues. Higher scores on each domain of both instruments indicate better quality of life. Both scales were translated into Tamil, the regional language, and back translated by two independent translators, before commencement of the study. We administered the Tamil versions to 10 subjects to ensure clarity, comprehension and cultural relevance of each item.

All participants provided informed consent and the study protocol was approved by the institutional review board of the institution

We used the software programme CIA, version 2.0.0 (Bryant, 2000) to calculate confidence intervals for the prevalence of psychiatric co-morbidity in the three groups. We used SPSS–WIN version 9.0. for further statistical analyses and used the X^2 test (with the Yates correction, if required) or the Fisher's exact test. We computed Odds Ratios (OR) with 95% confidence intervals (CI) for comparisons of binary outcomes, and the t test or one-way analysis of variance (ANOVA) with post hoc analyses for continuous outcomes between the three participant groups. Finally, in people with epilepsy, we computed Relative Risks (RR) and 95% CI for socio-demographic and clinical variables between those with and without psychiatric morbidity.

Results

The socio-demographic details of the sample are detailed in Table 1. People with epilepsy were age matched with controls but were younger than people with asthma in this sample ($p = 0.04$). People with epilepsy were significantly more likely to earn less than Rs. 2000 per month (£25) than those with asthma or healthy controls, though they did not differ significantly from people with asthma in proportions employed. They were also more likely to be single than those with asthma in this sample but not healthy controls (Table I).

Psychiatric co-morbidity

The prevalence of co-morbid psychiatric disorders was 28.7% (95 % CI 20.0 – 39.5%) in people with epilepsy; this was significantly greater than in those with asthma or controls (Table 2). People with asthma did not significantly differ from controls in this respect. Among those with psychiatric disorders in the total sample (43/240; 17.9%), Major Depressive Disorder was the most common diagnosis (26/43; 60.5%) followed by Dysthymia (8/43; 18.6%). Less than half of those with psychiatric disorders among those with epilepsy (47.3%), less than a third in those with asthma and psychiatric co-morbidity (27.3%), and none of the controls with psychiatric disorders were on treatment for the psychiatric disorder.

Risk Factors for Psychiatric Co-morbidity in those with epilepsy

Of the 80 people with epilepsy, 9 (11.3%) had a duration of seizure disorder less than 3 years, 32 (40%) had a duration of seizure disorder less than 5 years and in 53 (66.3%), the onset was less than 7 years; 50 (62.5%) had generalised tonic-clonic seizures, 20 (25%) had complex partial seizures, and the remainder had partial motor seizures. Twenty eight people (35%) had experienced no seizures in the preceding year; 43 people (53.8%) reported between 1-10 seizures and 9 (11.2%) reported more than 10 seizures a year.

The mean age of the 23 people with epilepsy and a co-morbid psychiatric disorder (30.30 years, SD 7.69) did not differ significantly from the mean age of the 57 without a psychiatric disorder (30.28 years, SD 9.07; t 0.011, df 78; $p = 0.9$). Those with epilepsy and co-morbid psychiatric disorders did not differ significantly from those without on other socio-demographic variables (Table 3).

Psychiatric co-morbidity was significantly higher (Table 3) in those with complex partial seizures, frequent seizures, seizures in the preceding year, anticonvulsant polytherapy, especially with phenobarbitone (but not phenytoin, carbamezapine or sodium valproate; data available on request). A family history of epilepsy and a history of febrile seizures in childhood were significantly more frequent in those with psychiatric co-morbidity; however, those with complex partial seizures were no more likely than those with other seizure types to report febrile seizures (4/20 vs. 5/60; RR 2.40; 95% CI 0.71 – 8.08). The duration of seizure disorder and the presence of side effects with anticonvulsants were not associated with psychiatric co-morbidity. A little more than a quarter of those with co-morbid psychiatric disorders had attempted suicide as opposed to none without psychiatric disorders.

Quality of life in people with epilepsy compared to controls and those with asthma

ANOVA revealed significant differences between the three groups on all four domains scores on the WHOQOL-BREF (Table 4). Post-hoc comparisons revealed significant lower scores in all domains between people with epilepsy and controls and between people with epilepsy and those with

Table 3: Comparison of socio-demographic details and clinical characteristics in people with epilepsy with co-morbid psychiatric diagnoses (n= 23) and without psychiatric co-morbidity (n = 57). RR= Relative risk

Variable	Psychiatric co-morbidity (%)	RR	95% Confidence Intervals	p
Socio-demographic variables				
Female gender (n=35)	13 (56.5)	1.46	0.90–2.38	0.14
Rural habitat (n=41)	17 (73.9)	1.28	0.92–1.77	0.18
Unmarried (n=31)	9 (39.1)	1.01	0.55–1.86	1.00
Education < 6 yrs (n=34)	11 (47.8)	1.19	0.7 –2.02	0.54
Unemployed (n=41)	15 (65.2)	1.43	0.95–2.16	0.18
Income < Rs 2000/month (n=47)	16 (69.6)	1.28	0.89–1.83	0.32
Clinical variables				
Duration of seizures > 3 yrs (n=71)	22 (95.7)	1.11	0.97–1.28	0.43
Duration of seizures > 7 yrs (n=27)	9 (39.1)	1.24	0.66–2.34	0.70
Complex partial seizures (n=23)	14 (70)	4.67	2.40–9.09	0.000
Seizures >10 per year (n=8)	5 (21.7)	4.13	1.07–15.89	0.04
Seizures 1 or more per year (n=47)	21 (91.3)	2.00	1.47–2.73	0.000
Last seizure within past year (n=52)	21 (91.3)	1.68	1.28–2.20	0.002
Polytherapy (n=29)	13 (56.5)	2.01	1.16–3.49	0.02
On phenobarbitone n=45)	21 (91.3)	2.17	1.56–3.02	0.000
Poor drug compliance (n=26)	14 (60.9)	2.89	1.59–5.27	0.001
Drug side effects (n=6)	3 (13.0)	2.48	0.54–11.39	0.35
History of febrile seizures (n=9)	6 (26.1)	4.96	1.35–18.16	0.02
Family history of psychiatric disorder (n=4)	4 (17.4)	0.83 *	0.69–0.99	0.006
Suicidal attempts (n=6)	6 (26.1)	0.74 †	0.58–0.94	0.000

*RR for family history of psychiatric disorder absent
†RR for suicidal attempt absent

asthma. The differences in quality of life scores differed significantly only on the psychological domain between those with asthma and controls.

Relationship between psychiatric co-morbidity and quality of life

People with co-morbid psychiatric disorders reported significantly poorer quality of life on all domains of the WHOQOL-BREF across all groups compared to those without psychiatric co-morbidity (Table 5).All comparisons were significant ($p<0.0001$)

In people with epilepsy, the presence of co-morbid psychiatric disorder was also associated with significantly poorer scores on the QOLIE 31 inventory than in those without psychiatric disorder (Table 6). This difference was significant for all the domains on this instrument with the exception of the domain that assessed medication effects.($p<0.0001$)

Impact of low income on psychiatric morbidity and quality of life

Since the groups differed with respect to monthly income and since low income could potentially be associated with psychiatric co-morbidity and with poorer quality of life, we assessed the association between the presence of psychiatric co-morbidity with low income in the whole sample and compared WHOQOL BREF domain scores in those with and without psychiatric co-morbidity. Of the 240 people in this sample, significantly greater proportions (23/43, 53.5%) of those with psychiatric co-morbidity earned less than 2000 rupees per month (£25) compared to those without (71/197, 36.0%) psychiatric morbidity (RR 1.48, 95 % CI 1.05 -3.97; p = 0.03). However, this relationship was not significant when those with low income among those with epilepsy were separately analysed for the presence of psychiatric morbidity (16/23 vs. 31/57; RR 1.28, 95% CI 0.89 – 1.83; p = 0.32). Similarly, this relationship was not significant when those with low income among controls (5/9 vs. 20/71; RR 1.97, 95% CI 0.99 – 3.94; p = 0.10) or among those with asthma (2/11 vs. 20/69; RR 0.63, 95% CI 0.17 – 2.32; p = 0.46) were separately analysed for the presence of psychiatric co-morbidity.

We compared domain scores on the WHOQOL- BREF between those with low income (less than 2000 rupees/ month) and higher incomes in the entire sample of 240 subjects (Table 7). There was a consistently significant association between lower income and lower scores on all domains of the WHOQOL- BREF. Similarly, when we compared the overall QOLIE 31 score in those with epilepsy dichotomised by monthly income, those with a monthly income less than rupees 2000 (n = 47; mean score 63.19, SD 14.10) scored significantly lower (p = 0.001) than those with a higher income (n = 33; mean score 73.7, SD 12.72).

Table 4: Quality of life (WHO - QOL BREF) scores in people with epilepsy (n = 80), asthma (n = 80) and controls (n = 80). * E = epilepsy; A = asthma; C = controls

WHO - QOL BREF Domain	Epilepsy (n = 80) Mean (SD)	Controls (n = 80) Mean (SD)	Asthma (n = 80) Mean (SD)	ANOVA F	p	Post hoc tests Mean difference*	p
Physical	58.68 (15.30)	69.95 (14.16)	70.50 (12.72)	17.920	<0.0001	E vs. C: -11.28	<0.001
						E vs. A: -11.83	<0.001
						A vs. C: - 0.55	=0.967
Psychological	54.46 (13.86)	67.19 (12.23)	72.11 (12.07)	40.840	<0.0001	E vs. C: -12.73	<0.001
						E vs. A: -17.65	<0.001
						A vs. C: 4.92	=0.039
Social	62.83 (16.62)	70.46 (9.39)	68.41 (9.03)	8.409	<0.0001	E vs. C: - 7.64	<0.001
						E vs. A: -5.59	=0.01
						A vs. C: -2.05	=0.53
Environmental	56.05 (9.53)	67.20 (11.34)	65.35 (7.83)	30.527	<0.0001	E vs. C: -11.15	<0.001
						E vs. A: -9.30	<0.001
						A vs. C: -1.85	=0.45

Discussion

The results of this study reinforce those of earlier studies that revealed that psychiatric co-morbidity is common in people with epilepsy and that depression is the most common co-morbid disorder (Hermann et al., 2000; Van der Feltz, 2002; Gaitatziz, 2004; Mendez et al. 1986). The prevalence of psychiatric co-morbidity in this sample of people with epilepsy from South India of 28.7%, with a 95 % CI of 20% to 39.5%, is within the prevalence range reported elsewhere in studies from high income (Hermann et al., 2000; Kimiskidis et al., 2007) and low to middle income countries (Phabphal et al., 2007; Okubadejo et al., 2007; Nidhinandana et al., 2007).

The rates of depression in people with epilepsy in this sample were more than double that in age and sex matched controls and those with bronchial asthma, reinforcing previous observations that depression in epilepsy is more than just a reaction to living with a chronic disorder (Kanner 2000; Robertson et al.,1987 and is, partly, biologically driven. As in other settings, 52% of the epilepsy group with psychiatric co-morbidity were not on specific treatment for the psychiatric disorder indicating that psychiatric co-morbidity is largely under-diagnosed in spite of its common occurrence (Hermann et al., 2000). This may be but a reflection of the low rates of recognition of psychiatric disorder in general in this country as evidenced by the fact that less than a third of those diagnosed with psychiatric disorders in people with asthma and none of those diagnosed with psychiatric disorders from the seemingly normal controls were on treatment.

As in other studies, socio-demographic variables, including gender, were not associated with a higher risk of developing psychiatric co-morbidity in those with epilepsy; though female gender has been associated with higher anxiety in some samples of people with epilepsy (Kimiskidis et al., 2007; Phabphal K et al., 2007).

In this sample, seizure related variables such as complex partial seizures, frequency of seizures, temporal proximity to seizures; poor drug compliance, anticonvulsant polypharmacy and a family history of psychiatric disorder were associated with a higher prevalence of psychiatric disorder. These have been identified previously as increasing the risk of developing psychiatric disorder (Hermann et al., 2000; Mendez et al., 1986; Kimiskidis et al., 2007) though not all previous reports have identified seizure frequency as contributory (Hermann et al.,2000; Hermann et al., 1991). A history of febrile seizures was also associated with a higher propensity to develop psychiatric disorder in this sample, though apparently not via the mechanism of an increased association with complex partial seizure disorder.

People with epilepsy in this sample rated their quality of life significantly lower than those with asthma and age and sex matched controls as assessed by the generic WHOQOL-BREF scale. Those with psychiatric co-morbidity reported significantly lower scores on all domains of the generic scale and this association was also evident in those with epilepsy using the epilepsy-specific QOLIE 31 inventory. This association between lower quality of life in those with psychiatric co-morbidity does not seem specific only to epilepsy as those with psychiatric co-morbidity in all three groups had significantly quality of life lower scores; this perception of poorer quality of life may also be related to the negative cognitive appraisal common in depression (Tracy et al., 2007). However, this also confirms previous observations that attest to poorer quality of life in those people with epilepsy and psychiatric co-morbidity (Hermann et al., 2000; Tracy et al., 2007; Johnson et al.,2004) and a higher suicidal rate in them compared to those people with epilepsy that were free of psychiatric disorder (Hermann et al., 2000; Mainio et al., 2007).

Table 5: Scores on WHOQOL-BREF domains in those with and without co-morbid psychiatric disorder in people with epilepsy, asthma and controls

WHO-QOL BREF Domains Mean (SD)	Epilepsy		Asthma		Controls	
	Psychiatric co-morbidity		Psychiatric co-morbidity		Psychiatric co-morbidity	
	(n = 23)	Absent (n = 47)	(n = 9)	Absent (n = 71)	(n = 11)	Absent (n = 69)
Physical	40.2 (12.5)	66.1 (8.5)	33.67 (3.39)	74.55 (5.85)	46.64 (2.11)	74.30 (8.98)
Psychological	37.1 (11.3)	61.4 (6.9)	37.00 (5.12)	71.01 (5.82)	43.64 (3.20)	76.65 (3.97)
Social	43.7 (16.7)	70.5 (8.4)	46.00 (3.00)	76.56 (3.43)	53.27 (4.92)	70.83 (6.95)
Environmental	50.3 (9.3)	58.4 (8.6)	42.33 (9.81)	70.35 (6.67)	53.64 (5.28)	67.22 (6.44)

There were significantly more people with low income among those with epilepsy than in those with asthma or among controls and low income increased the risk of developing psychiatric disorder for the sample as a whole, though not for groups analysed independently. Low income is independently associated with psychiatric disorders, particularly in low and middle income countries (Patel et al., 2003). This association between low income and the development of psychiatric disorder in those with epilepsy cannot as yet be ruled out, as a larger sample size might yield significant results. However, the independent and significant association between low income and poorer quality of life was striking; this suggests that while greater recognition and active treatment of co-morbid psychiatric disorder, as well as the prevention of psychiatric co-morbidity by better seizure control and avoiding phenobarbitone are warranted, and appear promising strategies to improve the quality of life for those with epilepsy, the effects of poverty may mitigate some of the gains these strategies offer. For example, the use of phenobarbitone in this country is often related to socio-economic considerations, as is to a lesser degree, poor compliance over the long term with anticonvulsants. However, in those with concurrent depressive disorders or with significant risk factors for its development, avoidance of phenobarbitone seems warranted. Identifying and treating depression appropriately is likely to improve adherence to anti-epileptic medication, and reduce suicidal ideation as well as improve perceived quality of life (Barry et al., 2008).

Table 6: Scores on QOLIE 31 in people with epilepsy (n = 80) with and without co-morbid psychiatric disorder (mean, SD = standard deviation)

QOLIE 31 domains	Psychiatric co-morbidity	
	(n = 23)	Absent (n = 57)
Seizure worry	50.5 (14.8)	71.8 (12.8)
Emotional well being	42.4 (13.2)	74.5 (7.9)
Energy/fatigue	35.8 (12.1)	68.4 (10.5)
Cognitive	66.4 (12.8)	78.9 (10.5)
Medication effects	82.4 (18.7)	90.3 (15.2)
Social function	49.4 (16.6)	76.4 (15.6)
Overall quality of life	51.7 (11.2)	73.9 (10.1)

Table 7: Comparison of WHOQOL BREF domain scores and monthly income in all people in the sample (N =240). All differerences significant at p<0.0001

WHO - QOL BREF domains	Monthly income (Indian rupees)	
	< 2000 (n = 94) Mean (SD)	> 2000 (n = 146) Mean (SD)
Physical	60.1 (16.4)	70.8 (12.7)
Psychological	58.4 (15.8)	68.9 (12.5)
Social	63.5 (14.3)	69.6 (10.7)
Environmental	56.9 (11.03)	66.7 (8.8)

The limitations of this hospital-based, cross-sectional study, and consequently its findings, are readily apparent; however, these associations will add to data from existing and future prospective, community based studies that use multivariate statistics to model identified risk factors from a more comprehensive list of psychosocial variables, including an assessment of the impact of significant life events and the effects of stigma. In this study, the effects of concurrent steroid use on mood in those with asthma were also not evaluated.

Conclusions

Psychiatric co-morbidity was significantly more common in people with epilepsy than in people with asthma or healthy controls. Depression was the commonest diagnosis. Seizure related variables such as complex partial seizures, frequency of seizures, temporal proximity to seizures; poor drug compliance, anticonvulsant poly-pharmacy, especially with phenobarbitone; and a family history of psychiatric disorder, were associated with a higher prevalence of psychiatric disorders. The findings from this study, though limited by the cross-sectional design, suggest avenues that could be fruitfully explored with potentially useful and quantifiable therapeutic gains.

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