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Evaluation of Anti-Epileptic Drug Adherence and Contributing Factors Among Adults with Epilepsy at Yekatite 12 Hospital Medical College, 2024

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ABSTRACT

Background: Epilepsy affects over 50 million individuals worldwide, making it one of the most prevalent neurological disorders. Anti-epileptic drugs (AEDs) serve as the primary treatment, enabling up to 70% of patients to achieve seizure freedom when adhering to an effective regimen. "Medication adherence" refers to the extent to which patients follow their prescribed medication schedules, including correct dosages and intervals. This concept emphasizes a patient-centered approach in healthcare, highlighting collaboration between patients and healthcare providers in developing treatment plans rather than a one-sided directive. Studies indicate that anti-epileptic drug (AED) non-adherence rates among adults with epilepsy range from 29% to 39%. This non-adherence undermines the effectiveness of AED regimens, leading to an increased risk of fractures, injuries, and automobile accidents. Additionally, retrospective research has shown that non-adherence contributes to higher healthcare utilization and
Costs as evidenced by increased emergency department visits and inpatient admissions.

Objective: To assess the prevalence of anti-epileptic medication adherence and associated factors among adult epileptic patients in Yekatite 12 Medical College, Addis Ababa, Ethiopia.

Method: A cross-sectional study involving adult epileptic patients at Yekatite 12 Medical College in Addis Ababa, Ethiopia, was carried out from May 3, 2024, to August 13, 2024. Data will be gathered using a structured questionnaire, and descriptive statistics will be used to analyze and present the results.

Result: Of 230 respondents, 130 (56.5%) were male, and 100 (43.5%) were female. Most of the patients, 160 (69.6%), were in the 20-45 age range, while only 11 (4.8%) were above 60. Most of the respondents, 155 (67.4%), identified as Orthodox, and nearly half, 109 (47.4%), were married. Additionally, 126 (54.8%) of the patients had access to primary education. Regarding employment, 104 (45.2%) were employed, and 9 (3.9%) were students. Lastly, 123 (53.5%) of the patients earned between 1000 and 5000.

Conclusion: The findings of this study show a low adherence rate to anti-epileptic drug (AED) treatment compared to the standard adherence rate of over 95%, which is necessary to effectively prevent seizure recurrence. Missing one or more doses of the AED regimen each week can lead to treatment failure and trigger seizures. In conclusion, 60% of the study participants adhered to their AED treatment, with forgetfulness being the main reason for non-adherence, followed by a busy lifestyle.

KEYWORDS: Adherence, Anti-epileptic drugs, Armed Force Hospital.

INTRODUCTION

1.1 Background

Epilepsy affects over 50 million individuals worldwide, making it one of the most prevalent neurological disorders [1]. Anti-epileptic drugs (AEDs) serve as the primary treatment [2], enabling up to 70% of patients to achieve seizure freedom when adhering to an effective regimen [3]. "Medication adherence" refers to the extent to which patients follow their prescribed medication

schedules, including correct dosages and intervals [4]. This concept emphasizes a patient-centered approach in healthcare, highlighting collaboration between patients and healthcare providers in developing treatment plans rather than a one-sided directive [5].

Studies indicate that anti-epileptic drug (AED) non-adherence rates among adults with epilepsy range from 29% to 39% [6]. This non-adherence undermines the effectiveness of AED regimens, leading to an increased risk of fractures, injuries, and automobile accidents [7]. Additionally, retrospective research has shown that non-adherence contributes to higher healthcare utilization and costs, as evidenced by increased emergency department visits and inpatient admissions [6, 8]

Non-adherence to anti-epileptic drugs (AEDs) is linked to adverse clinical outcomes and a higher risk of mortality [7]. Patients failing to follow their prescribed AED regimen may be misdiagnosed with refractory epilepsy [9]. Moreover, non-adherent adults with epilepsy face an increased risk of convulsive status epilepticus [10]. The most severe consequence of AED non-adherence is a heightened risk of sudden unexpected death in epilepsy [11] (SUDEP). Therefore, identifying the barriers to AED adherence is essential for practitioners to develop effective strategies aimed at improving adherence rates [6].

It was evident that undertaking this SR was timely, as there has been a surge in researchers investigating the reasons for AED non-adherence, with robust studies being published globally. While individual studies have identified specific barriers to AED adherence, contradictory findings have emerged. Well-controlled epilepsy has been identified as leading to non-adherence [12], which contradicted other research that associated experiencing fewer seizures with more adherent behavior [13]. Some argue it's the fear of and the occurrence of medication side effects, such as cognitive difficulty or weight gain, that leads to reduced AED adherence [14]. However, others found that adherence was dependent on treatment effectiveness rather than the occurrence of side effects [15]. It is also suggested that monotherapy increases adherence rates [13]. In contrast, adherence rates have been reported to be higher among AWE on polytherapy due to stronger medication necessity beliefs [16].

Variances between research findings on this subject have been attributed to population, geographical and methodological differences between studies [17]. Furthermore, while most definitions presume adherence is a stable patient characteristic, evidence suggests it's a much more dynamic process [18]. Each of these factors has led to a lack of clarity on this subject and hindered the development of substantive conclusions.

The primary outcome measure of this SR was to determine AED adherence and non-adherence rates among AWE and identify the specific barriers that contribute to AED non-adherence. The secondary outcome measure was the impact on quality of life (QoL) for AWE that was attributed to AED non-adherence.

2. OBJECTIVES OF THE STUDY

2.1 General objectives

To assess self-reported adherence to anti-epileptic drugs and associated factors among adult patients with epilepsy at Yekatite 12 Hospital Medical College, 2024

2.2 Specific objectives

- To assess the level of non-adherence to anti-epileptic medication regimens at Yekatite 12 Hospital medical college
- To assess factors affecting adherence to anti-epileptic treatment at yekatite 12 hospital medical college
- To assess determinants of non-adherence to anti-epileptic treatment at yekatite 12hospital medical collage

3. METHODS AND MATERIALS

3.1 Study setting and study period

The study was conducted at Yekatit 12 Hospital, officially known as Yekatit 12 Hospital Medical College. This prominent healthcare institution, established in 1923, is located in Addis Ababa, Ethiopia. It has a long-standing history of providing medical services and training healthcare professionals. The hospital serves a vast population and provides comprehensive medical services and training. Addis Ababa, Ethiopia's capital and largest city, is characterized by its diverse population representing various socioeconomic and cultural backgrounds. As of the 2007 national census, the city had a population of approximately 2.74 million, with major ethnic groups including the Amhara, Oromo, Gurage, and Tigrayan. The city also boasts a well-developed healthcare infrastructure, featuring both public and private health institutions, making it an ideal setting for accessing many emergency patients. An institutional-based cross-sectional study was conducted at Yekatit 12 Hospital Medical College's Internal Medicine Department. The hospital's extensive electronic medical record system facilitated efficient data collection, encompassing detailed patient demographics, medical histories, investigation results, diagnoses, and disease progression over time. This study setting was chosen due to the hospital's long-standing reputation, diverse patient population, and the availability of comprehensive medical records, ensuring a robust and representative analysis. An institutional-based cross-sectional study will be carried out in Yekatit 12 hospital medical colleges from May 3 to August 13, 2024

3.2. Study design

A hospital-based cross-sectional study was conducted using structured questionnaires, including the Morisky medication adherence scale-8 (MMAS).

3.3 Source and Study Population

3.3.1 Source population

The source populations were all patients visiting Yekatit 12 Hospital medical colleges from May 3 to August 13, 2024, with a diagnosis of epilepsy.

3.3.2. Study Population

All adult patients diagnosed with epilepsy attended the ambulatory clinic during the study period.

3.4 Inclusion and Exclusion Criteria

3.4.1 Inclusion Criteria

- All adult patients who take anti-epileptic medications.

3.4.2 Exclusion Criteria

- **Critically Ill Patients:** Individuals who are critically ill and receiving anti-epileptic medications.
- **Non-Epileptic Seizure Disorders:** Individuals using anti-epileptic medications for non-epileptic seizure disorders or other medical conditions.
- **Age Restrictions:** Individuals under the age of 18.
- **Non-Participation:** Individuals unwilling to participate in the study.

3.5 Study Variables

3.5. 1 Independent Variables

- Age:
- Marital Status
- Educational Level:
- Employment Status:
- Psychiatric Comorbidities:
- Perceived Stigma.
- Medication Side Effects:
- Number of Medications:
- Complexity of Medication Regimen:

3.5.2 Dependent Variables

Medication adherence

3.6 Sample Size and Sampling Technique

3.6.1 Sample Size Determination

The sample size was based on the assumption that the proportion of responses to most of the main questions is 50%, as both responses and response rates were completely unknown because there were no previous similar studies from that hospital. It was determined based on the single population proportion formula.

$n= z^2 *p* q/d^2$

Where $q = 1 – p$

Z=a confidence interval of 95%=1.96.

d = the margin of error (precision) = 5%n = the required sample size

The minimum sample size estimated for the study will be 384.

Needs to be adjusted using finite population correction formulan=n/{1+(n-1)/population}

n=384/ {1+ (384-1)/1000} =278 So we need to select 278 epileptic patients.

3.6.2 Sampling technique

A Simple random sampling technique was followed to select the study participants throughout the process.

3.7 Data collection instrument and Collection procedure

Data were collected through face-to-face interviews with patients receiving anti-epileptic treatment. A structured questionnaire incorporating the 8-item Morisky Medication Adherence Scale (MMAS-8) was utilized during these interviews. The MMAS-8 is a self-reported tool designed to assess medication-taking behavior, with scores ranging from 0 to 8; a score of 8 indicates high

adherence, 6 or 7 indicates medium adherence, and below 6 indicates low adherence. The scale employs a binary scoring system: "Yes" responses are scored as 0, and "No" responses are scored as 1.

The questionnaire was initially developed in English and translated into Amharic to ensure cultural relevance and comprehension. This translation process involved forward translation by two independent experts, followed by a review to reconcile any discrepancies, aligning with standard practices for instrument adaptation in cross-cultural research.

3.8 Data Quality Management

After collecting the data, responses from the questionnaires were entered into a digital format. Before analysis, the dataset underwent error checking, and variables requiring coding were appropriately assigned. Missing values were designated with specific codes, such as 9, 99, or 999. Subsequently, after analysis, the coded data were converted back to their original variables.

3.9 Data Processing and Analysis

The field questionnaires were reviewed to ensure all data fields were completed. Each dataset was entered twice independently to reduce data entry errors, and any discrepancies were identified and resolved. Data analysis was performed using IBM SPSS Statistics software (version 20), employing descriptive statistics such as frequencies and percentages. The findings were primarily presented through textual descriptions, tables, graphs, and charts.

3.10 Ethical Considerations

The Yekatit 12 Hospital Public Health Department's Ethical Review Committee granted formal permission for the study. Each questionnaire's cover page provided an introduction to the study, details about the inquiry method, and a confidentiality statement. Participants were informed of their freedom to participate or decline and that they could withdraw at any time during the interview. Strict confidentiality was maintained by using codes instead of participants' names, ensuring no information was shared with individuals not directly involved in the study without the participants' consent.

4. RESULTS

4.1 Socio-demographic variables

Out of 230 respondents, 130 (56.5%) were male and 100 (43.5%) were female. Most of the patients, 160 (69.6%), were in the 20-45 age range, while only 11 (4.8%) were above 60. Most of the respondents, 155 (67.4%), identified as Orthodox, and nearly half, 109 (47.4%), were married. Additionally, 126 (54.8%) of the patients had access to primary education. Regarding employment, 104 (45.2%) were employed, and 9 (3.9%) were students. Lastly, 123 (53.5%) patients earned between 1000 and 5000. The detailed socio-demographic characteristics of the respondents are presented in Table 1.

Table 1: Socio-demographic characteristics of the study participants (n=230), Yekatite 12 Hospital Medical College**, Addis Ababa, Ethiopia, from** May 3 to August 13, 2024

Variables		Frequency	Percent (%)
1. Age	20-45	160	69.6
	46-60	59	25.7
	>60	11	4.8
	Total	230	100
2. Sex	Male	130	56.5
	Female	100	43.5
	Total	230	100.0
3. Religion	Muslims	43	18.7
	Orthodox	155	67.4
	Protestant	32	13.9
	Total	88	100.0
4. Marital status	Married	109	47.4
	Single	58	25.2
	Divorced	17	7.4
	Widowed/widower	46	20.0
	Total	230	100.0
5. occupational Status	Employee	104	45.2
	Unemployed	23	10.0
	Student	9	3.9
	Daily labor	0	0
	Farmer	8	3.5
	Housewife	32	13.9
	Other	54	23.5
	Total	230	100.0
6. Monthly Income	< 1000birr	6	2.6
	1000-5000birr	123	53.5
	5000-10000	46	20.0
	>10000birr	55	23.9
	total	230	100.0
7. Educational Status	Unable to read and write	0	0
	Primary (1-8)	126	54.8
	Secondary (9-12)	86	37.4
	College and university	18	7.8
	Total	230	100.0

4.2 Side effects perceived by patients

From the total sample size of 230 patients, only 84 (36.5%) experienced side effects from their AEDs. Sedation was the most common side effect, which was perceived by the patients 42(50%), and the patients' least common side effects were those included in the list of the other who complained about some GI discomfort 4(4.8%).

Details of the types of side effects experienced by the patients presented in (Table 2)

Side effect		Frequency	Percent
Valid	rash	29	12.6
	sedation	42	18.3
	gingiva	3	1.3
	cognitive	6	2.6
	others	4	1.7
	Total	84	36.5
Missing	System	146	63.5
Total		230	100.0

4.3 Duration of anti-epileptic treatment

92(40%) of the patients were on AEDs for more than 1year, 63(27.4%) were started recently (6 month-1 year) and 75(32.6%) were on AEDs for less than 6 months.

4.4 Percentage of drug adherence

Based on MMAS 138(60%) of patients were classified as adherent, 63(27.40%) of the patients were medium adherent and 29(12.60%) of patient's non-adherent. (Table 3)

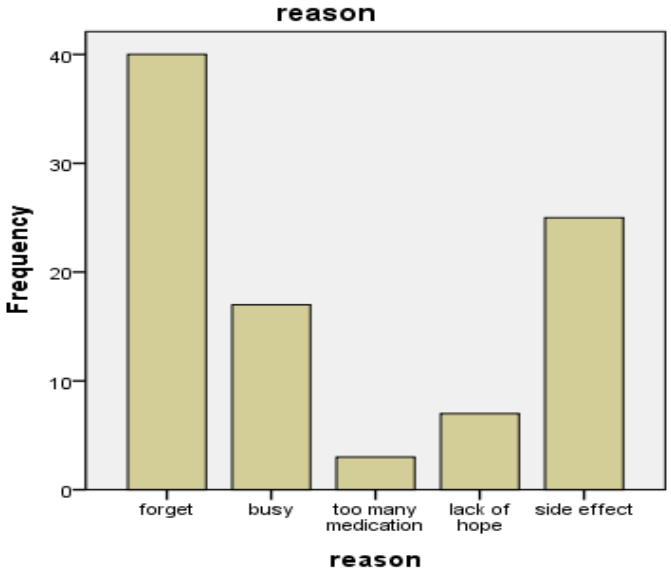
MMAS score	Frequency	Percent
8	138	60%
7-6	63	27.40%
below 6	29	12.60%
Total	230	100%

4.5 patients missed their anti-epileptic medication

92(40%) of patients missed the AED while 140(60%) of them did not miss their medication.

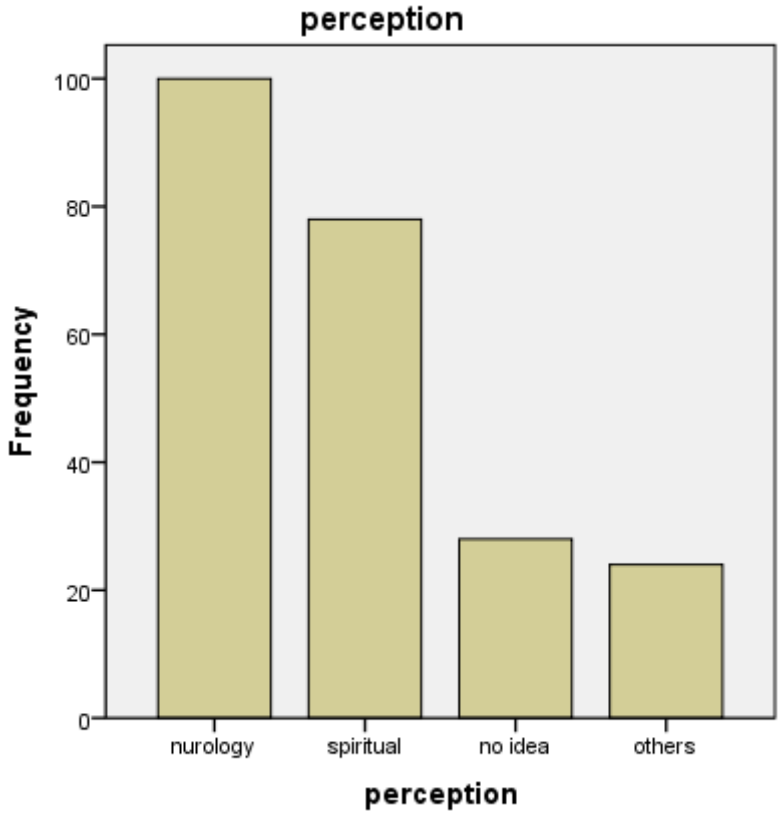
4.6 Reasons for missing medications

40(43.5%) of the patients reported forgetfulness as a significant reason. 17(18.5%) of the patients missed their medication because of busy work schedules,3(3.3%) of patients missed their medicines because of too many medications,7(7.6%) of patients missed their medicines because of a lack of hope in drugs, and 25(27.2%) of patients missed their medication because of side effects.



4.7 Perception of epileptic patients about their illness

Around 100(43.5%) of the respondents know that epilepsy is a neurological disease; some of the patients, 78(33.9%), think their illness is spiritual; 28 (12.2%) of patients had no idea about the disease and 24(10.4%) of patients listed other kinds of perceptions about the disease.

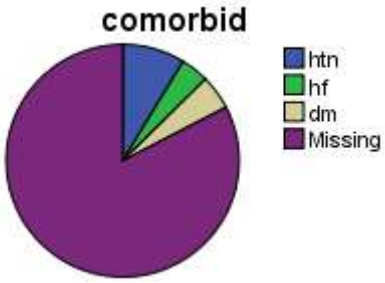


4.8 patients taking additional medicine

Only 40(17.4%) of patients took another medication in addition to their AEDs

4.9 Epileptic patients with co-morbid conditions

Of the 230 patients, only 40(17.4%) had other chronic illnesses. Of those who had chronic illnesses, 20(50%) reported hypertension, 9(22.5%) reported heart failure and 11(27.5%) reported diabetes mellitus.



5. DISCUSSION

This study found that 60% of epileptic patients at Yekatit 12 Hospital Medical College were adherent to their anti-epileptic medications. This result is comparable to a study conducted at Desse Referral Hospital in Ethiopia, where adherence was reported at 65.9%. **[21]**, in neurospinal hospital (70.8%) found in the United Arab Emirates **[20]**, in Gondar referral hospital (61.5%) of adherence **[24]**, and Ayub Teaching Hospital Pakistan (73.3%) of adherence [**23]**. However, other studies have reported higher rates of drug non-adherence. For example, a study at Emmanuel Hospital found a significantly higher percentage of non-adherence **[24].** This discrepancy in findings could be attributed to differences in data collection methods or the larger sample sizes used in these studies.

The significant differences in adherence rates across various studies can be attributed to the diverse methods used to assess adherence. Even when the same assessment tool, such as self-reported adherence, is employed, the lack of validated questionnaires

can lead to varying adherence rates across studies. These factors may explain why the findings of this survey differ from the study conducted at Jimma Medical Center Ambulatory Clinic. **[19].** This study reported a higher percentage of drug non-adherence than the current one despite using the Morisky questionnaires to measure adherence. This study identified forgetfulness (43.5%) as the primary reason for missing medication, followed by side effects (27.2%). Similar findings have been reported in other studies. For instance, a study conducted at Ayub Teaching Hospital in Pakistan also identified forgetfulness as the primary cause of non-adherence, followed by affordability issues (12.5%). **[23]** However, this affordability problem is not considered in our study area because all medications are free. Another reason for missing their medications is the side effects perceived by the patients. This report is similar to a study done in Sudan that shows one-third of the patients are non-adherent due to the side effects **[22]**. The reason why forgetfulness was the main reason for missing their medication might be that most of the patients are of working age, so they may get busy at work and forget to take their medication.

In this study, only 43.5% of patients recognized epilepsy as a neurological disorder. Meanwhile, 33.9% believed it to be a spiritual disease, and 12.2% did not know about the condition at all. When compared to a study conducted at Dessie Referral Hospital, 38.6% of patients identified epilepsy as a neurological disorder, 29.5% believed it was a spiritual illness, and another 29.5% had no understanding of the disease [18]. The reason many patients lacked awareness or considered epilepsy a spiritual condition may be due to limited access to reliable information, with their only source of knowledge often being brief conversations with their physicians.

6. LIMITATION OF THE STUDY

This study was limited to Yekatite 12 Hospital Medical College due to financial and time constraints, preventing its extension to other hospitals in the region or across the country. Additionally, the study focused solely on adherence to anti-epileptic medications, so the findings may not apply to other chronic illnesses. While the MMAS method used in this study is affordable and easy to administer, it may lead to overestimating results since it relies on patient self-reports. Due to time and logistical limitations, alternative methods such as pill counting or laboratory markers were not employed to assess medication adherence.

7. CONCLUSION

The findings of this study show a low adherence rate to anti-epileptic drug (AED) treatment compared to the standard adherence rate of over 95%, which is necessary to prevent seizure recurrence. Missing one or more doses of the AED regimen each week can lead to treatment failure and trigger seizures. In conclusion, 60% of the study participants adhered to their AED treatment, with forgetfulness being the main reason for non-adherence, followed by a busy lifestyle.

8. RECOMMENDATIONS

Therefore, we recommend that the Federal Ministry of Health, Regional Health Bureaus, and hospitals collaborate to ensure that anti-epileptic drugs are accessible and affordable. Health professionals should receive training on prescribing and selecting AEDs and strategies to enhance medication adherence. Adherence counseling and health education programs should be implemented in healthcare settings to improve medication adherence among patients on AEDs. To strengthen overall medication adherence, the following specific recommendations for this study are proposed:

- The hospital should initiate a program to provide health education aimed at changing patients' perceptions of their illness, which would help enhance adherence to their treatment.
- Clinicians should educate newly diagnosed epilepsy patients about their condition and the significance of adhering to their treatment regimen.
- Healthcare professionals should support patients in developing systems to remind them to take their medication.
- All healthcare professionals, particularly pharmacists, should be more responsible for providing information about medications and the consequences of non-adherence to improve patient outcomes.

List of Abbreviations:

- AED – Anti-Epileptic Drugs
- DM – Diabetes Mellitus
- DTPs – Drug Therapy Problems
- SD – Standard Deviation
- SPSS – Statistical Package for the Social Sciences
- WHO – World Health Organization
- NSE – Non-Seizure Episodes

- RWE – Real-World Evidence
- EEG – Electroencephalogram
- IRB – Institutional Review Board
- MPR – Medication Possession Ratio
- QOL – Quality of Life
- CBT – Cognitive Behavioral Therapy
- MMSE – Mini-Mental State Examination
- MMAS - Mo risky medication adherence scale-8
- SPSS - Statistical package for social science

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