Do expressed emotions result in stigma? A potentially modifiable factor in persons with epilepsy in India

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A B S T R A C T

Objective: Feeling stigmatized or having comorbid depression in a PWE may significantly influence epilepsy care and treatment. An important contributory factor to this can be the expressed emotions (EEs) from family, friends, or society. The present study aimed at understanding the influence of EEs, as exhibited by close relatives, on the perception of stigma and comorbid depression experienced by PWEs.

Method: Eighty PWEs aged 18 years and above, both genders, visiting neurology OPD in AIIMS Hospital, were recruited. Using the PHQ-09, we subdivided them into Group I (PWEs with comorbid depression) and Group II (PWEs without comorbid depression), followed by administration of Levels of Expressed Emotions Scale and Stigma Scale for Epilepsy, respectively.

Results: The comparative analysis, using independent t-test (for categorical data), Pearson’s correlation (for continuous data), and multivariate regression analysis, reflected significant influence of EEs on depression and stigma, with more than 20% of the participants reporting comorbid depression, out of which more than 50% further expressed feelings of inferiority or disgrace due to the ways in which family or society discriminated them from healthy persons, thereby highlighting a greater association of high EEs as opposed to low EEs from key individuals on patients’ perception of stigma or feeling of depression.

Conclusion: The result suggested that EEs from a relative might go unnoticed but may significantly overwhelm the patient, thereby making him succumb to depression or feeling stigmatized. The analysis of such a clinical profile and relationship between EEs and perceived stigma/depression may help us understand the pattern of attribution styles adopted by PWEs, thereby utilizing it further for enhancing the efficacy of cognitive-behavioral therapy for facilitating sustained recovery and improved quality of life for PWEs.

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1. Introduction

1.1. Impact of epilepsy

Seizures, despite being relatively brief in time, leave a dramatic impact not only on the quality of life of those who are living with them but also on those who witness them [1–3]. Except during the seizure episode, most persons with epilepsy (PWEs) are successfully able to perform their activities of daily living, achieve professional or personal goals, and manage relationship responsibilities well. Yet, such competence is overshadowed by idiosyncratic perceptions and misconceptions of those around a PWE, resulting in a narrowed mind-set, which usually rejects the PWE.

1.2. Epilepsy and expressed emotions: the hidden relationship

This mind-set is further reflected in the interactions between society, caregivers, and PWEs in the form of expressed emotion (EE). According to Brown [4,5], EE is the critical, hostile, and emotionally overinvolved remark or attitude that relatives have towards a family member with a disorder or impairment [6,7]. Studies in various parts of the world have demonstrated a consistent role of critical, hostile, and emotionally overinvolved attitude in relapse of psychiatric or medical conditions [7–12]. Bessi et al. [13] highlighted the impact of components of the families’ emotional climate on the clinical course and psychological adjustment of PWEs. Not only the patients but also the caregivers themselves face significant difficulties in accepting the
disorder [14,15]. They undergo distress due to the illness, intrusive thoughts such as “how will the society react to the person with epilepsy” and “will they accept him/her in a similar manner as a healthy person”, and so on [16,78]. This proves to be a potential breeding ground for stigma. The unpredictable nature of seizures induces fear of occurrence of such attacks in public [17]. They may ask a PWE to limit their social activities [16], or they themselves will conceal the illness [18], which in turn leaves the PWE feeling socially inferior or guilty [18]. Resultant psychological comorbidities such as depression and anxiety, [19] or escape via social withdrawal occur. A vicious circle is, therefore, created around the PWE’s life. It is so engulﬁng that it becomes hard for the PWE to live normally and enjoy a good quality of life and, most importantly, may increase the disease burden by acting as a hindrance in epilepsy care, thereby preventing optimal beneﬁts from treatment and counseling [20–23].

1.3. The ﬁght against stigma

One of the greatest challenges faced by PWEs is reported to be stigma [24]. On the basis of the hidden distress model of stigma in epilepsy [24], Scambler and Hopkins [25,26] proposed two forms of stigma for PWEs: enacted stigma (external stigma or discrimination), which refers to the experience of unfair treatment by others [27], and felt stigma (perceived stigma or self-stigmatization), which refers to the shame associated with having epilepsy and fear of anticipated discrimination [27, 28]. Several investigators, across the globe, have tried to understand the true picture of distress, which may be more difﬁcult to overcome than the seizures themselves [20,29]. “Out of the Shadows” is a campaign by the International League against Epilepsy, the International Bureau for Epilepsy, and the World Health Organization (WHO), which has beautifully highlighted the problems caused by stigma associated with epilepsy [30]. Not only does it manifest in psychosocial form, affecting social integration, personal and professional developments, relationships, etc., it also affects treatment-seeking behavior to a large extent [20,79]. Furthermore, the physical manifestation associated with seizures may scar people having poor knowledge about seizures, who in turn prefer to avoid a PWE, thereby contributing to social stigma [31,76]. Reno et al. [32] conducted an experiment in a Spanish secondary school, in which they hired an actor to act out a character who has tonic–clonic seizures. Group I of children received information on how to deal with the seizure after they viewed it, and the other did not receive any such instructions. Six months later, Group I portrayed few stigmatizing attitudes when completing the ‘Stigma in Epilepsy’ scale compared with Group II who viewed the seizure alongside derogatory comments about the person and had a much more negative and stigmatizing view of epilepsy at the follow-up. This demonstrates how negatively expressed emotions towards epilepsy can inﬂuence others’ perceptions of the condition [33]. Negative misconceptions of epilepsy and seizures prior to diagnosis have also been identiﬁed as contributory to perceived stigma [22].

Variations in treatment strategies and perception of stigma have been found among developed and developing countries [34]. A multivariate analysis in Europe identiﬁed signiﬁcant contributors to stigma, including age at onset, country and region of origin, feelings about life, and injuries associated with epilepsy [35]; it was also found that, overall, more than half of the European population with epilepsy did not feel stigmatized as opposed to only 17% reporting stigma. A country-wise analysis revealed that PWEs living in the Netherlands (27%) and Spain (31%) felt less stigmatized compared with those living in Poland (56%) and France (62%) [35]. Many East and South Asian countries and regions, such as South Korea [36], Iran, Hong Kong [37], and India, as well as Arabian countries, compared with Pakistan [38,39], China, and Vietnam, were also found to have high stigma levels. The most affected PWEs, however, were found in sub-Saharan Africa (SSA), [40]. People without epilepsy in SSA were shown to believe that epilepsy is contagious, and this fear, hence, extended beyond the individual to family members and other close associates [41–45]. Lack of employment and educational opportunities, risk of abandonment by spouse/family, and increased vulnerability to rape and physical abuse left them feeling socioeconomically disadvantaged [46]. Some aspects of stigma are culturally speciﬁc, and some are observed to be pervasive [47]. Studies in resource-poor countries [48–52], including Zambia [46], suggest a greater burden of epilepsy-associated stigma in developing countries versus developed countries [46,53]. Epilepsy was, however, believed to be contagious in both developing [54,55] as well as developed [56] countries. People in rural Sri Lanka, India, Pakistan, Indonesia, and Africa were demonstrated to believe that seizures are a result of sin or possession by spirits which, thus, inﬂuenced their conceptions of the disease and its causes and treatments [57–60,77]. The majority of them, as a result, have relied on traditional medicines including Ayurveda in India, Kampo medicines in Japan, herbal medications in China, and traditional herbs in Africa, along with the allopathic medicines for the treatment of epilepsy and other medical disorders in many societies around the world [34,61]. Based on articles from Asia, Europe, and the United States, seizure frequency has been reported to be the most consistent predictor of stigma [62–65].

1.4. Epilepsy and depression

A frequently reported comorbidity, compared with other chronic nonneurological illnesses, of epilepsy is depression [3,26,66–68]. The prevalence of depressive disorders is reported to be more than 30% in community-based samples with epilepsy [24] and 20–55% in patients in epilepsy specialty clinics [25,26,30]. Depression can be self-reinforcing, and its associated sequelae, such as poor sense of mastery, loss of conﬁdence, reduced self-esteem due to parental overprotection, rejection, educational and occupational underachievement, or perceived stigma/discrimination, can be even more disabling and long-lasting than the depression itself [4].

Various studies have highlighted that emotions play a pivotal role in health and well-being as emotional status and self-concept are key resources in patients’ adaptation to their present situation [5]. These variables, however, have not been studied previously in an Indian population; therefore, the lack of awareness about the possible inﬂuence of expressed emotions on perception of stigma and depression impeded progress in reducing stigma in the Indian society.

1.5. Objective

In this study, we hypothesized that the families’ or friends’ EEs have a signiﬁcant inﬂuence on perception of depression and stigma by PWEs and attempted to understand the correlation between them.

2. Material and methods

2.1. Methodology

At All India Institute of Medical Sciences (AIIMS), New Delhi, a tertiary care center with cost-free services, 110 consecutive PWEs, visiting the department of neurology, unit III were shortlisted using a non-probability sampling technique and screened. Of the 110 consecutive PWEs, 80 patients met the inclusion criteria and provided written informed consent and were recruited. In line with previous studies, all the recruited patients, both males and females, belonging to the age range of 18–65, underwent a clinical history and detailed systemic and neurological clinical examination done for establishing seizure type and presence of syndromic epilepsy. According to the guidelines of the instrument in use Levels of Expressed Emotions Scale, the person (such as a family member, a relative [e.g., uncle, aunt, or niece], or a friend) identiﬁed by the patient as being most inﬂuential and present in his life during the past three months (more than 12 h a day for at least 5 days a week) was focused upon during the study. In the presence of more
than one influential person, the individual having the highest level of EEs was considered. Patients having other organic or medical comorbidities were excluded.

2.2. Tools

The following tools were used in the study:

1. Patient Health Questionnaire -09 is a self-administered version of the mood module of the original PRIME-MD which is used as a diagnostic tool for depression by medical professionals. It consists of nine items based on the 9 DSM-IV criteria, The total score is calculated by assigning values of 0, 1, 2, and 3 to the response categories of “not at all”, “several days”, “more than half the days”, and “nearly every day”, respectively. The total score for the nine items ranges from 0 to 27. Scores of 5, 10, 15, and 20 represent cutoff points for mild, moderate, moderately severe, and severe depression, respectively. It has sound psychometric properties.

2. Levels of Expressed Emotions Scale (LEE) is an index of the perceived emotional climate in a person’s influential relationships. The scale was constructed on the basis of a conceptual framework described by expressed emotion theorists. In addition to providing an overall score, the 60-item scale assesses the following four characteristic attitudes or response styles of significant others: intrusiveness, emotional response, attitude towards illness, and tolerance/expectations. The LEE scale has sound psychometric properties of internal consistency; reliability; independence from sex and age, and construct validity.

3. Stigma Scale for Epilepsy (SSE) is specifically used to estimate the stigma associated with epilepsy. It comprises five questions with 24 items, each with a 4-point scale. A score of 0 indicates no stigma, and a score of 100 indicates maximum stigma [69].

### Table 1

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Group I</th>
<th>Group II</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Demographic variables: Group I and Group II</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18–29</td>
<td>22 (27.50%)</td>
<td></td>
</tr>
<tr>
<td>30–39</td>
<td>30 (37.50%)</td>
<td></td>
</tr>
<tr>
<td>40–49</td>
<td>13 (16.25%)</td>
<td></td>
</tr>
<tr>
<td>50–59</td>
<td>11 (13.75%)</td>
<td></td>
</tr>
<tr>
<td>60 and above</td>
<td>4 (5.00%)</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>41 (51.25%)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>39 (48.75%)</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not educated</td>
<td>5 (6.2%)</td>
<td></td>
</tr>
<tr>
<td>Educated up to 12th standard</td>
<td>22 (27.5%)</td>
<td></td>
</tr>
<tr>
<td>More than 12th standard</td>
<td>53 (66.3%)</td>
<td></td>
</tr>
<tr>
<td>Domicile</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>67 (83.75%)</td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>13 (16.25%)</td>
<td></td>
</tr>
<tr>
<td>Comorbid condition other than depression</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obesity</td>
<td>19 (23.7%)</td>
<td></td>
</tr>
<tr>
<td>Support system</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>37 (46.25%)</td>
<td></td>
</tr>
<tr>
<td>Adequate</td>
<td>18 (22.50%)</td>
<td></td>
</tr>
<tr>
<td>Bad</td>
<td>25 (31.25%)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>80 (100%)</td>
<td></td>
</tr>
<tr>
<td>Seizure type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Focal seizure</td>
<td>54 (67.5%)</td>
<td></td>
</tr>
<tr>
<td>General seizure</td>
<td>26 (32.5%)</td>
<td></td>
</tr>
<tr>
<td>Drug history</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monotherapy (only AED)</td>
<td>63 (79%)</td>
<td></td>
</tr>
<tr>
<td>Polytherapy (AED + Ayurvedic + homeopathic medicine)</td>
<td>17 (21%)</td>
<td></td>
</tr>
</tbody>
</table>

2.3. Patient assessment

The sociodemographic variables and clinical characteristics were collected using personal data sheets and are summarized in Table 1. An epileptologist (MT) conducted detailed medical and neurological examinations for each patient. The epilepsy syndrome was established by EEG, MRI 3T, and CT scans, following the 1989 classification system [70]. This was followed by administration of the respective tools. Patient Health Questionnaire (PHQ-09) (Hindi version) [71,72], used for depression, was self-administered by the patient, while LEE — Client Version [73] and SSE [69], used for understanding the emotional climate as perceived by the patient, were administered by the clinical psychologist (MV) (the scales were adapted in the Hindi language according to WHO guidelines). Based on the scores of PHQ-09, the participants were grouped under Group I, comprising PWEs with comorbid depression, and Group II, comprising PWEs without comorbid depression. Patients in Group I and Group II were then administered LEE — Client Version [73] and SSE [69], respectively, over 1 session of approximately 1–1.5 h. Fig. 1 describes the study design in detail. The study received approval from the Institute Ethical Committee, AIIMS, New Delhi.

2.4. Statistical analysis

The data were analyzed using Statistical Package for the Social Sciences (SPSS), version 16. The sociodemographic profiles were assessed using percentages. The independent t-test (for categorical data) was applied to check for significant differences in average scores between the groups on individual dimension, and Pearson’s correlation coefficients (for continuous data) were calculated to check the linear association between the variables. Multivariate logistic regression analysis was also applied to understand the independent effect of expressed emotions on perception of stigma and depression. A p value < 0.01 was considered statistically significant.

3. Results

Of the 80 PWEs, the majority were either 30–39 years old (37%) or 18–29 years old (27.5%). Slightly more males (51.25%), compared with females (48.75%), were present in this study. A majority of participating patients (66.3%) were educated above the 12th standard and had an urban background (83.75%). Also, the majority had a good support system (46.25%). The demographic profile is summarized in Table 1. Other than depression, obesity was another prevalent comorbidity that was observed in the sample affecting 23.7% (19) of the participants.

In our sample, 67.5% (54) had focal seizures, and 32.5% (26) had generalized seizures. Of these PWEs with focal seizures, 42.6% (23) had well controlled seizures (defined as being seizure-free for the duration of the study), and the remaining 57.4% (31) had drug-resistant epilepsy. About one-third of the patients were managed on monotherapy. The prescription of phenytoin and valproate was significantly higher in males. Females were frequently prescribed carbamazepine, levetiracetam, and clonazepam. Patients with generalized seizures were prescribed valproate and clonazepam. About 21% of the patients were taking Ayurvedic and homeopathic medicines.

In Group I, 18 (48.64%) patients had mild depression, 12 (32.43%) had moderate depression, 4 (10.81%) had moderately severe depression, and 3 (8.10%) had severe depression (Graph I), with the mean score being 6.08 ± 4.5. A statistically significant difference at the p=0.05 level was observed between Group I and Group II, with t-score being 13.77 (Table 2).

For EEs, in Group I, 9 (24.32%) PWEs reported low EEs, and 28 (75.67%) reported high EEs (Graph II), with the mean score being 39.1 ± 11.39. In Group II, 33 (76.74%) reported low EEs, and 10 (23.25%) reported high EEs (Graph II), with the mean score being 24.74 ± 9.71 (Table 2). A statistically significant difference (p=0.05) was observed between Group I and Group II, with t-score being 6.08
For perceived stigma, in Group I, 13 (35.15%) PWEs reported low stigma perception, and 24 (64.86%) reported high stigma perception, with the mean score being 54.02 (±19.89) (Table 2). In Group II, 29 (67.44%) reported low stigma perception, and 14 (32.55%) reported high stigma perception (Graph III), with the mean score being 39.9 (±18.38) (Table 2). A statistically significant difference (p=0.05) was observed.

**Table 2**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Group I</th>
<th>Mean ± S.D.</th>
<th>Group II</th>
<th>Mean ± S.D.</th>
<th>t-Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHQ-09</td>
<td>Mild</td>
<td>18</td>
<td>10.86 ± 4.5</td>
<td>No Depression</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>Moderate</td>
<td>12</td>
<td>Mild</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Moderate-severe</td>
<td>4</td>
<td>Moderate</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Severe</td>
<td>3</td>
<td>Moderate-severe</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No Depression</td>
<td>0</td>
<td>Severe</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>37</td>
<td>N</td>
<td>43</td>
<td></td>
</tr>
<tr>
<td>LEE</td>
<td>High</td>
<td>28</td>
<td>39.1 ± 11.39</td>
<td>High</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>9</td>
<td>Low</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>37</td>
<td>N</td>
<td>43</td>
<td></td>
</tr>
<tr>
<td>SSE</td>
<td>High</td>
<td>24</td>
<td>54.02 ± 19.89</td>
<td>High</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>13</td>
<td>Low</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>37</td>
<td>N</td>
<td>43</td>
<td></td>
</tr>
</tbody>
</table>

*Correlation is significant at the 0.05 level.
observed between Group I and Group II, with t-score being 3.29 (Table 2). A positive correlation was observed between EEs (critical, hostile, or overprotectiveness) from the key person and patient's level of depression (pc = 0.42; p = 0.01; Table 3). A similar result was obtained for perceived stigma (Stigma Perception Scale) (pc = 0.45; p = 0.01; Table 3). Moreover, it was also found that a high level of depression was positively correlated with perceived stigma (pc = 0.57; p = 0.01; Table 3). Multivariate logistic regression analysis reflected a significant relationship between EEs, stigma (OR = 8.31, CI = 2.38, 29.05; p = 0.001), and depression (OR = 13.71, CI = 4.28–41.91; p = 0.000). Persons with epilepsy with comorbid depressive conditions had a higher likelihood (OR = 34.5, p = 0.000) of having high stigma compared with PWEs without depression (when the effect of age, gender, education, and domicile was controlled).

4. Discussion

Analysis of the profiles of both groups in the present study suggests that families' perception of the illness did seem to influence patients' perception of their illness to a considerable extent. In line with previous research [13, 14], the current results highlight that patients belonging to families exhibiting positive, empathetic, and understanding emotions towards their illness were found to be better adjusted to the disorder compared with those having families with negative, critical, and rejecting emotions towards them.

4.1. The emotion profile

In our study, out of 80 participants, almost half (38) of the participants perceived elevated EEs from the family members. Of these individuals, a majority of them reported feelings of depression (28, Group I), with only few (10, Group II) reporting no such feelings and with the mean values being 39.1 ± 11.39 and 24.74 ± 9.71, respectively. Domain-wise analysis reflected that out of total responses, the attitude towards illness (37%) and tolerance/expectation (29%) domains were noted by a majority, while intrusiveness and emotional response were noted in the stigma (Stigma Perception Scale) (pc = 0.45; p = 0.01; Table 3). A similar trend across the data was observed for stigma as well; ratings for the group perceiving high EEs and depression were comparatively higher than for the other group. Thirty-eight (48%) participants in total (24 from Group I and 14 from Group II) felt highly stigmatized, the mean values being 54.02 ± 19.89 and 39.9 ± 18.38, respectively. The Spearman correlation coefficient for total study subjects shows the relationship between expressed emotions, stigma, and depression (Table 3). We may hereby infer that a positive approach towards the disorder from the caregiver may strengthen the patient to cope well with the circumstances. It can promote positive thoughts and concern, which will instill a feeling of confidence and high spirits for combating the illness, leading to a content life and personal growth; on the contrary, if the caregiver himself is negatively biased towards the illness, he will rather make himself or the patient so uncomfortable with his/her critical comments, negligence, overprotection, and humiliation that the patient will feel deprived of the mental strength to combat the epilepsy, thereby falling prey to a vicious circle of stigma or depression [4,7,8].

A caregiver's belief, therefore, is very important, as it determines their response to the circumstances and the strategies they use to help themselves and the PWE cope with the illness. Lack of sufficient/correct information may confuse them about symptoms, causes, and required treatment, leaving them perturbed and flustered at the time of a seizure [31]. Hesitation or pressures to conform to societal norms may maintain a negative attitude towards the illness. Therefore, identification, analysis, and modification of this belief is an important early step. Following modifications in prevailing practices are suggested to improve services for PWES.

• Psychoeducation of client as well as the family members can aid in bridging the gap between the misperceptions and reality. For some, acceptance of diagnosis might be initially difficult, but slowly, with the help of emotional as well as physical support from family and society, this process can be augmented significantly.

• Public awareness and education should be escalated—only then can we expect their understanding and support.

• Epilepsy care centers employing up-to-date technologies and medical advances should be made more readily available at affordable costs.

• Prior to this, however, counseling services should be provided to those who feel hesitant in approaching these centers due to fear of attached stigma.

• Government bodies, policymakers, and health authorities should be encouraged to provide improved health insurance policies that provide good security and safety, especially in the rural sector.

• With the help of mass media (audio, video, and print), efforts should be made to reduce attached stigma by providing easy-to-understand, accurate, and relevant knowledge to the public.

4.3. Results from logistic regression analysis

We applied multivariable logistic regression analysis to investigate the independent effect of EEs on the level of perceived stigma and depression. The results are presented in the form of odds ratios together with 95% confidence intervals (C.I.). Table 4A shows that after controlling for the effect of age, gender, education, domicile, and group, levels of EEs are significantly associated with levels of perceived stigma. It is clearly evident that patients with high levels of EEs are eight times more likely to have high levels of perceived stigma compared with patients with low levels of EEs (OR = 8.31, CI = 2.38, 29.05; p = 0.001). Similarly, Table 4B demonstrates that after controlling for the effect of age, gender, education, and domicile, levels of EEs are significantly associated with levels of depression. Further, it is apparent that patients with high levels of EEs are thirteen times more likely to have
Depression compared with patients with low levels of EEs (OR = 13.71, CI = 4.28, 41.91; p = 0.000).

An in-depth exploration of factors that are involved in propagation of such stigma and the determinants of stigmatizing attitude will help us localize the source of stigma generation, modify them, and eliminate or minimize their impact so as to improve the overall quality of life of PWEs. In this process, understanding the relationships between EEs, perceived stigma, and depression will prove highly beneficial.

5. Conclusion and future directions

In the present study, patients with relatives exhibiting low EEs most- likely reported having a good support system, low or no depression, as well as low levels of stigma. On the contrary, patients with relatives exhibiting high EEs had high levels of depression and stigma along with a poor support system. With awareness of these relationships, we should focus our attention towards these underappreciated aspects, which might go unnoticed but do, in this cross-sectional study, appear to potentially significantly overwhelm the patient, thereby preventing a holistic recovery and improvement of quality of life. Future research into the topic may be planned with a larger sample varying in age and other demographic factors, which would further help us in an in-depth exploration of these factors and bring out correlations that could have been missed in the present study due to limited sample size. Also, a more universal tool for assessing EEs that can record the influence of any/all members of the family should be used in further studies as both/all could influence the PWEs.

Acknowledgment

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Disclosure

None of the authors has any conflict of interest to disclose.

Appendix A. Supplementary data

Supplementary data to this article can be found online at http://dx.doi.org/10.1016/j.yebeh.2015.08.008.

Table 4A

<table>
<thead>
<tr>
<th>Variables</th>
<th>Adjusted odds ratio (95% CI)</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>8.31 (2.38, 29.05)</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Table 4B

<table>
<thead>
<tr>
<th>Variables</th>
<th>Adjusted odds ratio (95% CI)</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>13.71 (4.28, 41.91)</td>
<td>0.000</td>
</tr>
</tbody>
</table>

References

26. Scambler G, Hopkins A. A model of epileptic stigma: the role of perceived stigma and the determinants of stigmatizing attitude will help us localize the source of stigma generation, modify them, and eliminate or minimize their impact so as to improve the overall quality of life of PWEs. In this process, understanding the relationships between EEs, perceived stigma, and depression will prove highly beneficial.

5. Conclusion and future directions

In the present study, patients with relatives exhibiting low EEs mostly reported having a good support system, low or no depression, as well as low levels of stigma. On the contrary, patients with relatives exhibiting high EEs had high levels of depression and stigma along with a poor support system. With awareness of these relationships, we should focus our attention towards these underappreciated aspects, which might go unnoticed but do, in this cross-sectional study, appear to potentially significantly overwhelm the patient, thereby preventing a holistic recovery and improvement of quality of life. Future research into the topic may be planned with a larger sample varying in age range and other demographic factors, which would further help us in an in-depth exploration of these factors and bring out correlations that could have been missed in the present study due to limited sample size. Also, a more universal tool for assessing EEs that can record the influence of any/all members of the family should be used in further studies as both/all could influence the PWEs.

Acknowledgment

This study was supported by the Centre of Excellence for Epilepsy (Department of Biotechnology and Ministry of Science and Technology) (BT/01/COE/09/08).

Disclosure

None of the authors has any conflict of interest to disclose.

Appendix A. Supplementary data

Supplementary data to this article can be found online at http://dx.doi.org/10.1016/j.yebeh.2015.08.008.

Table 4A

<table>
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<th>Variables</th>
<th>Adjusted odds ratio (95% CI)</th>
<th>p-Value</th>
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<td>Low</td>
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</table>

Reference category; controlled variables: age, gender, education, domicile.

Table 4B

<table>
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<tr>
<th>Variables</th>
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<td>13.71 (4.28, 41.91)</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Reference category; controlled variables: age, gender, education, domicile.
Santosh D, Kumar TS, Sarma PS, Radhakrishnan K. Women with onset of epilepsy.

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