

Research Article

Assessment of Quality of Life of Epileptic Patients in Ethiopia

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Background. Patients with epilepsy are at an increased risk of poor quality of life. **Purpose.** We aimed at assessing the quality of life and its determinants among epileptic patients at University of Gondar Referral Hospital (UoGRH), Ethiopia. **Methods.** Institution based cross-sectional study was conducted on epileptic patients on follow up at UoGRH from January 15 to April 15, 2017. Information including socio-demographic profile and diagnosis was extracted from medical records and patients. Quality Of Life In Epilepsy-10 (QOLIE-10) tool was used to measure the quality of life. Independent *t*-test and one-way analysis of variance were used to look for factors associated with quality of life. The level of statistical significance was declared at P -value ≤ 0.05 . **Results.** A total of 354 patients were included in the study and mean age was 29.1 ± 11.7 years. The mean QOLIE-10 score was 19.85. One hundred ninety-four (54.8%) of participants had a good quality of life. Being illiterate, unemployment, and presence of co-morbid medical condition were associated with poorer quality of life. **Conclusion.** Nearly half of the participants had a poor quality of life. Patients with comorbidity, illiteracy, and unemployment should be given special emphasis in order to improve their quality of life.

1. Introduction

The International League Against Epilepsy (ILAE) defines epilepsy as a disease of the brain defined by any of the following conditions: (i) At least two unprovoked (or reflex) seizures occurring > 24 h apart; (ii) one unprovoked (or reflex) seizure and a probability of further seizures similar to the general recurrence risk (at least 60%) after two unprovoked seizures, occurring over the next 10 years; or (iii) diagnosis of an epilepsy syndrome [1].

Epilepsy affects people of any age, gender, ethnicity, and social background, irrespective of geographic location. It is the most common chronic serious neurologic disease [2]. About 10% of the whole world population living a normal life span can expect to have at least one epileptic seizure. At least 50 million will have recurrent seizures. This could be underestimated, as partial seizures are often not recognized as such in the developing world [3]. The point prevalence of active epilepsy was 6.38 per 1,000 persons while the lifetime prevalence was 7.60 per 1,000 persons [4]. In a large community-based epidemiological study, the prevalence of epilepsy in Ethiopia was reported as 5.2 per 1000 population. The incidence was 64 per 100,000 population [5].

Growing recognition of the importance of the psychosocial effects of epilepsy has led to the need to quantify the quality of life in affected individuals. Patients with epilepsy are at increased risk of poor Quality of Life (QOL) [6, 7]. WHO defines quality of life as the perception that an individual has of his place in existence, in the context of culture and system securities in which they live, and in relation to their goals, expectations, standards, and concerns [8]. Different tools were used to standardize this concept and many studies evaluated the quality of life of epileptic patients using various types of questionnaires. QOLIE-10 questionnaire, which was used in this study, is a valid and reliable tool used to measure the QoL of patients with epilepsy which was validated by Cramer et al. [9].

People with epilepsy face a condition that can affect their QoL in multiple domains. These include physical (increased risk of injury and death), psychological (increased risk of anxiety and depression), cognitive (both epilepsy and the medications used to treat it are associated with impaired cognition), and social and occupational (epilepsy is a stigmatizing condition, and also often carries limitations on driving and employment) [10]. Hence, assessment of QoL is important in the management of epilepsy to achieve the optimal goal of therapy.

The existing studies also revealed that individuals with epilepsy suffer from a number of social, psychological and physical poor outcomes. For example, a study conducted in Ethiopia revealed that 60% of the study participants faced different problems due to their illness such as stigma (24%), inability to find a partner (31%), educational problems (17%), and problems of employment (9%) [11]. The recently released Ethiopian mental health strategic plan emphasizes the special considerations to be given to these vulnerable patient groups [12].

Though different studies have been conducted in different parts of the world including Africa, very few studies were undertaken on quality of life of epilepsy patients in Ethiopia. The evidence for the different socio-demographic characteristics like level of education, age, marital status, employment status and some clinical characteristics of epileptic patients as a factor for QoL is inconsistent [13]. The aim of this study was to determine the quality of life of epileptic patients who were taking anti-epileptic drugs and to identify factors associated with it. This study can help as an input for hospital managers' performance measurement and to improve treatment outcomes of epileptic patients. It can also be used as baseline information for researchers who need to conduct further study in the area.

2. Materials and Methods

2.1. Study Area and Period. The study was conducted at University of Gondar Referral Hospital, North-West Ethiopia. It is one of the biggest tertiary level referral and teaching hospital in the region. It provides service for an estimated 7 million population. The hospital serves as a referral center for North Gondar administrative region and the residents around. It has 400 beds in five different inpatient departments and 14 wards. Patients with Neurologic disorders get service two days per week. The service is given by two neurologists. There are around 2200 epileptic patients on follow up. Data was collected from January 15 to April 15, 2017.

2.2. Study Design and Subjects. We employed hospital-based prospective cross sectional study. Adult epileptic patients who were on follow up in UoGRH were included as a study subject. We excluded epileptic patients who were less than 18 years old, those who were on antiepileptic drugs (AEDs) for less than one year period, patients with incomplete information on their chart and involuntary and uncooperative patients.

2.3. Sample Size & Sampling Methods. The sample size was calculated using single population proportion formula, where $Z = 1.96$, $\alpha/2$, $P = 54.2\%$, taken from a study done on similar setting [14], and 5% for d (margin of error). The total sample size calculated was 381. Since the source population were $<10,000$ the sample was recalculated using correction formula which gave the sample size of 324. After adding 10% contingency the final sample size became 356. We used systematic random sampling to recruit participants in each data collection day. The sampling fraction (k) was calculated through dividing the number of study population available

each day by the maximum possible number of patients' that could be interviewed the same day. Every k^{th} patient was then interviewed following physician's visit.

2.4. Data Collection Instrument. Data was taken from patients' medical chart and patient interview using data extraction format; which was pretested in 18 patients (5% of calculated sample size) in Felegehiwot referral hospital. Little adjustment was made to clarify questions. QOLIE-10 questionnaire was used to assess quality of life of epileptic patients [9]. There were 10 questions about health and daily activities, one question about how much distress they feel about problems and worries related to epilepsy, and a review of what bothers them most. Two individuals who were fluent in both the English and Amharic languages translated the QOLIE-10 into Amharic version. The new Amharic version of QOLIE-10 was back-translated into English to ensure that the meaning and comprehension of the original version was retained. The Amharic version of the questionnaire was also checked for both the accuracy and meaning of the translated versions before finalized.

2.5. Data Collection Procedures. Six BSc nurses who had basic knowledge of epilepsy treatment collected the data from January 15 to April 15, 2017. Patient demographics, diagnosis, co-morbid conditions and type of drug were collected on the patient charts by using well designed data extraction format. Information needed to measure patients' quality of life was collected through face to face interview using Amharic version of QOLIE-10 questionnaire. Data collectors were trained for 2 days on the documentation and techniques of data collection. Medical chart number was documented to avoid repetition of participants. The principal investigators reviewed all filled data abstraction formats daily.

2.6. Data Processing and Analysis. Data was entered into SPSS version 20.0 for analysis. We applied double entry to check whether the data was entered correctly or not. Descriptive statistics was used for demographic details and inferential statistical tests like the t -test for independent variables. Analysis of variance (ANOVA) was used to compare QOL scores among various socio-demographic factors and clinical characteristics. Level of statistical significance was declared at $P\text{-value} \leq 0.05$. Quality of life was considered as poor if QOLIE-10 Score for individual patient was less than the mean QOLIE-10 score for the study population.

The overall quality of life score represent the summation of all 10 item questions in the QOLIE-10 instrument. The questionnaire used has minimum score of 10 and maximum score of 50. Higher score indicate poor QoL and the lower the score the better QoL.

2.7. Ethical Consideration. We obtained letter of ethical clearance from ethical review board of school of pharmacy and letter of cooperation from UoGRH hospital. Each participant was informed about the objective of the study, procedures of selection and assurance of confidentiality. Oral consent was taken from participants before data collection. Privacy and confidentiality were ensured during patient interview and

TABLE 1: Socio-demographic characteristics of study participants, UoGRH, 2017.

| Variables | Categories | Frequency (n) | Percent (%) |
|--------------------|----------------------------|---------------|-------------|
| Age | 18–25 | 167 | 47.2 |
| | 26–44 | 150 | 42.4 |
| | >45 | 37 | 10.5 |
| Sex | Male | 216 | 61.0 |
| | Female | 138 | 39.0 |
| Marital status | Single | 224 | 63.3 |
| | Married | 89 | 25.1 |
| | Divorced | 31 | 8.8 |
| | Widowed | 10 | 2.8 |
| Religion | Orthodox | 317 | 89.7 |
| | Protestant | 7 | 1.9 |
| | Muslim | 28 | 7.9 |
| | Jehovah | 2 | .5 |
| Educational status | Illiterate | 107 | 30.2 |
| | Primary school | 111 | 31.4 |
| | Secondary school | 84 | 23.7 |
| | Diploma and above | 52 | 14.7 |
| Residency | Rural | 145 | 41.0 |
| | Urban | 209 | 59.0 |
| House hold income | <22\$* | 114 | 32.2 |
| | 22–66\$ | 136 | 38.4 |
| | 66.1–132\$ | 72 | 20.3 |
| | 132.1–220\$ | 24 | 6.8 |
| | ≥220.1\$ | 8 | 2.3 |
| Occupation | Unemployed | 54 | 15.3 |
| | House wife | 28 | 7.9 |
| | Merchant or private worker | 53 | 15.0 |
| | Student | 96 | 27.1 |
| | Daily laborer | 25 | 7.1 |
| | Farmer | 56 | 15.8 |
| | Others | 42 | 11.9 |
| | Purchase | 212 | 59.9 |

*\$ = USD (United States Dollar).

review of patients chart. Name and address of the participants were not recorded in the data extraction formats.

3. Results

3.1. Socio-Demographic Characteristics of Study Subjects. Out of the total 356 epileptic patients enrolled, 354 of them completed the interview and included in the analysis. The mean age of participants was 29.1 ± 11.7 years with a range of 18–88 years. More than half (61%) of respondents were male, quarter of the participants (25%) were married, 209(59%) were from urban area, 218(61.6%) of respondents were below primary school in educational background and most of the participants (89.7%) were orthodox Christian in religion.

TABLE 2: Clinical characteristics of study participants at UoGRH; Northwest Ethiopia, 2017.

| Clinical character | Category | Frequency (n) | Percent (%) |
|--|-----------------------------------|---------------|-------------|
| Age at diagnosis | ≤15 years old | 104 | 29.4 |
| | 16–30 years old | 194 | 54.8 |
| | 31–45 years old | 34 | 9.6 |
| | >46 years old | 22 | 6.2 |
| Types of seizure/epilepsy | Focal seizure | 5 | 1.4 |
| | Generalized tonic-clonic epilepsy | 305 | 86.2 |
| | Unclassified epileptic | 44 | 12.4 |
| Number of AEDs | Monotherapy | 291 | 82.2 |
| | Two drug combination | 62 | 17.5 |
| | Three drug combination | 1 | 0.3 |
| Presence of comorbidity | Yes | 36 | 10.2 |
| | No | 318 | 89.8 |
| Duration of epilepsy | <3 years | 105 | 29.7 |
| | 3–5 years | 69 | 19.5 |
| | 6–10 years | 89 | 25.1 |
| Frequency of seizure during last follow up | >10 years | 91 | 25.7 |
| | No seizure | 250 | 70.6 |
| | 1 or 2 seizure | 79 | 22.3 |
| | 3–5 seizure | 15 | 4.2 |
| Frequency of seizure during last year | >5 seizure | 10 | 2.8 |
| | Free of seizure | 129 | 36.4 |
| | 1–5 seizure | 193 | 54.5 |
| | 6–10 seizure | 20 | 5.6 |
| Current status of epilepsy | >10 | 12 | 3.4 |
| | Controlled | 129 | 36.4 |
| | Improving | 199 | 56.2 |
| | No change | 20 | 5.6 |
| | Deteriorated | 6 | 1.7 |

One third of participants were students, 70.6% had below 66 USD household monthly incomes. The detailed description of socio-demographic characteristics of the study participants is shown in Table 1.

3.2. Clinical Characteristics of the Study Subjects. Most of the patients (63.8%) had at least one episode of seizure a year before. The mean age of onset of epilepsy was 22 ± 12.1 years, the mean duration of epilepsy was 7.8 ± 6.4 years. Most (82.2%) of participants were on a single AED (Table 2).

3.3. Participants' Response to Quality of Life Assessment Questions. Participants mean quality of life in epilepsy-10 (QOLIE-10) score was 19.86 ± 6.91 , with a minimum and maximum score of 10 and 40 respectively. Equivalent mean quality of life result was 75.36%. One hundred ninety four

TABLE 3: Response of patients for quality of life assessment questions, UoGRH, Northwest Ethiopia; 2017.

| QOLIE-10 questions | All the time N (%) | Most of the time N (%) | Sometimes N (%) | Rarely N (%) | Never N (%) |
|---|--------------------|------------------------|------------------|------------------|--------------------|
| Did you have enough energy for the last month? | 151 (42.6) | 101 (28.5) | 47 (13.3) | 25 (7) | 30 (11.9) |
| Have you felt down-hearted and blue? | 28 (7.9) | 64 (18) | 88 (24.9) | 54 (15.3) | 120 (33.9) |
| | Not at all N (%) | A little N (%) | Somewhat N (%) | A lot N (%) | A great deal N (%) |
| Has your epilepsy/AED caused your daily life to be terrible? | 191 (54) | 61 (17.2) | 50 (14.1) | 37 (10.5) | 15 (4.2) |
| How much are you bothered by memory difficulty? | 193 (54.5) | 44 (12.4) | 60 (17) | 40 (11.3) | 17 (4.8) |
| How much are you bothered by work limitation? | 189 (53.4) | 49 (13.8) | 61 (17.2) | 43 (12.2) | 12 (3.4) |
| How much are you bothered by social limitation? | 214 (60.5) | 41 (11.6) | 39 (11) | 30 (8.5) | 28 (7.9) |
| How much are you bothered by physical effect of AED? | 280 (79.1) | 18 (5.1) | 22 (6.2) | 14 (3.9) | 20 (5.6) |
| How much are you bothered by mental effect of AED? | 236 (66.6) | 40 (11.3) | 34 (9.6) | 24 (6.8) | 20 (5.7) |
| How fearful are you of having seizure during the next month? | 185 (52.2) | 77 (21.7) | 31 (8.7) | 39 (11) | 21 (5.9) |
| | Very well N (%) | Pretty good N (%) | Good = bad N (%) | Pretty bad N (%) | Very bad N (%) |
| How has the quality of your life been during the past 4 weeks? That is, how have things been going for you? | 58 (16.4) | 170 (48.0) | 108 (30.5) | 16 (4.5) | 2 (0.6) |

(54.8%) of participants had a good quality of life. Two hundred sixty one (73.7%) of participants had enough energy for most of their time, but 180(50.85%) of the patients feel down hearted or blue for at least some of their time. For more than half (54%) of patients, their epilepsy and or AEDs didnot terribly disturb their daily life (Table 3).

3.4. Factors Associated with Quality of Life. One way ANOVA analysis of QOLIE-10 scales with socio demographics and clinical characteristics showed that educational status, occupation, income, frequency of seizure during last follow up, frequency of seizure during a year before, number of AEDs and patient's perception of current status of epilepsy have significant association with quality of life. Independent *t*-test also showed that presence of co-morbidity and methods of acquiring AEDs, were significantly associated with quality of life (Table 4).

Note: independent *t*-test was done for variables with 2 categories and one way ANOVA was done for those variables with 3 or more categories.

After detecting the presence of association between some of the patients' characteristics and quality of life using one way ANOVA, then Post hock analysis was done to determine where the significant mean difference lies. Accordingly illiterates, unemployed individuals and patients with less than 22 USD monthly incomes had significantly poorer quality of life as compared to their counter parts. Patients who perceive their epilepsy status was controlled had better quality of life as

compared to patients who thought that it was improved, deteriorated or had no change (Table 5).

4. Discussion

The mean QOLIE-10 score in this study was 19.86 (75.3%). This result is in line with the study in Bangalore, India, which reported a mean quality of life of 74.9% [15]. However this finding was higher than many other studies conducted in different part of the world [14, 16–20]. This difference may be explained by the presence of high percentage of two or more AEDs use in those studies in contrast to the finding in the current study. Different literatures suggested that patients receiving two or more AEDs had poor quality of life as compared to patients on monotherapy [14, 21–24].

The higher rate of monotherapy (82.2%) reported in this study is in line with the result of previous studies done in Ethiopia. The study conducted on two hospitals in Northwest Ethiopia reported that 76.7% of epileptic patients were on monotherapy [25]. Another study in Bishoftu general hospital also reported monotherapy users to be 78.6% [26] and a study done by Birru et al. also found that 80.35% [27] of studied patients used single drug for treatment of their epilepsy. However Gurshaw et al. reported only 54.5% of studied epileptic patients in Jimma university hospital used monotherapy [28].

In this study, various socio-demographic and clinical characteristics were checked for their possible influence on quality of life. Significantly poor QoL was seen among people who

TABLE 4: Association of socio demographics and clinical characteristics with quality of life of epileptic patients, Northwest Ethiopia; 2017.

| Characteristics | Category | Frequency (%) | QOLIE-10 (mean) | P-Value |
|--|------------------------------|-------------------------|-----------------|---------|
| Gender | Male | 216 (61) | 19.5926 | 0.371 |
| | Female | 138 (39) | 20.2681 | |
| Age | | 29.0 ± 11.7 (mean ± SD) | | 0.515 |
| Address | Urban | 209 (59) | 19.5694 | 0.350 |
| | Rural | 145 (41) | 20.2690 | |
| Marital status | Single | 224 (63.3) | 19.7188 | 0.342 |
| | Married | 89 (25.1) | 19.3933 | |
| | Divorced | 31 (8.8) | 21.3226 | |
| | Widowed | 10 (2.8) | 22.5000 | |
| Educational status | Illiterate | 107 (30.2) | 21.6636 | 0.003* |
| | Primary school | 111 (31.4) | 19.7387 | |
| | Secondary school | 84 (23.7) | 19.0357 | |
| | Diploma and above | 52 (14.7) | 17.7115 | |
| Religion | Orthodox | 317 (89.5) | 20.0365 | 0.793 |
| | Protestant | 7 (2) | 19.7500 | |
| | Islam | 28 (7.9) | 20.0000 | |
| | Jehovah | 2 (0.6) | 13.0000 | |
| Patient occupation | Unemployed | 54 (15.3) | 23.2778 | 0.003* |
| | House wife | 28 (7.9) | 20.6429 | |
| | Merchant or private worker | 53 (15.0) | 18.9057 | |
| | Student | 96 (27.1) | 19.3542 | |
| | Daily laborer | 25 (7.1) | 19.0400 | |
| | Farmer | 56 (15.8) | 19.8214 | |
| | Others ^a | 42 (11.9) | 17.8095 | |
| Monthly household income | <22 \$* | 114 (32.2) | 21.4123 | 0.024* |
| | 22–66\$ | 136 (38.4) | 19.4265 | |
| | 66.1–132\$ | 72 (20.3) | 19.3472 | |
| | 132.1–220\$ | 24 (6.8) | 17.1250 | |
| | ≥220.1\$ | 8 (2.3) | 17.7500 | |
| Method of acquiring AED | Free | 142 (40.1) | 20.9718 | 0.013* |
| | Purchase | 212 (59.9) | 19.1085 | |
| Age of onset | <15 years | 104 (29.4) | 19.4712 | 0.859 |
| | 16–30 | 194 (54.8) | 19.8918 | |
| | 31–45 | 34 (9.6) | 20.5000 | |
| | >46 | 22 (6.2) | 20.3636 | |
| Types of seizure | Focal seizure | 5 (1.4) | 22.8000 | 0.469 |
| | GTCS | 305 (86.2) | 19.7049 | |
| | Unclassified epileptic | 44 (12.4) | 20.5682 | |
| Duration of epilepsy (years) | <3 | 105 (29.7) | 19.1810 | 0.554 |
| | 3–5 | 69 (19.5) | 19.5652 | |
| | 5–10 | 89(25.1) | 20.4157 | |
| | >10 | 91(25.7) | 20.3077 | |
| Number of AEDs for treatment | Mono-therapy | 291 (82.2) | 19.4330 | 0.020* |
| | Two or more drug combination | 63 (17.8) | 21.8095 | |
| Frequency of seizure during last follow up | No seizure | 250 (70.6) | 18.6240 | 0.001* |
| | 1-2 seizure | 79 (22.3) | 21.1646 | |
| | 3–5 seizure | 15 (4.2) | 28.1333 | |
| | >5 seizure | 10 (2.8) | 27.9000 | |
| Frequency of seizure during last year | No seizure | 129 (36.4) | 17.4186 | 0.001* |
| | 1–5 | 193 (54.5) | 20.7098 | |
| | 6–10 | 20 (5.6) | 24.8000 | |
| | >10 | 12 (3.4) | 24.0833 | |

TABLE 4: Continued.

| Characteristics | Category | Frequency (%) | QOLIE-10 (mean) | P-Value |
|---------------------------------------|--------------|---------------|-----------------|---------|
| Presence of co-morbidity | Yes | 36 (10.2) | 22.5278 | 0.014* |
| | No | 318 (89.8) | 19.5535 | |
| Patient perception of epilepsy status | Controlled | 129 (36.4) | 17.1938 | 0.001* |
| | Improving | 199 (56.2) | 20.9598 | |
| | No change | 20 (5.6) | 24.7000 | |
| | Deteriorated | 6 (1.7) | 24.3333 | |

*Significant association. GTCS: Generalized tonic clonic epilepsy. \$ = USD (United States Dollar).

TABLE 5: Post-hoc analysis of demographic and clinical characteristics of patients which have significant association with quality of life in one way ANOVA, UoGRH, Northwest Ethiopia.

| Characteristics | Reference category | Compared with | Mean difference | Standard error | P value | 95% confidence interval | |
|--|--------------------|-------------------------------|-----------------|----------------|---------|-------------------------|--------|
| Educational status | Illiterate | Primary school | 1.92481 | .92214 | .038 | .111 | 3.738 |
| | | Secondary school | 2.62784 | .99222 | .008 | .676 | 4.579 |
| | | Diploma and above | 3.95201 | 1.15061 | .001 | 1.689 | 6.215 |
| Occupation | Unemployed | Merchant or private worker | 4.37212 | 1.31080 | .001 | 1.794 | 6.950 |
| | | Student | 3.92361 | 1.15317 | .001 | 1.655 | 6.191 |
| | | Daily laborer | 4.23778 | 1.63994 | .010 | 1.012 | 7.463 |
| | | Farmer | 3.45635 | 1.29296 | .008 | .9133 | 5.999 |
| | | Others | 5.46825 | 1.39474 | .000 | 2.725 | 8.211 |
| Income | <22\$* | 22–66 \$ | 1.98581 | .86855 | .023 | .2776 | 3.694 |
| | | 66.1–132\$ | 2.06506 | 1.02963 | .046 | .0400 | 4.090 |
| | | 132.1–220\$ | 4.28728 | 1.53612 | .006 | 1.266 | 7.308 |
| Patient perception of epilepsy status | Controlled | Improving | –3.76600 | .74283 | .000 | –5.227 | –2.305 |
| | | No change | –7.50620 | 1.57928 | .000 | –10.612 | –4.400 |
| | | Deteriorated | –7.13953 | 2.74455 | .010 | –12.537 | –1.741 |
| | Improving | Controlled | 3.76600 | .74283 | .000 | 2.305 | 5.227 |
| No change | | –3.74020 | 1.54154 | .016 | –6.772 | –.708 | |
| Frequency of seizure during last year | No seizure | 1–5 seizure/year | –3.29124 | .75071 | .000 | –4.767 | –1.814 |
| | | 5–10 seizure/year | –7.38140 | 1.58636 | .000 | –10.501 | –4.261 |
| | | >10 seizure/year | –6.66473 | 1.99225 | .001 | –10.583 | –2.746 |
| Frequency of seizure during last follow up | 1–5 seizure | 5–10 seizure/follow up | –4.09016 | 1.55065 | .009 | –7.139 | –1.040 |
| | | 1 or 2 seizure/follow up | –2.54056 | .83566 | .003 | –4.184 | –.897 |
| | No seizure | 3 up to 5 seizure/follow up | –9.50933 | 1.72116 | .000 | –12.894 | –6.124 |
| | | More than 5 seizure/follow up | –9.27600 | 2.08800 | .000 | –13.382 | –5.169 |
| | | 3–5 seizure/follow up | –6.96878 | 1.82355 | .000 | –10.555 | –3.382 |
| | 1 or 2 seizures | >5 seizure/follow up | –6.73544 | 2.17317 | .002 | –11.009 | –2.461 |

\$ = USD (United States Dollar).

had no formal education. This finding is supported by many other studies [16, 29–31]. The poor QoL observed in illiterate patients may be due to the lesser knowledge they may have about the diseases and its treatment; as well as they may not easily understand instructions given from health professionals

and this may result in poor adherence to medication and poorer seizure control which may finally lead to poor quality of life.

Marital status did not significantly influence QoL. Although this result is in agreement with the study done in India [15], it

is contrasting with the result of the studies conducted in Malaysia, Iran and China. [31–33]. Quality of life of unemployed patients is significantly lower than those of epileptic patients who have a job. This may be because job gives mental satisfaction. Those who are unemployed get bored and face more cognitive problems. This finding is similar to the study done by Singh and Pandey [31] and Ashjazadeh et al. [32]. Mean QOLIE-10 score of patients with household monthly income <22 USD was 21.4. The score is significantly higher (lower quality of life) than for patients who got 22 USD or more per month. Therefore, income significantly affected quality of life of epileptic patients. This is consistent with the result of the study done from the US Centers for Disease Control and Prevention Managing Epilepsy Well Network [34].

Patients who have access to AEDs free of charge and those who purchase their drug out of pocket had mean QOLIE-10 score of 20.97 and 19.12 respectively. Independent *t*-test result showed there is significant difference in QOL score between these 2 groups. Accordingly to those who spent money to buy drug have better quality of life than who get freely. The possible explanation for this may be those who spent money to buy drugs may have better medication adherence than patients who got drugs freely.

Frequent seizure during last follow up and a year before leads to poorer quality of life score as compared to no seizure. Literatures support the finding of this study in which people with frequent seizures had significantly poorer health related QOL than those with infrequent or no seizures [15, 16, 34–36]. This finding emphasizes the importance of encouraging patients to observe symptoms of the onset of a seizure (aura, tingling, numbness, headaches, confusion, etc.), record them, and share the information with their health-care provider. Health education interventions involving medication intake, diet, regular sleep, exercise, and stress reduction can all aid in reducing seizure frequency so that patients will have better quality of life.

Patients who were taking two or more AEDs had lower quality of life as compared to patients who took single AED. Similar result was found in many other previous studies [14, 15, 21–24, 37]. Patients who perceive that their current status of epilepsy was controlled had better quality of life than patients who perceive that their epilepsy was improving, had no change or had deteriorated. In addition patients who perceived their disease is improving had better quality of life than those who perceived nothing is changed. As patients perceive their epilepsy is controlled or improving, their worry about the illness and the fear of seizure recurrence will reduce and patient will have improved quality of life. Patients who had co morbid diseases had a worse quality of life than those who have only epilepsy. Similar association was reported by Tegegne et al. [26].

Age, gender, place of residency, religion, age at diagnosis of epilepsy and duration on AEDs had no significant association with quality of life. Similar nonsignificant association of Patient's age, age at onset of epilepsy and duration of AEDs with quality of life was reported by Tegegne et al. [26]. Patients' gender did not significantly affect quality of life ($p = 0.371$). Similar result was reported by Singh and Pandey [31].

Even though the use of validated tool, excellent response rate and sufficient sample size were the strengths of this study, it is not without limitation. The cross-sectional nature of this study did not allow establishing casual relation between quality of life and the different factors associated with it. The participants were recruited from one medical center in Northwest Ethiopia. Therefore, the findings may not be generalizable to all PWE in Ethiopia. Although the concept of QOL is very broad and can be influenced by multiple variables, some other clinical and socio-demographic conditions were not addressed in the study (e.g., severity of seizures, anxiety disorders, sleep disorder, specific structural/metabolic cause of epilepsy, and family support, among others) which could affect QOL.

5. Conclusion

Nearly half of participants had poor quality of life. Presence of co-morbidity, usage of two or more AEDs, illiteracy, unemployment and monthly income of less than 22 USD were significantly associated with poor quality of life. Patients with such characteristics should be given special emphasis to improve their quality of life. Patients perception of their epilepsy status as controlled or improved, absence of seizure episode during the past 1 year period and lesser number of seizure episodes during the last follow up were significantly related with a better quality of life.

Abbreviations

| | |
|-----------|---|
| AED: | Anti-epileptic drug |
| ANOVA: | Analysis of variance |
| GTCS: | Generalized tonic clonic seizure |
| ILAE: | The international league against epilepsy |
| OPD: | Outpatient department |
| PWE: | Patients with epilepsy |
| QoL: | Quality of Life |
| QOLIE-10: | Quality of life in epilepsy ten |
| SPSS: | Statistical package for social science |
| UoGRH: | University of gondar referral hospital |
| WHO: | World health organization |
| USD: | United States dollar. |

Data Availability

Data underlying the findings of the study could be found up on reasonable request from the corresponding author.

Ethical Approval

Ethical clearance was obtained from the Ethical Review Committee of School of Pharmacy, University of Gondar. The respondents were informed about the purpose of the study and their consent to participate was obtained.

Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

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