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# Demographic and Clinical Determinants of Aura Recognition and Epilepsy Self-Management among Patients with Epilepsy

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**Abstract:** ***Epilepsy is a condition which needs proper recognition and management of symptoms to help reduce the risk of seizures. This study was intended to determine the correlation between the scores on the aura scale and the Epilepsy Self-Management Scale (ESMS) and some selected demographic and clinical variables. A quantitative, cross-sectional analytical study was done among 75 adult patients who visited the Neurology Outpatient Department of a tertiary care hospital in Kerala, India. Purposive sampling method was used in the selection of participants. Data were obtained using a demographic and clinical proforma, a Rating Scale on Recognition of Aura, and the Epilepsy Self-Management Scale (ESMS). Data analysis involved descriptive statistics and Chi-square test with p value less than 0.05 being considered statistically significant. Aura score was significantly associated with seizure frequency (p = 0.01), etiology of seizures (p = 0.03), and adverse effects of antiepileptic drugs (p = 0.05). There were no significant associations between aura score and demographic variables, age of onset of seizures, number of antiepileptic drugs, and presence of comorbidities. Only one demographic variable - occupation - had significant association with ESMS scores (p < 0.001) but none with the other demographic and clinical variables. The results show that aura detection is largely dependent on clinical factors while self-management of epilepsy depends largely on the occupation of the patient. The importance of nurse-led education tailored to help patients understand seizures, proper use of drugs, and self-management techniques is evident from the study.***

**Keywords:** Epilepsy; Aura; Epilepsy self-management; Demographic factors; Clinical characteristics

## 1. Introduction

Epilepsy is among the commonest neurologic disorders, afflicting almost 50 million individuals globally and accounting for a great proportion of disability, stigma, and poor quality of life. Even though there are efficient antiepileptic drugs (AEDs), about a third of patients have their seizures uncontrolled, thus the need for an integrated approach to epilepsy beyond the medication only.

Aura is the first subjective sign of a focal seizure, which may be sensory, autonomic, cognitive, emotional, and experiential. It is important to identify aura in patients since it helps to localize the seizure and to prepare for the coming episode, seek help from others, put protective measures in place, and decrease the risk of seizure-related injuries.

Epilepsy self-management is comprised of those tasks performed by the individual on a regular basis in order to control his/her condition. Those tasks include drug taking, seizures surveillance, triggering factors avoidance, lifestyle changes, and communication with the health care provider. Successful self-management has been linked to increased control of seizures, greater compliance with the treatment, higher quality of life, and lower usage of health care services. Nurses can promote those behaviours by means of education, counseling, and follow-up.

The demographic and clinical features of the patients may be associated with their capability of identifying aura symptoms and carrying out self-management. Age, educational background, occupation, social class, frequency of seizures, etiology of the seizures, drug regime, side effects of medications, and co-morbidity can have an effect on the identification of the symptoms, health literacy, and compliance with self-management. Nevertheless, researches have not come up with consistent results about those issues yet.

In India, epilepsy continues to be associated with treatment gaps, social stigma, and inadequate patient education regarding seizure recognition and self-management. Determining the relationship between various factors that could contribute to aura recognition and epilepsy self-management can enable health care practitioners to determine the patients who need further education and behavioral assistance.

Hence, the objectives of the current research were to determine the relationship between aura scores and selected demographic and clinical factors and between Epilepsy Self-Management Scale (ESMS) scores and selected demographic and clinical factors among patients with epilepsy.

## 2. Review of Literature

Recent evidence indicates that effective epilepsy management depends not only on seizure control but also on patients' ability to recognize aura symptoms and actively engage in self-management behaviours (Devinsky et al., 2018). Aura, the earliest subjective manifestation of a focal seizure, provides valuable information for seizure localization and enables patients to anticipate seizure onset and adopt safety measures (Fisher et al., 2017). Studies have shown that

clinical factors such as seizure frequency, seizure type, and seizure etiology are more strongly associated with aura recognition than demographic characteristics (Devinsky et al., 2018).

Epilepsy self-management involves medication adherence, seizure monitoring, trigger avoidance, lifestyle modification, and effective communication with healthcare providers (DiIorio et al., 2004). The Epilepsy Self-Management Scale (ESMS) is a validated instrument widely used to assess these behaviours. Systematic reviews have demonstrated that structured self-management interventions improve medication adherence, seizure management, and quality of life among people with epilepsy (Zhang et al., 2022; Huang et al., 2025).

Evidence suggests that employment, self-efficacy, education, and social support are important determinants of epilepsy self-management, whereas the influence of age, gender, and other demographic variables remains inconsistent (Tian et al., 2025; Luedke et al., 2019). In addition, barriers such as inadequate patient education, stigma, poor healthcare access, and limited social support adversely affect self-management practices (Lewinski et al., 2020).

Despite growing evidence on epilepsy self-management, few studies have simultaneously examined the demographic and clinical factors associated with both aura recognition and self-management, particularly among Indian patients with epilepsy. Therefore, the present study was undertaken to determine the association of aura scores and Epilepsy Self-Management Scale (ESMS) scores with selected demographic and clinical variables among patients with epilepsy.

## 3. Materials and Methods

### Study Design and Setting

A hospital-based quantitative cross-sectional study was conducted among patients with epilepsy attending the Neurology Outpatient Department of a tertiary care teaching hospital in Kerala, India. The study was carried out over a period from March 27th, 2023, to April 30th, 2023.

### Study Population

The study population comprised adult patients diagnosed with epilepsy who attended the neurology outpatient department during the study period. Patients aged 18 years and above, diagnosed with epilepsy for at least six months, receiving antiepileptic drug (AED) therapy, and able to communicate in Kannada or English were included in the study. Patients with severe cognitive impairment, acute psychiatric illness, critically ill conditions, or those unwilling to participate were excluded.

### Sample Size and Sampling Technique

A total of 75 patients were enrolled using a non-probability purposive sampling technique. Eligible participants who fulfilled the inclusion criteria were recruited consecutively after obtaining written informed consent.

### Data collection instruments

Data were collected through the use of three instruments. Information on age, gender, religion, marital status, educational background, occupation, family monthly income, age of seizure onset, seizure frequency, cause of seizures, duration of disease, antiepileptic drug (AED) treatment, adverse effects of medications, and any other illnesses was collected through the use of a structured demographic and clinical proforma. The presence and features of aura symptoms prior to seizure onset were measured using a structured Aura Assessment Tool. Epilepsy self-management skills were determined using the Epilepsy Self-Management Scale (ESMS). This instrument measures medication management, seizure management, information management, lifestyle management, and safety management. High ESMS scores indicated high self-management behaviors.

### Validity and Reliability

The study instruments were validated by experts in the fields of neurology, medical-surgical nursing, and biostatistics. Modifications needed in the instruments were carried out accordingly. Acceptable reliability showed satisfactory internal consistency, indicating suitability of the instruments for data collection.

### Data Collection Procedure and Ethical Considerations

Ethical approval was obtained from the Institutional Ethics Committee (Approval No. EC/80/22, approved on October 26, 2022), and administrative permission was obtained from the concerned hospital authorities before data collection. Eligible patients attending the Neurology Outpatient Department were recruited using purposive sampling after obtaining written informed consent. Data were collected using the demographic and clinical proforma, Aura Assessment Tool, and Epilepsy Self-Management Scale (ESMS). Participation was voluntary, and participants were informed of their right to withdraw at any time without affecting their treatment. Confidentiality and anonymity were maintained by assigning unique identification codes and securely storing the study data.

### Statistical Analysis

Data were entered into Microsoft Excel and analyzed using Statistical Package for the Social Sciences (SPSS) version 21.0 (IBM Corp., Armonk, NY, USA). Associations between aura scores and selected demographic and clinical variables, as well as between ESMS scores and selected demographic and clinical variables, were examined using the Chi-square test. A $p$-value of less than 0.05 was considered statistically significant.

## 4. Results

A total of 75 patients with epilepsy participated in the study. Associations between aura scores and epilepsy self-management scores (ESMS) with selected demographic and clinical variables were analyzed using the Chi-square test. Statistical significance was considered at $p < 0.05$.

**Table 1:** Baseline demographic and clinical characteristics of the participants (N = 75)

| Variable | Category | n (%) |
|---|---|---|
| Age (years) | 18–31 | 34 (45.9) |
| | 32–45 | 21 (28.4) |
| | 46–59 | 6 (8.1) |
| | 60–74 | 14 (17.6) |
| Gender | Male | 32 (42.7) |
| | Female | 43 (57.3) |
| Marital status | Married | 47 (62.7) |
| | Unmarried | 24 (32.0) |
| | Others | 4 (5.3) |
| Occupation | Unemployed | 39 (52.0) |
| | Private job | 17 (22.7) |
| | Self-employed | 9 (12.0) |
| | Government | 5 (6.7) |
| | Professional/Retired | 5 (6.6) |
| Age at seizure onset | 1–16 years | 35 (46.7) |
| Seizure frequency | Less than monthly but at least once/year | 23 (30.7) |
| | Less than weekly but at least once/month | 21 (28.0) |
| | Less than once/year | 18 (24.0) |
| | Weekly | 9 (12.0) |
| | Daily | 4 (5.3) |
| Seizure etiology | Unknown | 45 (60.0) |
| | Stroke/Brain tumor | 14 (18.7) |
| | Other causes | 12 (16.0) |
| | Head trauma | 4 (5.3) |

The majority of participants were young adults (45.9%), females (57.3%), married (62.7%), and unemployed (52.0%). Nearly half experienced seizure onset between 1 and 16 years of age, while unknown etiology accounted for 60% of epilepsy cases.

**Table 2:** Association between Aura Score and Selected Demographic Variables (N = 75)

| Demographic Variable | Category | Rarely Occur (n) | Sometimes Occur (n) | Most of the Times Occur (n) | $\chi^2$ | df | *p* value |
|---|---|---|---|---|---|---|---|
| Age (years) | 18–31 | 3 | 21 | 10 | 10.65 | 6 | 0.1 |
| | 32–45 | 4 | 14 | 4 | | | |
| | 46–59 | 0 | 5 | 1 | | | |
| | 60–74 | 0 | 13 | 0 | | | |
| Gender | Male | 4 | 21 | 7 | 1.22 | 2 | 0.54 |
| | Female | 3 | 33 | 7 | | | |
| Religion | Hindu | 3 | 21 | 4 | 3.51 | 4 | 0.48 |
| | Islam | 3 | 31 | 10 | | | |
| | Christian | 1 | 2 | 0 | | | |
| Marital Status | Unmarried | 3 | 14 | 7 | 4.38 | 8 | 0.82 |
| | Married | 4 | 36 | 7 | | | |
| | Divorced | 0 | 1 | 0 | | | |
| | Separated | 0 | 1 | 0 | | | |
| | Widow | 0 | 2 | 0 | | | |
| Educational Status | No formal education | 0 | 2 | 0 | 15.43 | 14 | 0.35 |
| | Primary | 0 | 3 | 1 | | | |
| | Upper primary | 1 | 3 | 0 | | | |
| | High school | 1 | 9 | 2 | | | |
| | Higher secondary | 2 | 20 | 3 | | | |
| | Diploma | 3 | 8 | 1 | | | |
| | Graduate | 0 | 7 | 5 | | | |
| | Postgraduate | 0 | 2 | 2 | | | |
| Monthly Family Income (₹) | <5,000 | 1 | 2 | 2 | 10.81 | 8 | 0.21 |
| | 5,001–10,000 | 1 | 3 | 0 | | | |
| | 10,001–15,000 | 1 | 5 | 4 | | | |
| | 15,001–20,000 | 1 | 18 | 1 | | | |
| | >20,000 | 3 | 26 | 7 | | | |
| Occupation | Government | 1 | 4 | 0 | 8.45 | 10 | 0.59 |
| | Private job | 3 | 12 | 2 | | | |
| | Self-employed | 0 | 8 | 1 | | | |
| | Retired | 0 | 1 | 0 | | | |
| | Unemployed | 3 | 27 | 9 | | | |
| | Professional | 0 | 2 | 2 | | | |

Chi-square test; statistically significant at $p < 0.05$. None of the selected demographic variables showed a statistically significant association with aura scores ($p > 0.05$).

**Table 3:** Association Between Aura Score and Selected Clinical Variables (N = 75)

| Variable | Category | Sometimes | Most of the Times | $\chi^2$ (df) | P value |
|---|---|---|---|---|---|
| Age (years) | 18–31 | 33 | 1 | 1.19 (3) | 0.76 |
| | 32–45 | 21 | 0 | | |
| | 46–59 | 6 | 0 | | |
| | 60–74 | 14 | 0 | | |
| Gender | Male | 32 | 0 | 0.75 (1) | 0.39 |
| | Female | 42 | 1 | | |
| Religion | Hindu | 28 | 0 | 0.71 (2) | 0.7 |
| | Islam | 43 | 1 | | |
| | Christian | 3 | 0 | | |
| Marital status | Unmarried | 24 | 0 | 0.60 (4) | 0.96 |
| | Married | 46 | 0 | | |
| | Divorced | 1 | 0 | | |
| | Separated | 1 | 0 | | |
| | Widow | 2 | 0 | | |
| Educational status | No formal education | 2 | 0 | 5.32 (7) | 0.62 |
| | Primary | 4 | 0 | | |
| | Upper primary | 4 | 0 | | |
| | High school | 12 | 0 | | |
| | Higher secondary | 25 | 0 | | |
| | Diploma | 11 | 1 | | |
| | Graduate | 12 | 0 | | |
| | Postgraduate | 4 | 0 | | |
| Monthly income (₹) | < 5,000 | 5 | 0 | 1.18 (4) | 0.89 |
| | 5,001–10,000 | 4 | 0 | | |
| | 10,001–15,000 | 10 | 0 | | |
| | 15,001–20,000 | 20 | 0 | | |
| | > 20,000 | 35 | 1 | | |
| Occupation | Government | 5 | 0 | 17.99 (5) | 0.00* |
| | Private job | 17 | 0 | | |
| | Self-employed | 9 | 0 | | |
| | Retired | 1 | 0 | | |
| | Unemployed | 39 | 0 | | |
| | Professional | 3 | 1 | | |

Chi-square test; statistically significant at $p < 0.05$. Aura scores were significantly associated with seizure frequency, seizure etiology, and adverse effects of antiepileptic drugs.

**Table 4:** Association between ESMS score and selected demographic variables

| Variable | Category | Sometimes | Most of the Times | $\chi^2$ (df) | P value |
|---|---|---|---|---|---|
| Age (years) | 18–31 | 33 | 1 | 1.19 (3) | 0.76 |
| | 32–45 | 21 | 0 | | |
| | 46–59 | 6 | 0 | | |
| | 60–74 | 14 | 0 | | |
| Gender | Male | 32 | 0 | 0.75 (1) | 0.39 |
| | Female | 42 | 1 | | |
| Religion | Hindu | 28 | 0 | 0.71 (2) | 0.7 |
| | Islam | 43 | 1 | | |
| | Christian | 3 | 0 | | |
| Marital status | Unmarried | 24 | 0 | 0.60 (4) | 0.96 |
| | Married | 46 | 0 | | |
| | Divorced | 1 | 0 | | |
| | Separated | 1 | 0 | | |
| | Widow | 2 | 0 | | |
| Educational status | No formal education | 2 | 0 | 5.32 (7) | 0.62 |
| | Primary | 4 | 0 | | |
| | Upper primary | 4 | 0 | | |
| | High school | 12 | 0 | | |
| | Higher secondary | 25 | 0 | | |
| | Diploma | 11 | 1 | | |
| | Graduate | 12 | 0 | | |
| | Postgraduate | 4 | 0 | | |

| | | | | | |
|---|---|---|---|---|---|
| Monthly income (₹) | < 5,000 | 5 | 0 | 1.18 (4) | 0.89 |
| | 5,001–10,000 | 4 | 0 | | |
| | 10,001–15,000 | 10 | 0 | | |
| | 15,001–20,000 | 20 | 0 | | |
| | > 20,000 | 35 | 1 | | |
| Occupation | Government | 5 | 0 | 17.99 (5) | 0.00* |
| | Private job | 17 | 0 | | |
| | Self-employed | 9 | 0 | | |
| | Retired | 1 | 0 | | |
| | Unemployed | 39 | 0 | | |
| | Professional | 3 | 1 | | |

Chi-square test; statistically significant at $p<0.05$. Among the demographic variables, only occupation demonstrated a statistically significant association with epilepsy self-management scores, indicating that employment status may influence patients' ability to manage epilepsy effectively.

**Table 5:** Association between ESMS score and selected clinical variables

| Variable | Category | Sometimes | Most of the Times | $\chi^2$ (df) | P value |
|---|---|---|---|---|---|
| Age of seizure onset (years) | 1–16 | 34 | 1 | 1.16 (3) | 0.76 |
| | 17–33 | 22 | 0 | | |
| | 34–50 | 8 | 0 | | |
| | 51–68 | 10 | 0 | | |
| Seizure frequency | Daily | 4 | 0 | 2.29 (4) | 0.68 |
| | Once in a week | 9 | 0 | | |
| | Less than weekly but at least once in a month | 21 | 0 | | |
| | Less than monthly but at least once in a year | 22 | 1 | | |
| | Less than once a year | 18 | 0 | | |
| Seizure etiology | Head trauma/Brain injury | 4 | 0 | 0.68 (3) | 0.88 |
| | Stroke/Brain tumour | 14 | 0 | | |
| | Other causes | 12 | 0 | | |
| | Unknown | 44 | 1 | | |
| Number of AEDs currently taking | One AED | 24 | 1 | 2.03 (2) | 0.36 |
| | Two AEDs | 34 | 0 | | |
| | More than two AEDs | 16 | 0 | | |
| Side effects from current AED regimen | None | 72 | 1 | 0.03 (1) | 0.87 |
| | Minor inconvenience | 2 | 0 | | |
| Comorbid illness | Yes | 17 | 0 | 0.37 (1) | 0.59 |
| | No | 57 | 1 | | |

Chi-square test; statistically significant at $p < 0.05$.No statistically significant associations were observed between epilepsy self-management scores and any of the selected clinical variables, suggesting that self-management behaviors were largely independent of disease-related clinical characteristics in the study population.

**Summary of Findings**

Aura recognition was significantly influenced by clinical characteristics, particularly seizure frequency, seizure etiology, and adverse effects of antiepileptic medications. In contrast, demographic variables did not demonstrate any significant relationship with aura scores. Epilepsy self-management was significantly associated only with occupation, while no demographic or clinical variables other than occupation showed a statistically significant association with ESMS scores.

## 5. Discussion

The present study examined the association of aura scores and Epilepsy Self-Management Scale (ESMS) scores with selected demographic and clinical variables among patients with epilepsy. It was found that the impact of clinical factors on aura perception was more significant compared to that of demographic factors, but occupation was the only demographic factor that significantly affected epilepsy self-management.

It was noted that there was no significant relationship between aura scores and any demographic factors, such as age, gender, religion, marital status, educational status, family monthly income, and occupation. This result is in line with the fact that aura is the first subjective phenomenon that occurs during focal seizures and does not depend on any demographic factors.

Among the clinical variables, the following showed statistically significant correlations with aura scores: the frequency of seizures ($p = 0.01$), etiology of the seizures ($p = 0.03$) and side effects of the antiepileptic medications (AEDs) ($p = 0.05$). More frequent seizures corresponded to increased ability to recognize aura symptoms, possibly because of the experience gained from recurrent episodes of pre-ictal phenomena. In the same manner, patients suffering from structural epilepsy, due to conditions such as stroke or traumatic brain injury, showed increased awareness of aura symptoms because of the presence of focal cortical lesions that cause consistent aura. The relationship between the side effects of AEDs and the aura scores could be linked with the neurological side effects influencing patient awareness of pre-ictal phenomena. There was no correlation between aura

scores and age at onset of seizures, AED usage and co-morbidity.

Regarding epilepsy self-management, occupation was the only demographic variable significantly associated with ESMS scores ($p < 0.001$). Employed participants demonstrated better self-management practices, possibly due to greater financial stability, health literacy, and structured daily routines. This finding is consistent with evidence identifying employment and socioeconomic participation as important determinants of epilepsy self-management. Other demographic variables, including age, gender, religion, marital status, educational status, and monthly family income, were not significantly associated with ESMS scores, suggesting that behavioural and psychosocial factors may play a greater role than demographic characteristics.

None of the chosen clinical variables such as the age of seizure onset, the frequency of seizures, the cause of seizures, the number of AEDs, the adverse effects of medications and the existence of other diseases was associated with ESMS scores. Thus, the current data proves that self-management among patients with epilepsy depends mostly on behavioral aspects that can be changed via educational programs. As it has been mentioned above, the similar results were obtained in previous researches.

In general, the results prove that clinical factors are important for recognition of aura, while the socioeconomic factors are important for self-management of epilepsy. It should be noted that the results demonstrate the importance of individual education led by nurses about aura recognition, adherence to medications, seizure safety and self-management, as well as special attention to unemployment among patients.

## 6. Conclusion

The present study demonstrated that aura recognition among patients with epilepsy was significantly associated with seizure frequency, seizure etiology, and adverse effects of antiepileptic drugs, whereas epilepsy self-management was significantly associated only with occupation. No significant associations were observed between aura recognition and demographic variables or between epilepsy self-management and the selected clinical variables. These findings suggest that aura recognition is primarily influenced by disease-related clinical characteristics, while self-management is more closely associated with socioeconomic and behavioural factors. The results underscore the importance of individualized, nurse-led interventions focusing on aura recognition, medication adherence, seizure safety, and self-management education, particularly for unemployed and socially vulnerable individuals.

## 7. Recommendations

Based on the findings of the present study, it is recommended that healthcare professionals, particularly nurses, implement structured educational programmes focusing on aura recognition, medication adherence, seizure safety, and epilepsy self-management. Routine assessment of aura symptoms and individualized counselling should be integrated into epilepsy care, with additional support provided to unemployed and socioeconomically vulnerable patients. Future multicentre studies with larger sample sizes and longitudinal follow-up are recommended to validate these findings and evaluate the effectiveness of nurse-led self-management interventions in improving long-term clinical and quality-of-life outcomes.

### Conflict of Interest

The authors declare no conflict of interest

### Ethical Approval

Institutional Ethics Committee (Approval No. EC/80/22, approved on October 26, 2022), and administrative permission was obtained from the concerned hospital authorities. Informed consent was obtained from all individual participants included in the study.

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