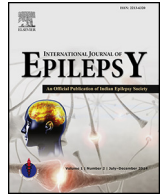




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Research paper

Measurement and associative factors of adherence to epilepsy drug treatment among the elderly population in Tehran (Iran)

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ABSTRACT

Purpose: The objective of this survey was to measure adherence and to identify correlation and prediction factors related to noncompliance among the elderly in Tehran, Iran.

Methods: A population-based survey was carried out among the elderly (≥ 60 years of age) by using Tehran Epilepsy registry. All subjects were contacted by telephone and invited for face-to-face consultation. Questionnaires used were the following: Medication Adherence Rating Scale (MARS); Medical Prescription Knowledge (MPK); Abbreviated Mental Test (AMT). Along with customary descriptive statistics, a simple chi-square test (or Fischer exact test if value of cells was ≤ 5) was used for correlating; Cramer's V was used for strength of association, and prediction was by logistic regression. **Results:** Out of 104 subjects' approached, 23 subjects (median age 62.0, 95% CI 61.0–64.7, range 60–71; 73.9% males; 78.3% married and having a living partner; 54.5% epilepsy as supernatural; 21.7% with comorbid condition) participated. Most did not have a recent epilepsy onset ($n = 20$, 86.8%), or had active epilepsy ($n = 22$, 95.7%), convulsive seizures ($n = 21$, 91.3%), with no ($n = 13$, 56.5%) to low seizure number, and polytherapy ($n = 12$, 52.2%). Median MARS score was 8.0 (95% CI 6.0–8.0, range 3–10). Nonadherence was **correlated** to comorbidity ($p = 0.003$) and widowhood or divorcehood ($p = 0.04$) and **predicted** by the same factors. Treatment side effects altered behavior ($p = 0.03$), and unsteadiness ($p = 0.01$) was also associated with nonadherence. MPK was positive for all participants. Median AMT score was 9.0 (95% CI 9.0–10.0, range 6–10).

Conclusion: Elderly patients had a high treatment adherence and, as logically expected, were associated with comorbid state, divorce-widowhood, and drug-related behavioral side effects particularly behavioral and unsteadiness.

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1. Introduction

Epilepsy is a major neurological disorder with varying significance, opportunities, and challenges across different regions and countries.^{1,2} Besides treatment coverage issues,² adherence to anti-seizure³ medication treatment is a major issue of importance

among those with epilepsy, particularly among the elderly.⁴ This ability and/or willingness to remain treatment compliant may not be always due to practical factors such as cost, distance, etc.,^{2,5–7} but can also be culture-driven⁸; hence, it is a topic that merits assessment across different cultural set-ups.

There are a number of countries across geographical regions that continue to remain scientifically silent, less participatory, and internationally less vocal on epilepsy, be it in Asia,¹ Middle East, and North Africa (MENA)⁹ or in Central America (currently unpublished, D Bhalla 2016). Among these, MENA also uniquely

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stands apart in its culture, religious and dietary aspects, etc. This is the region where elders are *by default* highly regarded and owe a special authoritative position in their family and communities. They are rarely preferred to be displaced to old age homes or other long-term care institutions.^{10,11} In our example, MENA country i.e. Iran, similar cultural scenarios are noted where society is family-oriented and providing care to the elderly is considered a 'duty'.¹¹ Despite international anxieties,¹² Iran is an economically and culturally rich country and has a number of outstanding health and population-related aspects, be it near complete literacy of the population or liberal provision of 90.0% medical cost reimbursement to the country's population, among others. The population of Iran is predominantly young while the elderly constitute only about 5.0% of the population, which is growing¹³ but not as dramatic or *sensationally* as often reported in the dementia literature (currently unpublished, D Bhalla 2016). Thus, with these different visions in mind, we conducted a population-based survey among the elderly (≥ 60 years) epilepsy population of Tehran in order to measure treatment adherence and identify possible correlated and predictive factors related to nonadherence.

2. Methods

2.1. Source

In order to obtain participants, we relied on the population-based Tehran epilepsy registry (TER). This TER has now been established (current unpublished, D Bhalla 2016) to have more than 4800 epilepsy subjects of all ages, genders, and epilepsy types. The work to make this TER electronic in nature is also ongoing and so is the work to improve questionnaires for data collection. The registration for a patient with epilepsy (any age, epilepsy type) in this database is voluntary although encouraged through a number of public awareness and patient education campaigns (current unpublished, D Bhalla 2016).

2.2. Recruitment

From this population pool, all subjects 60 years and above, irrespective of gender and type of epilepsy, were identified as our possible participants. All such subjects were then invited by telephone for face-to-face consultation and collection of necessary data. In case of a nonresponse at the first invitation, a second attempt was made to encourage participation. Along with those who did not provide their consent to participate, those with any known physical and/or mental condition that could interfere with their ability to participate, and to understand and answer questions independently were simply excluded. As described below, Abbreviated Mental Test (AMT) was performed before other questionnaires.

2.3. Questionnaires

Data collection questionnaires included relevant socio-demographic, clinical and medication (chronic use) history, epilepsy, and seizure-related items. Apart from this, the following three questionnaires were used that have been previously used in Iran's population^{14,15}: (a) Medication Adherence Rating Scale (MARS) for treatment adherence; (b) 3-question Medical Prescription Knowledge (MPK) questionnaire that tells us about the understanding of prescription by patients; (c) AMT, which provides rapid assessment among the elderly toward possibility of impaired cognition. AMT score of more than 6 was considered normal, 4–6 as moderate impairment, and 0–3 as severe impairment. MARS score of ≥ 6 was considered as being compliant to ASM.³

Tehran is the capital of Iran and has a population of 9 million within its metropolitan areas. The population is Persian-speaking and there are also large proportions of those with other ethnic origins such as Azerbaijanis, Armenians, Lurs, and Kurds. Tehran is divided into 22 municipalities with two important arrangements, universal health insurance and family physician program through primary health centers.^{16,17}

In addition to customary descriptive statistics, a simple chi-square test (or Fischer exact test if value of cells ≤ 5) was used for correlating univariate categorical dependent (compliant/noncompliant) and independent variables, although it does intend to model dependent and independent variables. The strength of association (i.e. effective size of chi-square) after chi-square was determined by using Cramer's V test, which is better than Phi test because of nondependence on table size. Cramer's V test on its own is also appropriate for determining correlation between discrete variables. Prediction of a categorical binary outcome (dependent variable; compliant/noncompliant) *vis-à-vis* independent variables (i.e. **presence** of supernatural origin of epilepsy, polytherapy, active epilepsy, family history, comorbid state, female gender, convulsive epilepsy, night-time seizures, singlehood, lower-than-cutoff AMT score, and **absence** of acceptance of disease) was determined by logistic regression. In case where independent categorical variables had more than two levels (education, 30-day severity of seizures, and marital status), dummy coding was performed. Data were analyzed using STATA. A 95% confidence interval (CI) was adopted and a *p* value of <0.05 was considered statistically significant. All potential participants were requested to provide informed verbal consent prior to their participation. They were explained about the purpose of this survey prior to its start and the kind of data that would be collected. They had freedom to not choose or continue to participate. Ethical permission was obtained from the institutional review board of the University of social welfare and rehabilitation sciences. The authors are also aware that neither correlation nor other methods such as regression demonstrate 'causation' of any kind; hence, the effort is to identify associative factors.

3. Results

3.1. Number of participants and nonparticipation

Overall, our population pool constituted 104 subjects', who were ≥ 60 years of age. Each of them was invited to participate in the survey. The reasons of nonparticipation were as follows: being in debilitated state ($n = 41$, 78.0%), distance and residence in another city ($n = 4$, 3.8%), pollution ($n = 7$, 6.7%), no one to accompany ($n = 2$, 1.9%), phone switched off, wrong phone number, or unreachable ($n = 27$, 34.6%).

3.2. Socio-demographics

Overall, 23 subjects participated with mean and median ages of 63.3 (SD 3.3, range 60–71) and 62.0 (95% CI 61.0–64.7, range 60–71) years, respectively. Majority of participants were males ($n = 17$, 73.9%) and their mean (63.4 versus 63.3) and median (62.0 versus 63.0) ages did not differ descriptively and statistically ($p = 0.4$). Overall, 18 participants were married and had a living partner ($n = 18$, 78.3%) and the rest were widowed ($n = 4$, 17.4%) and divorced ($n = 1$, 4.3%). Only six participants had consanguineous marriage ($n = 6$, 26.1%). Only seven participants (30.4%) had family history of epilepsy. The majority had reported acceptance of epilepsy ($n = 20$, 90.9%) while 12 participants (54.5%) had reported epilepsy as supernatural, that is according to God's will. Only few had known comorbid condition ($n = 5$, 21.7%). Only one subject was an illiterate ($n = 1$, 4.3%) and only three participants ($n = 3$,

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