Research Article

Relationships Between Beliefs about Medication, Seizure Control and Adherence to Antiepileptic Drugs Among People with Epilepsy

Archana Verma¹, Kiran K², Alok Kumar³

¹Professor, Department of Neurology, UP University of Medical Sciences, Saifai, Etawah, UP, 206301, India
²Junior Resident, Department of Community Medicine, UP University of Medical Sciences, Saifai, Etawah, UP, 206301, India
³Dean, Professor and Head, Forensic Medicine & Toxicology, UP university of Medical Sciences, Saifai, Etawah, UP, 206130, India

*Corresponding Author:* Dr. Archana Verma, Professor, Department of Neurology, UP University Medical Sciences, Saifai, Etawah, UP, 206301, India, E-mail: archanashiva2010@rediffmail.com

Received: 17 July 2020; Accepted: 18 September 2020; Published: 06 November 2020

Abstract

Objectives: To determine the relation between beliefs about medication, seizure control and non adherence to antiepileptic drugs (AEDs) in people with epilepsy (PWE) from rural northern Indian community.

Methods: Three hundred and eighty five adult PWE were included in the present cross sectional study. Morisky–Green Test was applied for evaluation of adherence level and their beliefs towards usage of AEDs by utilizing Beliefs about Medicine Questionnaire (BMQ).

Results: 58.8 % patients were reported non adherent to treatment on the Morisky Green scale. PWE belonging to lower socio economical class has high concern towards the negative effect of AEDs (r=0.200; p<0.001). Patients with lower adherence expressed strong doubts about the necessity of AEDs (r= -0.356; p< 0.01) and increase concern about the negative consequences of taking AEDs (r= -0.433; p< 0.01) as compared to adherent patients. PWE with increased concern has significantly high seizure recurrence (r=0.397; p<0.0001) while believing in necessity of medicines was associated with fewer seizures recurrence (r= -.156; p= .02).
Conclusion: Attitude towards AEDs is closely related with adherence. PWE having high concern and low necessity towards AEDs were more non adherent and had poorly controlled seizures. To improve adherence a full and inclusive evaluation of modifiable factors should be made. Present challenge is to create effective interventions to address patients’ doubts about the need for treatment and concerns about adverse consequences in order to enhance adherence.

Keywords: Beliefs about Medicine Questionnaire (BMQ); Adherence; Antiepileptic drugs; Morisky–Green Test

1. Introduction
Epilepsy is a major public health problem; more than 85% of people with epilepsy (PWE) are living in low- and middle-income countries, including India [1]. Anti-epileptic drugs (AEDs) are the main treatment modality. Up to 70% could become seizure-free once the most effective regime is followed [2]. The principal determinant of treatment success in epilepsy is adherence to treatments. Non adherence to AEDs is associated with of seizure recurrence, increased risk of mortality, hospital admissions, injuries and fractures. Current estimates of non-adherence in epilepsy are similar to those in other chronic illnesses and ranges from 40 to 60% [3, 4].

For variety of chronic illnesses the Necessity-Concerns Framework suggests that the beliefs towards medication influences adherence can be grouped under two categories: perceptions for the personal need of treatment (Necessity beliefs) and concerns about a range of potential unfavorable side effects [5]. A Meta analysis on assessing the relationship between treatment beliefs and adherence confirmed that the chances of non adherence were altogether increases when patients revealed high concerns and low necessity beliefs [6]. Previous studies have documented role of beliefs and perceptions towards medication in non adherence to AEDs [7, 8].

The present study was aimed to determine the relation between patient’s beliefs about medication, seizure control and non adherence to AEDs.

2. Material and Methods
We performed a cross sectional study by consecutively enrolling adults (≥18 years) PWE attending to our neurology department from November 2016 to March 2018. The study received the approval from the institutional ethics committee. Patients who were taking at least one AEDs for more than a year; without psychiatric disorders or major cognitive impairment were included. We excluded patients experiencing first-time seizures or newly diagnosed epilepsy.

Demographic data recorded included the following: age, gender, education, employed (included self-employed) or unemployed (retired, student and homemaker), marital status: classified as married or unmarried (single, widowed or separated), seizure semiology, duration of epilepsy, duration of treatment and recurrence of seizures in the last 6
months. BG Prasad socioeconomic classification 2016 [9] was used to calculate per capita income. AED adherence was assessed by using Morisky Green 4-item scale [10]. The Morisky scale has four items with minimum score of 0 and maximum of 4. Patients were considered non-adherent if they scored 1 or more.

Beliefs about Medicine Questionnaire (BMQ) [11] were used to assess patients' belief towards use of medication in general and in addition to their AEDs. The BMQ has two sections (BMQ-Specific and BMQ-General). BMQ-Specific was related to AEDs and has two parts: the Specific Necessity scale and the Specific Concern scale and each have five items. The Specific Necessity scale evaluates need of AEDs whereas the Specific Concern scale reviews the uncertainties about the potential adverse effects of AEDs. BMQ-General has two parts: the General Harm scale and the General Overuse scale. General Harm scale has five items and review how much drug is perceived to be addictive and destructive. General Overuse scale has three items and estimate how much medicine is overused by clinicians. Items of each area are rated with a Likert scale from 1 to 5; higher belief levels of necessity, concern, harm, or overuse is connected with higher scores. The responses to each question was noted by one of the investigators (KK).

3. Statistical Analysis
A sample size of 385 was calculated by using Single population proportion formula [12], assuming a 50% non-adherence rate, with a 95% confidence level and a 5% significance level. The data collected was coded and analyzed using MS Excel and SPSS 23 and results were represented in the form of tables. Categorical data and continuous data were expressed as percentage and mean with standard deviation respectively. Pearson correlation coefficient was calculated to know the correlation between different variables and the domains BMQ.

4. Results
The mean age of 385 patients were 26.2±10.4 years (range between 18-66 years). Most (68%) patients were unmarried (52% single, 16% separated or divorced). As far as their socio economical status concerned most of them belongs to lower middle class (class IV) (44.4%) followed by lower; class V (35.6%). The period of epilepsy ranged from 1 to 42 years (median 5 yrs, IQR: 3-10yrs). Length of antiepileptic treatment ranged from 1 to 24 years (median 2yrs IQR: 1-4 yrs). Focal seizures (60%) (Focal motor, focal motor with dyscognitive features, focal with bilateral convulsive seizures) was the most common presentation. Demographic characteristic of patients enrolled in the study are shown in Table-1. 58.8 % patients were non adherent to AEDs. Non-adherence was related with forgetting to take AEDs (74.6%), lack of time to take AEDs (13.4%), stop taking AEDs when feeling more worse (9 %) or better (3%).

PWE belonging to lower socio economical class has high concern towards the negative effect of AEDs (r=0.200; p<0.001). A significant moderate negative correlation was observed in between age and necessity (r=-0.62, p<0.001) of AEDs. No significant correlation was seen between duration of AEDs and BMQ domains. Patients with lower
adherence expressed strong doubts about the necessity of AEDs \((r= -0.356; p< 0.01)\) and increase concern about the negative consequences of taking AEDs \((r= −0.433; p< 0.01)\) as compared to adherent patients.

On an average patients with increased concern have significantly high seizure recurrence in last six months \((r=0.397; p<0.0001)\) while believing in necessity of medicines was associated with fewer seizures recurrence \((r= −.156; p=.02)\). Necessity showed negative correlation, whereas concern showed positive correlation with all the variables. Table 2 shows that several beliefs about medication and association with the Morisky score and seizure recurrence.

| Variables          | N (%)         |
|--------------------|---------------|
| Adherent           | 159 (41.2)    |
| Non adherent       | 226 (58.8)    |
| Age mean (SD)      | 26.2 ±10.4    |
| Gender             |               |
| Male               | 252 (65.4)    |
| Female             | 133 (34.6)    |
| Age Group          |               |
| 18-25              | 256 (66.5)    |
| 26-35              | 64 (16.6)     |
| 36-45              | 41 (10.6)     |
| >46                | 24 (6.3)      |
| Religion           |               |
| Hindu              | 368 (95.5)    |
| Muslim             | 17 (4.5)      |
| Employment status  |               |
| Employed           | 130 (33.7)    |
| Unemployed         | 255 (66.3)    |
| Education status   |               |
| Illiterate         | 30 (7.8)      |
| Primary            | 126 (32.7)    |
| High school        | 119 (31)      |
| College            | 110 (28.5)    |
| Regime             |               |
| Monotherapy        | 204 (53)      |
| Polytherapy        | 181 (47)      |
Frequency of drug intake

|       |       |       |       |       |       |       |       |
|-------|-------|-------|-------|-------|-------|-------|-------|
| Once  | 4     | 3     |
| Twice | 373   | 97    |
| Thrice| 8     | 2     |

Duration of Epilepsy (Median(IQR))

5 (IQR:3-10)

Duration of anti-epileptic drugs (Median(IQR))

2 (IQR:1-4)

Socio economical class 1,2 & 3

77 (20)

4

171 (44.4)

5

137 (35.6)

Type of seizure

Focal

231 (60)

Generalized

154 (40)

Table 1: The demographic characteristic of patients enrolled in the study (N=385).

| Domain          | Age       | Socio economical status | Duration of anti-epileptic drugs | Seizure frequency | Morisky score |
|-----------------|-----------|-------------------------|----------------------------------|------------------|---------------|
|                 | r         | P                       | r                                | P                | r             | P             | r         | P                          | r         | P                          | r         | P | r         | P | r         | P | r         | P | r         | P | r         | P | r         | P | r         | P | r         | P |
| Harm            | -0.015    | 0.776                   | -0.013                           | 0.796            | 0.085          | 0.098          | 0.039      | 0.44                       | 0.049     | 0.335                      |          |   |          |   |          |   |          |   |          |   |          |   |          |   |          |   |          |   |
| Overuse         | -0.097    | 0.056                   | 0.067                            | 0.187            | 0.021          | 0.683          | 0.015      | 0.76                       | 0.078     | 0.125                      |          |   |          |   |          |   |          |   |          |   |          |   |          |   |          |   |          |   |
| Necessity       | -0.628    | <0.0001*                | -0.036                           | 0.477            | -0.03          | 0.96           | -0.156     | 0.02                       | -0.356    | <0.01                      |          |   |          |   |          |   |          |   |          |   |          |   |          |   |          |   |          |   |
| Concern         | 0.068     | 0.186                   | 0.200                            | <0.001*          | 0.057          | 0.268          | 0.397      | <0.0001*                    | 0.433     | <0.01                      |          |   |          |   |          |   |          |   |          |   |          |   |          |   |          |   |          |   |

Table 2: Beliefs about medication and association with the Morisky score and seizure control.

5. Discussion

In our study the majority (58.8%) of PWE were non adherent to AEDs. Attitude towards AEDs was related with adherence. We found that non adherent expressed strong doubts about the necessity of AEDs and high concern about the negative consequences of taking AEDs. These findings are fairly comparable with previous other studies that evaluated beliefs about medication in PWE and adherence to AEDs using consistent scales [4,7,13]. In ethnic minority Nakhutina L et al. [13] observed that beliefs about medicines were not associated with adherence as measured by the Morisky scale but were associated with self-rated AED adherence may be due to small sample size. Beliefs about medicines were connected with clinical and demographic factors. PWE belonging to lower socio
economical class has high concern towards the negative effect of AEDs. Relationship between AEDs non adherence and lower economic status was also reported from other Indian studies [14, 15].

Seizure recurrence was primarily connected with belief in medication in our study. PWE with increased concern has significantly high seizure recurrence in last six months than counterpart. Higher seizure recurrence has less belief in necessity of medication. Whereas Jones et al. [4] and Chapman SCE et al. [7] reported that PWE with poorly controlled seizures had stronger beliefs in the necessity of AEDs than well-controlled patients and also found a trend for a relationship between AEDs concerns and poorer control.

Our study has some limitations: there is a potential risk of response bias as the self reported adherence measure was used. We did not analyze the factors like stigma, cultural factors within the present study. To conclude PWE having high concern and low necessity belief towards AEDs were more non adherent, had poorly controlled seizures and belong to lower socioeconomically status.

To improve adherence a full and inclusive evaluation of modifiable factors should be made. Present challenge is to create effective interventions to address patients’ doubts about the need for treatment and concerns about adverse effects of AEDSs in order to enhance adherence in PWE.

**Ethical Publication Statement**

We confirm that we have read the Journal’s position on issues involved in ethical publication and affirm that this report is consistent with those guidelines.

**Disclosure**

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

**References:**

1. Ngugi AK, Bottomley C, Kleinschmidt I, et al. Estimation of the burden of active and life-time epilepsy: a meta-analytic approach. Epilepsia 51 (2010): 883-890.
2. Kwan P, Brodie MJ. Early identification of refractory epilepsy. New England Journal of Medicine 342 (2000): 314-319.
3. Davis KL, Candrilli SD, Edin HM. Prevalence and cost of nonadherence with antiepileptic drugs in an adult managed care population. Epilepsia 49 (2008): 446-454.
4. Jones RM, Butler JA, Thomas VA, et al. Adherence to treatment in patients with epilepsy: associations with seizure control and illness beliefs. Seizure 15 (2006): 504-508.
5. Horne R, Weinman J. Patients' beliefs about prescribed medicines and their role in adherence to treatment in chronic physical illness. Journal of Psychosomatic Research 47 (1999): 555-567.
6. Horne R, Chapman SC, Parham R, et al. Understanding patients’ adherence-related beliefs about medicines prescribed for long-term conditions: a meta-analytic review of the Necessity-Concerns Framework. PloS one 8 (2013): e80633.

7. Chapman SC, Horne R, Chater A, et al. Patients’ perspectives on antiepileptic medication: relationships between beliefs about medicines and adherence among patients with epilepsy in UK primary care. Epilepsy & Behavior 31 (2014): 312-320.

8. Kemp S, Feely M, Hay A, et al. Psychological factors and use of antiepileptic drugs: pilot work using an objective measure of adherence. Psychology, Health & Medicine 12 (2007): 107-113.

9. Khairnar M, Wadgave U, Shimpi P. Updated BG Prasad socioeconomic classification for 2016. Journal of Indian Association of Public Health Dentistry 14 (2016): 469.

10. Morisky DE, Green LW, Levine DM. Concurrent and predictive validity of a self-reported measure of medication adherence. Medical Care (1986): 67-74.

11. Horne R, Weinman J, Hankins M. The beliefs about medicines questionnaire: the development and evaluation of a new method for assessing the cognitive representation of medication. Psychology and Health 14 (1999): 1-24.

12. Naing L, Winn T, Rusli BN. Practical issues in calculating the sample size for prevalence studies. Archives of Orofacial Sciences 1 (2006): 9-14.

13. Nakhutina L, Gonzalez JS, Margolis SA, et al. Adherence to antiepileptic drugs and beliefs about medication among predominantly ethnic minority patients with epilepsy. Epilepsy & Behavior 22 (2011): 584-586.

14. Gurumurthy R, Chanda K, Sarma GR. An evaluation of factors affecting adherence to antiepileptic drugs in patients with epilepsy: a cross-sectional study. Singapore Medical Journal 58 (2017): 98.

15. Das K, Banerjee M, Mondal GP, et al. Evaluation of socio-economic factors causing discontinuation of epilepsy treatment resulting in seizure recurrence: a study in an urban epilepsy clinic in India. Seizure 16 (2007): 601-607.

**Citation:** Archana Verma, Kiran K, Alok Kumar. Relationships Between Beliefs about Medication, Seizure Control and Adherence to Antiepileptic Drugs Among People with Epilepsy. Archives of Clinical and Medical Case Reports 4 (2020): 1031-1037.

This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC-BY) license 4.0