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Brief Communication

Self-reported medication adherence and treatment satisfaction in patients with epilepsy

Waleed M. Sweileh [a,*,1], Manal S. Ihbesheh [b,1], Ikhlas S. Jarar [a,1], Adham S. Abu Taha [a], Ansam F. Sawalha [a], Sa'ed H. Zyoud [c], Raniah M. Jamous [a], Donald E. Morisky [d]

[a] Department of Pharmacology and Toxicology, College of Pharmacy, An-Najah National University, Nablus, Palestine
[b] Department of Biochemistry, College of Pharmacy, An-Najah National University, Nablus, Palestine
[c] WHO Collaborating Centre for Drug Information, National Poison Centre, Universiti Sains Malaysia (USM), Penang, Malaysia
[d] Department of Community Health Sciences UCLA School of Public Health, Los Angeles, CA, USA

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ABSTRACT

Objective: Reports about medication adherence and satisfaction in patients with epilepsy in Arab countries are lacking. The objective of this study was to assess medication adherence and its relationship with treatment satisfaction, number of antiepileptic drugs (AEDs) taken, and epilepsy control in a sample of Palestinian patients.

Methods: This cross-sectional descriptive study was carried out at Al-Makhfya Governmental Outpatient Center in Nablus, Palestine, during the summer of 2010. A convenience sampling method was used to select patients over the study period. Medication adherence was measured using the eight-item Morisky Medication Adherence Scale (MMAS); treatment satisfaction was measured using the Treatment Satisfaction Questionnaire for Medication (TSQM 1.4). Epilepsy was arbitrarily defined as "well controlled" if the patient had had no seizures in the last 3 months and was defined as "poorly controlled" if he or she had had at least one seizure in the last 3 months.

Results: A convenience sample of 75 patients was studied. On the basis of the MMAS, 11 patients (14.7%) had a low rate, 37 (49.3%) had a medium rate, and 27 (36%) had a high rate of adherence. Adherence was positively and significantly correlated with age ($P=0.02$) and duration of illness ($P=0.01$). No significant difference in adherence was found between patients with well-controlled and those with poorly controlled epilepsy. Similarly, there was no significant difference in adherence between patients on monotherapy and those on polytherapy. Mean satisfaction with respect to effectiveness, side effects, convenience, and global satisfaction were 73.6 ± 20.7, 82.4 ± 29.8, 69.5 ± 15.5, and 68.4 ± 18.3, respectively. There were significant differences in mean values in the effectiveness ($P<0.01$) and convenience ($P<0.01$) domains, but not the side effect ($P=0.1$) and global satisfaction ($P=0.08$) domains among patients with different levels of adherence. Patients on monotherapy had significantly higher satisfaction in the effectiveness domain ($P=0.04$) than patients on polytherapy. Similarly, patients with well-controlled epilepsy scored significantly higher in the Effectiveness ($P=0.01$) and Global Satisfaction ($P=0.01$) domains than those with poorly controlled epilepsy.

Conclusion: In our convenience sample, we found that adherence to and satisfaction with AEDs were moderate and were not associated with seizure control or number of AEDs.

1. Introduction

Epilepsy is a common chronic neurological disorder that affects about 50 million people around the world, 10% of whom are in the Middle East [1,2]. In the majority of patients with epilepsy, antiepileptic drugs (AEDs) effectively control their illness [3]. However, more than 30% of people with epilepsy do not attain full seizure control, even with the best available treatment regimen [4]. One possible reason for treatment failure in epilepsy is poor adherence to AEDs. Non-adherence to AEDs has been found to be high [5,6]. For example, studies using insurance claims databases have reported that approximately 30–50% of patients with epilepsy do not adhere to their prescribed AED regimens [7,8]. Another study found that 70% of patients reported AED dose omissions [9]. Poor adherence to AEDs has been reported to increase morbidity and mortality [7,10], and decrease quality of life and productivity [6]. From a health economic perspective, nonadherence

* Corresponding author at: Department of Pharmacology and Toxicology, School of Pharmacy, An-Najah National University, P.O. Box: 7, Nablus, Palestine.
E-mail address: waleedsweileh@yahoo.com (W.M. Sweileh).
[1] These authors contributed equally to the project.

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can also involve additional costs to the health service for the staff and resources required to deal with admissions to hospitals because of seizures or seizure-related injuries [11].

Three types of factors influence medication adherence: (1) patient-related factors such as forgetfulness and stigmatization [11]; (2) medication-related factors such as cost, side effects, number of medications prescribed, and dosing frequency [12–14]; (3) disease-related factors including seizure type and severity [15] and duration of illness [16]. In epilepsy, medication adherence has been measured by self-report, drug blood level monitoring, and prescription refill monitoring. Each method has disadvantages [17–19]. Self-reporting is considered the simplest and least expensive method. George et al. had found that when a valid scale [20], like the Morisky questionnaire [21], is used to assess medication adherence, self-report scores are accurate, with both sensitivity and specificity greater than 70%.

Treatment satisfaction is believed to impact the patient's health-related decision making [22,23]. Consequences of low treatment satisfaction on medication adherence are of particular concern in patients with chronic diseases. It has been estimated that up to one-half of patients with chronic illness end up making medication-related decisions without seeking medical advice, becoming "non-adherent" to such an extent that they compromise the effectiveness of treatment [24]. Therefore, health care providers need to know their patients' level of satisfaction with the medications they are taking. To facilitate this, measures for assessing satisfaction have been developed.

The objective of this study was to assess medication adherence and its relationship with treatment satisfaction in a sample of Palestinian patients with epilepsy. In addition, this descriptive study looked at the hypothesis that adherence is positively correlated with number of AEDs and seizure control. Our study is significant for the following reasons: (1) various studies investigating self-reported adherence in epilepsy have not used validated questionnaires [16,25–28]; (2) very few studies on treatment satisfaction in patients with epilepsy have been published; (3) a review of the literature revealed no studies on medication adherence and treatment satisfaction among patients with epilepsy in the Arab world. This is important given that culture and religion might play a role in health-related issues [29].

2. Methodology

2.1. Study design and patient selection

This cross-sectional descriptive study was conducted between July 2010 and September 2010 at Al-Makhfya Psychiatric Health Center in Nablus, Palestine. Approval to perform the study was obtained from the Palestinian Ministry of Health and Institutional Review Board at An-Najah National University. Patients who met the following criteria were invited to participate in this study: (1) diagnosis of epilepsy documented in their medical files, (2) age between 16 and 65 years, (3) therapy with least one AED, and (4) no change in AED in the last 6 months. The sample size was calculated based on a reported adherence of approximately 50%, with $z = 1.96$ for a 95% confidence interval and a total width of confidence interval of 25%. The estimated sample size would be at least 61 patients. A convenience sample of 87 patients met the inclusion criteria, and 75 agreed to participate and were asked to complete two scales to assess medication adherence and satisfaction. After patients gave verbal consent, they were asked to complete the scales in the clinic. The two scales were administered together and took less than 20 minutes to complete. Epilepsy was arbitrarily defined as "well controlled" if the patient reported no seizures in the last 3 months and was defined as "poorly controlled" if they reported having had at least one seizure in the last 3 months.

2.2. Assessment and measures

The instrument used in this study consisted of three parts: part 1 elicited sociodemographic, clinical, and medication data directly from patients and their medical files; part 2 was a medication adherence test; and part 3 was a treatment satisfaction test. Medication adherence was tested using the Arabic version of the validated 8-item Morisky Medication Adherence Scale (MMAS) [21,30]. The English version of the MMAS was translated into Arabic and was approved by Professor Morisky through e-mail communications. The translation was carried out according to the following procedure: (1) A forward translation of the original questionnaire from English into Arabic was carried out by two qualified independent, native linguistic expert translators. (2) A back translation from Arabic into English was carried out by two different translators. (3) The back-translated questionnaire was tested and approved by the developer by e-mail. The Arabic version of the MMAS is an 8-item questionnaire with seven yes/no questions and one question answered on a 5-point Likert scale. According to the scoring system for the MMAS, 8 = high adherence, 6 to <8 = medium adherence, and <6 = low adherence. Patients who had a low or a moderate rate of adherence were considered nonadherent.

Treatment satisfaction was tested using the Arabic version of the Treatment Satisfaction Questionnaire for Medication (TSQM 1.4), which the researchers obtained from Quintiles Strategic Research Services. The TSQM 1.4 is a 14-item psychometrically robust and validated instrument comprising four domains [31]: Effectiveness (questions 1–3), Side Effects (questions 4–8), Convenience (questions 9–11), and Global Satisfaction (questions 12–14). The TSQM 1.4 domain scores were calculated as recommended by the instrument's authors and described in detail elsewhere [32,33]. TSQM 1.4 domain scores range from 0 to 100, with higher scores representing higher satisfaction in that domain.

In addition to the two scales, key clinical and demographic information on each patient was gathered at the time of the clinic visit. Clinical data included seizure activity over the last 3 months (based on the patient's medical file and/or recall) and number of AEDs taken based on pharmacy records.

2.3. Data analysis

Continuous variables were expressed as means ± SD. Associations between continuous variables were examined using Pearson's correlation. Differences in means among groups were tested using one-way ANOVA with Tukey's post hoc test. All statistical analyses were conducted using the Statistical Package for Social Sciences (SPSS Version 16.0) for Windows. The conventional 5% significance level was used throughout the study.

3. Results

A convenience sample of 87 patients with epilepsy met the inclusion criteria during the study period. Twelve patients refused to participate and 75 patients agreed, yielding a response rate of 86.2%. Of the 75 patients, 45 (60%) were male and 30 (40%) were female. Mean age was 38.6 ± 12.3 years. Mean duration of illness was 22.1 ± 12.1 years. Eighteen patients (13.7%) had other chronic diseases. Less than half of the patients (34, 44.7%) had had at least one epileptic seizure in the last 3 months. More than half of the patients (48; 63.2%) were on polytherapy. The average number of AEDs taken each day was 1.8 ± 0.7 (median = 2).

On the basis of the MMAS results, 11 (14.7%) patients had low adherence, 37 (49.3%) had medium adherence, and 27 (36.0%) had high adherence rates (Fig. 1). Therefore, 64% of the patients were nonadherent. The average adherence score (6.9 ± 1.3) represents a medium rate of adherence. There was a significant and positive

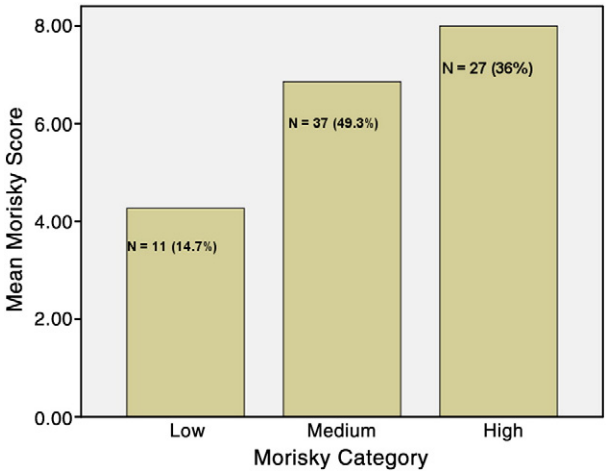

Fig. 1. Distribution of patients based on adherence level.

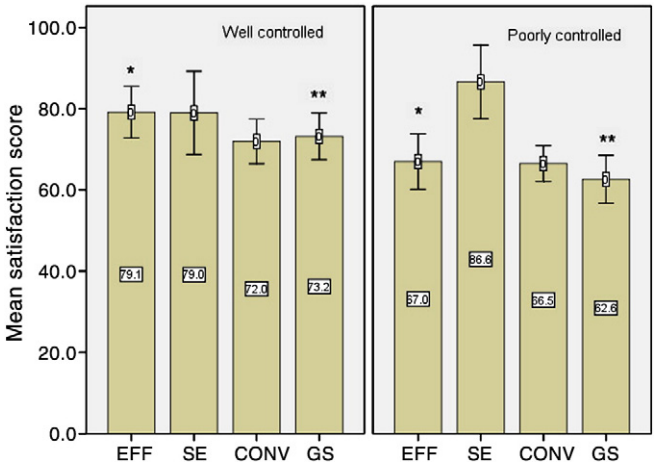

Fig. 2. Mean treatment satisfaction scores based on reported epilepsy control. *,**Statistically significant differences between well-controlled and poorly controlled patients. EFF, Effectiveness; SE, Side Effects; CONV, Convenience; GS, Global Satisfaction.

correlation between adherence and age ($P=0.02$, $r=0.3$). A similar significant correlation was obtained between adherence and duration of illness ($P=0.01$, $r=0.3$). However, no significant difference in adherence ($P=0.9$) was found between male and female patients (6.9 ± 1.2 and 6.9 ± 1.5, respectively).

The average satisfaction scores in the Effectiveness, Side Effects, Convenience, and Global Satisfaction domains were 73.6 ± 20.7, 82.4 ± 29.8, 69.5 ± 15.5, and 68.4 ± 18.3, respectively. Analysis of satisfaction scores based on adherence levels is outlined in Table 1. There was a significant difference in the mean scores in the Effectiveness ($P<0.02$, $F=4$) and Convenience ($P<0.01$, $F=5.45$) domains, but not in the Side Effects ($P=0.2$) or Global Satisfaction ($P=0.09$) domain among patients with different levels of adherence. Patients with a high adherence rate had the highest satisfaction scores compared with those with a low or medium adherence rate.

Twenty-seven (36%) patients were on monotherapy and 48 (64%) were on polytherapy. Carbamazepine was the most commonly used AED followed by phenytoin. There were no significant differences between patients on monotherapy and those on polytherapy with respect to age, gender, or duration of illness. There was no significant difference ($P=0.8$) between patients on monotherapy and those on polytherapy with respect to medication adherence scores (6.8 ± 1.4 and 6.9 ± 1.3, respectively). Repeated analysis also showed no significant correlation ($P=0.9$) between number of AEDs and medication adherence. Regarding satisfaction, analysis revealed a significant difference ($P=0.04$) in mean scores in the Effectiveness domain between patients receiving monotherapy and those receiving polytherapy. However, no such significant difference was observed in mean scores in the Convenience ($P=0.3$), Side Effects ($P=0.6$), and Global Satisfaction ($P=0.1$) domains (Fig. 2).

Forty-one (54.7%) patients had well-controlled epilepsy, and 34 (45.3%) had poorly controlled epilepsy. There were no significant differences in age, number of AEDs, or duration of illness between patients with well-controlled and those with poorly controlled epilepsy. There was a significant association ($P=0.008$) between gender and epilepsy control. Females had a higher proportion of well-controlled epilepsy compared with male patients (73.3% vs 42.2%). There was no significant difference in medication adherence between patients with well-controlled and those with poorly controlled epilepsy (6.9 ± 1.4 vs 6.9 ± 1.2). As for treatment satisfaction, patients with well-controlled epilepsy had significantly higher satisfaction scores in the Effectiveness ($P=0.01$) and Global Satisfaction ($P=0.01$) domains compared with patients with poorly controlled epilepsy. However, no significant difference was observed in the Side Effects and Convenience domains between patients with well-controlled and those with poorly controlled epilepsy (Fig. 3).

Table 1
Treatment satisfaction stratified with adherence level.

Variable	Adherence level			*P*	Post hoc analysis, significant pairs
	Low (a)	Medium (b)	High (c)		
Effectiveness	61.6 ± 6.8	71.6 ± 3.4	81.3 ± 3.4	0.02	a–c
Side Effects	68.8 ± 11.4	83.2 ± 5.0	86.8 ± 5.1	0.2	None
Convenience	56.6 ± 3.0	70.3 ± 2.5	73.7 ± 3.0	0.007	a–b, a–c
Global satisfaction	61.0 ± 6.6	66.4 ± 2.7	74.1 ± 3.5	0.09	None

4. Discussion

In our study, the majority (64%) of patients did not adhere to their AED regimens. Few studies have used the Morisky questionnaire to assess adherence in patients with epilepsy. A study in the United States indicated that a total of 58% had a low or medium adherence

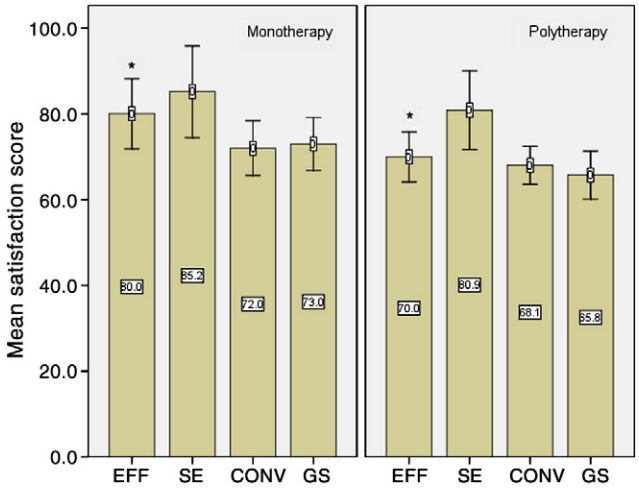

Fig. 3. Mean treatment satisfaction scores based on whether patients are on monotherapy or polytherapy. *Statistically significant difference between patients on monotherapy and patients on polytherapy. EFF, Effectiveness; SE, Side Effects; CONV, Convenience; GS, Global Satisfaction.

rate [34]. Similarly, a study in the United Kingdom reported that 59% of the patients were nonadherent [35]. These results suggest that patients in our study had higher rates of nonadherence compared with patients in other studies carried out using the same methodology for assessment of adherence. In our study, older patients and patients with longer duration of illness had higher adherence rates. This may be due to the patients' realization of the benefits of adherence to their medications through time. Similar results were obtained by other researchers [36,37]. Our study demonstrated that higher adherence was significantly associated with satisfaction, particularly in the Effectiveness domain but not in the Side Effects domain. This suggests that patients are willing to tolerate side effects of AEDs and adhere to their medication regimens as long as they are satisfied with the effectiveness of these regimens.

Approximately two-thirds of patients in our study were on polytherapy. This is higher than rates reported in other studies. A study of 314 adults in the United States found that 44% of patients were on monotherapy and 56% on polytherapy [38]. Similar proportions were found in a European study of more than 5000 patients: 47% of patients were reported to be receiving monotherapy and 53% were on polytherapy, and the most commonly taken drugs were carbamazepine (53%), sodium valproate (33%), and phenytoin (25%) [39]. In our study, there was no significant difference in adherence between patients on monotherapy and those on polytherapy. This is in agreement with Cramer et al., who reported that the number of different medications to be taken was not a factor affecting adherence [18]. However, Buck et al. reported that patients on polytherapy were more likely to adhere [11]. Regarding satisfaction, patients on monotherapy showed significantly higher satisfaction in the Effectiveness domain compared with patients on polytherapy. This might be expected, as patients on polytherapy are usually those who do not respond to traditional monotherapy or polytherapy.

The results on the relationship between medication adherence and epilepsy control are not very conclusive. The nature of the illness and the efficacy of available AEDs make it difficult to predict such a relationship. Despite that, Stanaway et al. found that 31% of seizures were precipitated by nonadherence to medication [40]. Another study demonstrated a higher prevalence of seizures (21%) in those who did not adhere to their AED regimens [5]. In our study, adherence was not correlated with reported seizure frequency. Our findings are not surprising given that many individuals who do not adhere to medication do not experience seizures and vice versa [41]. Incorrectly timed doses, which can be considered nonadherence, can result in a seizure [18]. On the MMAS, patients were not asked whether they take their medications on time. Inappropriate timing of doses might lead to seizures. Some patients with epilepsy who have not experienced seizures for a while gradually reduce their adherence to their regimens. Some patients believe that taking an AED(s) is unnecessary, particularly if they have skipped doses previously without a seizure occurring [9]. Patients may not perceive nonadherence as the main factor in seizure occurrence. When patients were asked if anything increased the likelihood of a seizure, 41% said stress/emotion, 19% said fatigue, and only 13% stated missing medications [42]. As expected, patients with well-controlled epilepsy showed significantly higher satisfaction in the Effectiveness and Global Satisfaction domains compared with those with poorly controlled epilepsy.

It is noteworthy in this regard that McAuley et al., who used the Morisky questionnaire to assess adherence in patients with epilepsy, found no significant differences between patients who were seizure free and those who were not [34]. Jones et al. also used the Morisky scale to assess adherence in patients with epilepsy, and detected no significant overall correlation between adherence and seizure frequency until they excluded one subject with high seizure frequency from the analysis [35]. These results suggest that measurement of adherence is of lesser value in predicting disease outcome in epilepsy than in other chronic diseases like diabetes mellitus and hypertension.

In our study, we used a validated questionnaire to measure satisfaction. This study is the first to measure treatment satisfaction in patients with epilepsy in the Arab world. One study involved seven European countries and assessed patients' and physicians' satisfaction with management of epilepsy. Patients in this study were generally satisfied with their treatment and with the care provided by their physicians [43]. Most satisfaction studies on patients with epilepsy have been done to compare differemt types of antiepliептic drugs [44] or to measure satisfaction with health care in general [45].

Our study is one of the few to assess adherence and satisfaction among Arab patients with epilepsy using validated tools; however, our study has a few limitations. First, the relatively small sample size makes the detection of significant results less likely. Therefore, this brief communication needs to be followed by future studies with larger samples. Second, self-reported adherence and satisfaction might not match actual adherence and satisfaction [46]. Third, patients with epilepsy might have memory deficits that might affect the accuracy of their responses. Fourth, a more accurate measure may be needed to assess whether epilepsy is well controlled or not. Fifth, the cross-sectional study design is another limitation in the study. Finally, there is a risk of response bias as the measures rely on self-reporting. Studies that include larger samples of patients with more demographic and clinical data are needed. In conclusion, in our convenience sample, we found that adherence to and satisfaction with AED regimens were moderate and not associated with seizure outcome or number of medications.

References

[1] World Health Organization. Epilepsy in the WHO Eastern Mediterranean region: bridging the gap. Available at: http://www.emro.who.int/dsaf/dsa1039.pdf. 2010 Accessed: January 23, 2011.
[2] World Health Organization. Epilepsy: fact sheet. Available at: http://www.who.int/mediacentre/factsheets/fs999/en/. 2009 Accessed January 23, 2011.
[3] Shinnar S, Berg AT. Does antiepileptic drug therapy prevent the development of "chronic" epilepsy? Epilepsia 1996;37:701–8.
[4] Devinsky O. Patients with refractory seizures. N Engl J Med 1999;340:1565–70.
[5] Manjunath R, Davis KL, Candrilli SD, Ettinger AB. Association of antiepileptic drug nonadherence with risk of seizures in adults with epilepsy. Epilepsy Behav 2009;14:372–8.
[6] Hovinga CA, Asato MR, Manjunath R, et al. Association of non-adherence to antiepileptic drugs and seizures, quality of life, and productivity: survey of patients with epilepsy and physicians. Epilepsy Behav 2008;13:316–22.
[7] Davis KL, Candrilli SD, Edin HM. Prevalence and cost of nonadherence with antiepileptic drugs in an adult managed care population. Epilepsia 2008;49:446–54.
[8] Rosenfeld WE, Bramley TJ, Meyer KL. Patient compliance with topiramate vs. other antiepileptic drugs: a claims database analysis. Epilepsia 2004;45:238.
[9] Cramer JA, Glassman M, Rienzi V. The relationship between poor medication compliance and seizures. Epilepsy Behav 2002;3:338–42.
[10] Faught RE, Weiner JR, Guerin A, Cunnington MC, Duh MS. Impact of nonadherence to antiepileptic drugs on health care utilization and costs: findings from the RANSOM study. Epilepsia 2009;50:501–9.
[11] Buck D, Jacoby A, Baker GA, Chadwick DW. Factors influencing compliance with antiepileptic drug regimes. Seizure 1997;6:87–93.
[12] Doughty J, Baker GA, Jacoby A, Lavaud V. Compliance and satisfaction with switching from an immediate-release to sustained-release formulation of valproate in people with epilepsy. Epilepsy Behav 2003;4:710–6.
[13] Garnett WR. Antiepileptic drug treatment: outcomes and adherence. Pharmacotherapy 2000;20 191–9S.
[14] Parkerson K, Pathmanathan J, Milligan T. Optimizing antiepileptic treatment. J Clin Outcomes Manag 2009;16:468–80.
[15] Eatock J, Baker GA. Managing patient adherence and quality of life in epilepsy. Neuropsychiatr Dis Treat 2007;3:117–31.
[16] Loiseau P, Marchal C. Determinants of compliance in epileptic patients. Epilepsy Res Suppl 1988;1:135–40.
[17] Dunbar-Jacob J, Mortimer-Stephens MK. Treatment adherence in chronic disease. J Clin Epidemiol 2001;54(Suppl 1):S57–60.
[18] Cramer J, Vachon L, Desforges C, Sussman NM. Dose frequency and dose interval compliance with multiple antiepileptic medications during a controlled clinical trial. Epilepsia 1995;36:1111–7.
[19] Straka RJ, Fish JT, Benson SR, Suh JT. Patient self-reporting of compliance does not correspond with electronic monitoring: an evaluation using isosorbide dinitrate as a model drug. Pharmacotherapy 1997;17:126–32.
[20] George CF, Peveler RC, Heiliger S, Thompson C. Compliance with tricyclic antidepressants: the value of four different methods of assessment. Br J Clin Pharmacol 2000;50:166–71.

[21] Morisky DE, Green LW, Levine DM. Concurrent and predictive validity of a self-reported measure of medication adherence. Med Care 1986;24:67–74.
[22] Llewellyn-Thomas HA. Investigating patients' preferences for different treatment options. Can J Nurs Res 1997;29:45–64.
[23] Schommer JC, Kucukarslan SN. Measuring patient satisfaction with pharmaceutical services. Am J Health Syst Pharm 1997;54:2721–32; quiz 2741–3.
[24] Dunbar-Jacob J, Erlen JA, Schlenk EA, Ryan CM, Sereika SM, Doswell WM. Adherence in chronic disease. Annu Rev Nurs Res 2000;18:48–90.
[25] Gomes Mda M, Maia Filho Hde S, Noe RA. Anti-epileptic drug intake adherence: the value of the blood drug level measurement and the clinical approach. Arq Neuropsiquiatr 1998;56:708–13.
[26] Schmidt D, Reininghaus R, Winkel R. Relevance of poor compliance for seizure control. Epilepsy Res Suppl 1988;1:141–6.
[27] Peterson GM, McLean S, Millingen KS. Determinants of patient compliance with anticonvulsant therapy. Epilepsia 1982;23:607–13.
[28] Long L, Reeves AL, Moore JL, Roach J, Pickering CT. An assessment of epilepsy patients' knowledge of their disorder. Epilepsia 2000;41:727–31.
[29] Ismail H, Wright J, Rhodes P, Small N. Religious beliefs about causes and treatment of epilepsy. Br J Gen Pract 2005;55:26–31.
[30] Morisky DE, Ang A, Krousel-Wood M, Ward HJ. Predictive validity of a medication adherence measure in an outpatient setting. J Clin Hypertens (Greenwich) 2008;10: 348–54.
[31] Bharmal M, Payne K, Atkinson MJ, Desrosiers MP, Morisky DE, Gemmen E. Validation of an abbreviated Treatment Satisfaction Questionnaire for Medication (TSQM-9) among patients on antihypertensive medications. Health Qual Life Outcomes 2009;7:36.
[32] Atkinson MJ, Kumar R, Cappelleri JC, Hass SL. Hierarchical construct validity of the Treatment Satisfaction Questionnaire for Medication (TSQM version II) among outpatient pharmacy consumers. Value Health 2005;8(Suppl 1):S9–S24.
[33] Atkinson MJ, Sinha A, Hass SL, et al. Validation of a general measure of treatment satisfaction, the Treatment Satisfaction Questionnaire for Medication (TSQM), using a national panel study of chronic disease. Health Qual Life Outcomes 2004;2:12.
[34] McAuley JW, McFadden LS, Elliott JO, Shneker BF. An evaluation of self-management behaviors and medication adherence in patients with epilepsy. Epilepsy Behav 2008;13:637–41.
[35] Jones RM, Butler JA, Thomas VA, Peveler RC, Prevett M. Adherence to treatment in patients with epilepsy: associations with seizure control and illness beliefs. Seizure 2006;15:504–8.
[36] Lusic I, Titlic M, Eterovic D. Epileptic patient compliance with prescribed medical treatment. Acta Med Croat 2005;59:13–8.
[37] Asawavichienjinda T, Sitthi-Amorn C, Tanyanont W. Compliance with treatment of adult epileptics in a rural district of Thailand. J Med Assoc Thai 2003;86: 46–51.
[38] Yeager KA, Diiorio C, Shafer PO, et al. The complexity of treatments for persons with epilepsy. Epilepsy Behav 2005;7:679–86.
[39] Baker GA, Jacoby A, Buck D, Stalgis C, Monnet D. Quality of life of people with epilepsy: a European study. Epilepsia 1997;38:353–62.
[40] Stanaway L, Lambie DG, Johnson RH. Non-compliance with anticonvulsant therapy as a cause of seizures. NZ Med J 1985;98:150–2.
[41] Shope JT. Compliance in children and adults: review of studies. Epilepsy Res Suppl 1988;1:23–47.
[42] Hayden M, Penna C, Buchanan N. Epilepsy: patient perceptions of their condition. Seizure 1992;1:191–7.
[43] Ross J, Stefan H, Schauble B, Day R, Sander JW. European survey of the level of satisfaction of patients and physicians in the management of epilepsy in general practice. Epilepsy Behav 2010;19:36–42.
[44] Viteri C, Codina M, Cobaleda S, Lahuerta J, Barriga J, Morales MD. Quality of life and treatment satisfaction in Spanish epilepsy patients on monotherapy with lamotrigine or valproic acid. Seizure 2010;19:432–8.
[45] Bautista RE, Glen ET, Shetty NK. Factors associated with satisfaction with care among patients with epilepsy. Epilepsy Behav 2007;11:518–24.
[46] Modi AC, Guilfoyle SM, Morita DA, Glauser TA. Development and reliability of a correction factor for parent-reported adherence to pediatric antiepileptic drug therapy. Epilepsia 2011;52:370–6.