

# Marriage in Epilepsy: The Impact of the Question in Knowledge Attitude and Practices Surveys

Gagandeep Singh\*<sup>#</sup>

Caroline Selai<sup>^</sup>

Saiful Islam<sup>^</sup>

Pratibha Chaudhary\*

Josemir W Sander<sup>#i □\*</sup>

From

\*Department of Neurology, Dayanand Medical College, Ludhiana, India,

<sup>#</sup>Department of Clinical & Experimental Epilepsy,

<sup>^</sup>Education Unit, NIHR University College London Hospitals Biomedical Research Centre, UCL Institute of Neurology, Queen Square, London WC1N 3BG,

<sup>i □</sup>Chalfont Centre for Epilepsy, Chalfont St Peter, Bucks., SL9 0RJ, UK and

\*Stichting Epilepsie Instellingen Nederland (SEIN), Achterweg 5, Heemstede 2103SW, Netherlands.

Correspondence to: Prof. Ley Sander, Box 29, 33 Queen Square, London WC1N 3BG, UK; phone: +44 20 34488612; fax: +44 20 34488615; E-mail: [l.sander@ucl.ac.uk](mailto:l.sander@ucl.ac.uk)

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## ABSTRACT

*Background:* Knowledge, attitudes and practice (KAP) questionnaire-based surveys have captured negative attitudes towards marriage involving people with epilepsy. The attitudes may vary according to the nature of the question posed, whether personal or generic, in addition to many other covariates. *Methods:* We carried out a meta-proportion and -regression analyses of epilepsy-related KAP surveys published between 1970 and 2016 in MEDLINE. *Results:* The pooled estimate of the proportion of those responding positively to the marriage question was 0.45 (95%CI, 0.35 to 0.54;  $I^2_{\text{res}}=99.89\%$ ). The pooled proportion of positive responders to a personal question (0.40; 95%CI, 0.35 to 0.46) was significantly lower than those responding positively to a generic question (0.64; 95%CI, 0.57 to 0.70) ( $p=0.001$ ). When modeled individually in regression analyses, only the continent of origin of the survey ( $P=0.001$ ;  $\tau^2$ , 0.06;  $I^2_{\text{res}}$  99.8%; adjusted  $R^2$  11.4%) and subject population type ( $P=0.02$ ;  $\tau^2$ , 0.07;  $I^2_{\text{res}}$  99.9%; adjusted  $R^2$  4.2%) were associated with the pooled estimate of positive responders to the question on marriage. *Conclusions:* Personal questions probing the possibility of marriage of self or family members to someone with epilepsy bring about negative attitudes more often than generic questions inquiring the marriage-worthiness of people with epilepsy.

**Key Words:** Epilepsy, marriage, negative attitudes, stigma, social impact

## Introduction

Epilepsy is often a lifelong condition with recurrent seizures [1]. The predicament of people with epilepsy, however, is not limited to seizures but includes psychosocial problems encountered in the course of education, employment and marriage [2–4]. Epilepsy poses major challenges at some of these seminal occasions in life. Marriage is a crucial personal landmark but there is scarce evidence of how it is impacted by epilepsy [3, 5]. There are only few studies examining stigma associated with epilepsy during marriage [2, 6]. A number of studies have, however, elicited beliefs relating to, and negative attitudes towards epilepsy in the form of all-inclusive, generic *knowledge, attitudes and practice* (KAP) surveys. These questionnaire-based surveys have covered a large number of social domains including marriage.

Epilepsy-related KAP surveys have captured the range of responses across different geographies, time periods and populations. Based on surveys performed over different periods of time, it has been suggested that attitudes towards epilepsy have slowly improved over a span of decades [7–13]. In addition to the time variable, others such as geographical location, socio-economic status, profession, age, gender, employment and marital status, education and familiarity with epilepsy may influence responses [12-21].

We hypothesized that responses to KAP questions probing attitudes towards marriage depend on the nature of the question posed. Questions examining attitudes in the personal context bring out negative attitudes more often than generic questions querying attitudes towards marriage-ability of an individual with epilepsy. We extracted questions pertaining to marriage from epilepsy KAP studies to critically review responses according to the nature of the question on marriage *vis-a-vis* other factors influencing attitudes towards marriage.

## **Material and Methods**

We carried out a meta-proportion with meta-regression analysis of epilepsy KAP studies.

### Eligibility criteria

To be eligible, surveys in any subject population had to have one or more questions assessing attitudes towards marriage of people with epilepsy. No geographic restrictions were placed but only reports in English were included. Data only reported in abstracts were excluded.

### Search strategy

A MEDLINE search via Pubmed using the terms, “knowledge”, “attitudes” and “practice” combined with medical subject headings for epilepsy was independently undertaken by two authors (PC and GS) between 01.09.2014 and 31.12.2014. Both reviewed all abstracts and independently assessed eligibility. Reference list of retrieved articles were hand-searched to identify additional studies. No grey literature (lay publications, leaflets, websites and conference abstracts) searches were performed.

### Data extraction and analysis

Questions and responses examining beliefs and attitudes specifically about marriage of, or to, an individual with epilepsy were extracted from the filtered KAP studies (Fig. 1) and allocated to one of the two groups, ‘generic’ and ‘personal’ (Table 1). Generic questions probed the belief whether an individual with epilepsy could get married and personal questions enquired from the subjects whether they or their close relatives or friends would marry someone with epilepsy. Responses to the extracted questions were recorded and classified into three sets: ‘yes’, ‘no’, and ‘not sure’. Negative (No) and ‘not sure’ responses were pooled to generate a binary response variable. Responses to negative questions (e.g., Do you believe that people with epilepsy should avoid getting married?) were inverted. Hence, the nature of the question asked, i.e., generic vs. personal constituted the explanatory variable and the study-level and pooled proportions of positive responders constituted the summary

measure. Covariates included decade of publication (1970-79, 1980-89, 1990-99, 2000-2009 and 2010-16), continent of origin (Asia, Africa, North America, South & Central America, Europe and Australia), 2016 World Bank country income status (<https://blogs.worldbank.org/opendata/new-country-classifications-2016>), subject population (people with epilepsy, caregivers, general public, health-care workers, school and college teachers and students) and setting (hospital-based *versus* others including population-based) of the study.

The statistical analysis was implemented using the *metaprop* command of Stata IC (ver. 12) (Stata Corp. LP, College Station, TX) [22]. To determine the pooled prevalence of affirmative responders, the variances of raw proportions ( $r/n$ ) were stabilized using a Freeman-Turkey type arcsine square root transformation [23].

$y = \arcsine[\sqrt{r/(n+1)}] + \arcsine[\sqrt{(r+1)/(n+1)}]$  with a variance of  $1/(n+1)$ ,

where  $n$ =denominator, i.e., subject population size.

The overall variation in the proportion of affirmative responders attributable to between-study heterogeneity was measured by the  $I^2$  statistic. We assumed high levels of heterogeneity due to variable subject populations spanning different geographic locations and time periods in addition to diverse economic settings and survey methods. The Der-Simonian Lard random effects method was used to pool the transformed proportions [24].

There was no missing data insofar as the explanatory variable or covariates studied. Forest plots of the pooled proportion for various subgroups divided according to the explanatory variable and study-level covariates were generated. These plots depicted the overall Der-Simonian Lard pooled estimate as well as Clopper Pearson confidence intervals of the proportion of affirmative responders by each study. Results were reported as pooled proportion of affirmative responders in each subgroup with 95% CIs and the difference in pooled proportions between various subgroups noted. Random effects

meta-regression analyses were used to examine the interaction between types of question posed (generic *versus* personal), study-level covariates and the proportion of affirmative responses [25]. First, each variable was fit in a separate model and the P values, correlation coefficients, random effects estimate of between study variance ( $\tau^2$ ), the proportion of residual variation attributable to heterogeneity ( $I^2_{\text{res}}$ ), and the proportion of variance in the response variable explained by the independent variables noted. Next, all variables were fit into a regression model and a joint test for the null hypothesis obtained from a multi parameter Wald test was implemented [26]. P and  $I^2_{\text{res}}$  values were computed, the latter indicating residual heterogeneity not attributable to the covariates studied. P values were exact and considered significant if  $<0.05$ .

## **Results**

### Search results

The initial search returned 502 articles and the reference search yielded another 34 (Fig. 1). Screening of their abstracts revealed 142 did not address epilepsy, 45 were not KAP surveys, seven alluded solely to sudden death in epilepsy, 11 were in languages other than English and one was a narrative review; these were excluded from analysis. Full text articles of the remainder were accessed and of these 227 were excluded because the surveys were devoid of a question on marriage (n=208), recorded only open-ended descriptive responses (n=10), used a quantitative scale for recording responses(n=7), involved an implausible question (n=1) or did not report the number of positive or negative responses(n=1) on the question of marriage. Hence, 103 studies remained eligible for the analysis. Eleven reports described responses for more than one subject population. Samples from different source populations in a given report were analyzed as separate units. Thus, the final listing included 114 analyzable sampling units with 99,394 subject responses.

### Study level variables

Generic questions featured in 41 (36%) studies [15, 27-60] and personal questions in 73 (64%) [14, 18, 20, 21, 27, 29, 39, 46, 54, 57, 61-107]. Samples in 82 reports (79.6%) were population-based and 22 (20.4%) were hospital-based. The distribution of studies according to decade of publication, continent and economic status of country of origin and the composition of the source population from which the samples were drawn are rendered in Table 2.

### Proportion of positive responses

The random, overall pooled estimate of positive responders was 0.45 (95%CI, 0.35 to 0.54) with considerable heterogeneity in the estimate ( $I^2_{res}=99.89\%$ ). The pooled estimate for the proportion that responded positively to a generic question was 0.64 (95%CI, 0.57 to 0.70), significantly higher in comparison of those who responded positively to a personal question, i.e., 0.40 (95% CI, 0.35 to 0.46) ( $p=0.001$ ) (Fig. 2). Analysis of the pooled estimate of positive responders according to the continent, showed that the 95% confidence intervals of the pooled estimates of proportions in surveys from Africa (0.45, 95%CI, 0.35 to 0.54) [27, 28, 43, 48, 52, 57, 60, 61, 64-68, 94, 97, 99, 100, 103, 105, 110, 111, 114, 115, 121, 124, 125] and Asia (0.43, 95%CI, 0.35 to 0.50) [18-21, 29, 30, 33-37, 44, 50, 53, 56, 59, 63, 71, 72, 74-76, 78-80, 82, 85-87, 90, 93, 95, 104, 108, 109, 112, 113, 116, 122, 126, 127] were lower from estimates from North America (0.76, 95%CI, 0.62 to 0.91) [31, 32, 73, 81, 96, 102], Europe (0.70, 95%CI, 0.58 to 0.81) [41, 42, 45, 51, 54, 83, 84, 89, 128-131] and Australia (0.93, 95%CI, 0.91 to 0.96) [14, 55] (Fig. 3) despite considerable between-study heterogeneity within each continent ( $I^2$ , Africa – 99.6%; Asia – 99.8%; Europe – 99.8%; North America – 99.7%; South America – 99.7%; Australia – 99.9% and overall – 99.0%). The test for heterogeneity between continents was significant ( $p=0.001$ ). Analysis of the proportion of positive responses undertaken according to other covariates revealed no significant difference between subgroups based on the income status of the country in which the survey took place, the survey setting (hospital-based [32, 33, 36, 38, 43, 48, 50, 54-56, 63, 76, 83, 85, 107, 111, 112, 114, 119] versus others [7, 18-21, 27-31,

34, 37, 39, 41, 42, 44-46, 51-53, 57, 58, 60-62, 64, 66, 67, 70-75, 77-82, 87-94, 97-100, 102-105, 108-110, 113, 115, 116, 118-123, 125, 127, 128] ) and the period (decade) of study (Table 3).

### Regression analysis

When each of the covariates studied above were fitted in separate models, hence not adjusted for others, the continent of origin of the study ( $P=0.001$ ;  $\tau^2$ , 0.06;  $I^2_{\text{res}}$  99.8%; adjusted  $R^2$  11.9%), subject population ( $P=0.02$ ;  $\tau^2$ , 0.07;  $I^2_{\text{res}}$  99.9%; adjusted  $R^2$  4.2%) and question type ( $P=0.001$ ;  $\tau^2$ , 0.06;  $I^2_{\text{res}}$  99.8%; adjusted  $R^2$  13.3%) were found to be associated with the pooled estimate of the proportion of positive responders (Appendix 1). Other covariates, including income status of the country of origin ( $P=0.13$ ;  $\tau^2$ , 0.07;  $I^2_{\text{res}}$  99.8%; adjusted  $R^2$  1.2%), survey setting ( $P=0.11$ ;  $\tau^2$ , 0.07;  $I^2_{\text{res}}$  99.9%; adjusted  $R^2$  1.4%) and decade of publication ( $P=0.34$ ;  $\tau^2$ , 0.07;  $I^2_{\text{res}}$  99.9%; adjusted  $R^2$  -0.07%) were not associated with responder status. When all covariates were fit in to a regression model, the joint test of null hypothesis indicated an association between one or more of the covariates and the pooled proportion of positive responders ( $P=0.00001$ ) (Table 3). A fair amount of between-study variance in the proportion of positive responders could be explained by the covariates even though the measure of the residual variation attributable to between study heterogeneity was high ( $I^2_{\text{res}}$ , 99.6%;  $\tau^2$ , 0.05; adjusted  $R^2$  24.99%).

### **Discussion**

People with epilepsy frequently experience problems in the marital arena including reduced marital prospects, poor marital outcomes with increased rates of divorce and low levels of marital satisfaction [3, 5]. Some of these problems might be on account of epilepsy itself (*c.f.*, higher rates of infertility in PWE), but most result from negative attitudes towards epilepsy which engender felt and enacted stigma in the context of marriage [132, 133]. This has been captured in a large number of epilepsy-related KAP surveys. The scale of negative attitudes towards marriage in these studies varies widely partly due to methodological differences. Responses to questions posed also depend on a large

number of factors including age, gender, social class, education, marital and employment status and residence [7, 12, 14, 15, 18, 20, 21]. These variables have been assessed in many *post hoc* analyses of survey datasets. Only few have, however, methodically studied these variables using multivariate approaches [77, 78].

Our finding bears out the association between the nature of the question posed and the proportion of positive responders to questions on marriage (Fig. 2; Table 3). A significantly lesser proportion of positive responders to personal questions in comparison to generic questions on marriage imply that responses to the latter might not reflect true attitudes, behaviors or practices in context of one's own self or family. In support of this, several of the included studies have documented that when the social contexts probed by the questions switch from the generic to personal domain, the proportion of positive responders declines. For instance, questions regarding the acceptance of marriage of an offspring to someone with epilepsy provoke negative reactions more frequently than those inquiring allowing the offspring to play with someone having epilepsy (15, 18, 34). The degree of prejudice is often determined by the extent to which the situation impacts the respondent's personal sphere. Hence, questions of a personal nature might be more predictive of actual behaviors and practices in real life situations.

Most KAP surveys in westernized countries have probed employability and association with someone with epilepsy but only few have probed attitudes towards marriage [7, 129-131]. The few that have probed the marital standpoint suggest that people do not seem to have a great amount of reservation about themselves or their close family members marrying someone who has epilepsy [14, 77]. Hence, it appears that epilepsy does not pose a major barrier in marriage in westernized cultures.

Substantial improvements in attitudes towards epilepsy over time have been documented in KAP surveys of the general population. A series of nation-wide surveys performed at five-yearly intervals

between 1949 and 1979 in the United States demonstrated serial and substantial improvement in attitudes of the general public towards epilepsy [7-11]. The last published survey in 1979 documented that people were highly supportive of employability of people with epilepsy and in allowing their children to interact with someone with epilepsy. The scope of the survey did not include marriage [11]. Improvements in attitudes towards and knowledge about epilepsy over time have likewise been documented in population-based surveys in East Europe [12, 13]. The attitudinal upswing in westernized cultures might be attributed largely to a massive perfusion of knowledge *via* modern media and informational campaigns mounted by support organizations. We did not see a similar trend in improvement in attitudes in our meta-analysis possibly as it included a large number of surveys from Asia and Africa conducted in preceding two decades [18-21, 27-29, 30, 33-37, 43, 44, 48, 50, 52, 53, 56, 57, 59-61, 63-68, 71, 72, 74-76, 78-80, 82, 85-87, 90-94, 95, 97, 99, 100, 103, 104, 105, 108-116, 121, 122, 124-127]. Negative attitudes towards epilepsy which are widely prevalent in low- and middle income countries even now might have balanced out the trend in improvement in attitudes in westernized cultures.

There are limitations to our approach. We did not include unpublished or “not in English” studies. Besides, a number of methodological covariates could have influenced the proportion of positive responders, e.g., the manner of collection of survey data, whether by face-to-face interviews, self-administered, written questionnaires, telephonic interviews or internet-based surveys [14]. These were not studied to simplify the analysis and for lack of available data in the KAP studies included in the meta-analysis. For instance, the use of telephonic interviews versus face-to-face interviews to acquire KAP data has been shown to influence results of the survey due to an operational social desirability bias [14, 77]. The social desirability bias pervades nearly all KAP studies to an extent as there is an overall tendency to provide responses consistent with social norms in public interactions [15]. An extreme variation of this may be a tendency to provide responses which will please the surveyor or health-care provider. Other forms of non-random response bias within and between the

included surveys might have impacted our results [135]. Given the large number and heterogeneity of the studies, it is likely that any influence on the validity of measure would have evened out. The considerable heterogeneity seen could represent true heterogeneity explained by study-level covariates, but could also be explained by obscured covariates, a small study size effect or publication, citation or language bias inherent to the design of this meta-analysis [134]. The low R-squared values in the univariate and overall models suggests that the variance in the response variable cannot be entirely explained by variance in the independent variables included in the meta-analysis and that there are additional variables that might be operational but have not been addressed by this analysis. We believe that these are subject-level covariates (e.g., gender, education, employment and comorbid disorders, e.g., psychiatric ailments), which could not be studied largely due to difficulties in extracting individual subject-level data from the included KAP studies.

The above limitations should be considered in the interpretation of our findings but they underscore the importance of carefully considering questions while designing KAP questionnaires. Personally-oriented questions seem to elicit stigma to a greater degree than generic questions and are more predictive determinants of individual behaviors and practices. Our results also confirm that westernized cultures are more tolerant of epilepsy in personal relationships even though other surveys have demonstrated inter-country variations between the westernized nations [136]. Evidence of this discrepancy between different cultures simply draws attention to the scale of informational campaigns as well as various interventions at community, interpersonal and individual levels required to mitigate the stigma associated with epilepsy in marriage in traditional cultures [5]. Undoubtedly, different sectors, e.g., legislative, policy-making, judicial, non-governmental and health departments need to be engaged in contending with the stigma of epilepsy.

## References

1. Sander J. The epidemiology of epilepsy revisited. *Curr Opin Neurol* 2003; 16:165–70.
2. Jalava M, Sillanpaa M, Camfield C, Camfield P. Social adjustment and competence 35 years after onset of childhood epilepsy: A prospective controlled study. *Epilepsia* 1997; 38: 708–15.
3. Kinariwalla N, Sen A. The psychosocial impact of epilepsy on marriage: A narrative review. *Epilepsy Behav* 2016; 63: 34–41.
4. Kokkonen J, Kokkonen ER, Saukkonen AL, Pennanen P. Psychosocial outcome of young adults with epilepsy in childhood. *J Neurol Neurosurg Psychiatry* 1997; 62: 265–8.
5. Singh G, Pauranik A, Menon B, Paul BS, Selai C, Chowdhury D, *et al.* The dilemma of arranged marriages in people with epilepsy. An expert group appraisal. *Epilepsy Behav* 2016; 61: 242–7.
6. Shackleton DP, Kasteleijn-Nolst Trenité DG, de Craen JM, Vandenbroucke JP, Westendorp RGJ. Living with epilepsy: Long-term prognosis and psychosocial outcomes. *Neurology* 2003; 61: 64–70.
7. Caveness WF, Gallup GH. A survey of public attitudes toward epilepsy in 1979 with an indication of trends over the past thirty years. *Epilepsia* 1980; 21: 509–18.
8. Caveness W. A survey of public attitudes towards epilepsy. *Epilepsia* 1949; 4: 19-26.
9. Caveness W. A survey of public attitudes towards epilepsy. *Epilepsia* 1954; 3: 99-102.
10. Caveness W, Merritt HH, Gallup GH, Ruby EH. A survey of public attitudes towards epilepsy in 1964. *Epilepsia* 1965; 6:75-86.
11. Caveness W, Merritt HH, Gallup GH. A survey of public attitudes towards epilepsy in 1974 with an indication of trends over the past twenty-five years. *Epilepsia* 1974; 15:523-36.
12. Mirnics Z, Czikora G, Zvecz T, Halsz P. Changes in public attitudes toward epilepsy in Hungary: Results of surveys conducted in 1994 and 2000. *Epilepsia* 2001; 42:86–93.

13. Novotná I, Rektor I. The trend in public attitudes in the Czech Republic towards persons with epilepsy. *Eur J Neurol* 2002; 9:535–40.
14. Hills MD, MacKenzie HC. New Zealand community attitudes toward people with epilepsy. *Epilepsia* 2002; 43:1583–9.
15. Diamankopoulos N, Joseph K, Meropi T, Charilaos K. A survey of public awareness, understanding, and attitudes toward epilepsy in Greece. *Epilepsia* 2006; 47:2154–64.
16. Baker GA. People with epilepsy: What do they know and understand, and how does this contribute to their perceived level of stigma? *Epilepsy Behav* 2002; 3:26–32.
17. Jacoby A, Gorry J, Gamble C, Baker GA. Public knowledge, private grief: A study of public attitudes to epilepsy in the United Kingdom and implications for stigma. *Epilepsia* 2004; 45:1405–15.
18. Kim MK, Kim IK, Kim BC, Cho KH, Kim SJ, Moon JD. Positive trends of public attitudes toward epilepsy after public education campaign among rural Korean residents. *J Korean Med Sci* 2003; 18:248–54.
19. Wong V, Chung B, Wong R. Pilot survey of public awareness, attitudes and understanding towards epilepsy in Hong Kong. *Neurol Asia* 2004:21–7.
20. Choi-Kwon S, Park KA, Lee HJ, Park MS, Lee CH, Cheon SE, *et al.* Familiarity with, knowledge of, and attitudes toward epilepsy in residents of Seoul, South Korea. *Acta Neurol Scand* 2004; 110:39–45.
21. Cuong LQ, Thien DD, Jallon P. Survey of public awareness, attitudes, and understanding toward epilepsy in Nhan Chinh, Hanoi, Vietnam, in 2003. *Epilepsy Behav* 2006; 8:176–80.
22. Nyaga VN, Arbyn M, Aerts M. *Metaprop*: A stata command to perform meta-analysis of binomial data. *Arch Public Health* 2014; 72:1–10.

23. Muller JJ. The inverse of the Freeman-Tukey double arcsine transformation. *Am Stat* 1978; 32:138.
24. DerSimonian R, Laird N. Meta-analysis in clinical trials. *Control Clin Trials* 1986; 7:177–88.
25. Berkey CS, Hoaglin DC, Mosteller F, Colditz GA. A random effects regression model for Meta analysis. *Stat Med* 1995; 14:395–411.
26. Knapp G, Hartung J. Improved tests for a random effects meta-regression with a single covariate. *Stat Med* 2003; 22:2693–710.
27. Ezeala-Adikaibe BA, Achor JU, Onwukwe J, Ekenze OS, Onwuekwe IO, Chukwu O, *et al.* Knowledge, attitude and practice towards epilepsy among secondary school students in Enugu, South East Nigeria. *Seizure* 2013; 22:299–302.
28. Ezeala-Adikaibe BA, Achor JU, Nwabueze AC, Agomoh AO, Chikani M, Ekenze OS, *et al.* Knowledge, attitude and practice of epilepsy among community residents in Enugu, South East Nigeria. *Seizure* 2014; 23:882–8.
29. Lee H, Lee SK, Chung CK, Yun SN, Choi-Kwon S. Familiarity with, knowledge of, and attitudes toward epilepsy among teachers in Korean elementary schools. *Epilepsy Behav* 2010; 17:183–7.
30. Tiamkao S, Sawanyawisuth K, Singhpoo K, Ariyanuchitkul S, Ngamroop R. Differences of knowledge, attitudes, and behaviors towards epilepsy between populations in municipal and non municipal areas. *Psychol Res Behav Manag* 2013; 6:111–6.
31. Noronha ALA, Fernandes PT, Andrade M, Santiago SM, Sander JW, Li LM. Training medical students to improve the management of people with epilepsy. *Arq Neuropsiquiatr* 2007; 65 (1):23–7.

32. Fernandes PT, Noronha ALA, Sander JW, Bell GS, Li LM. Training the trainers and disseminating information: a strategy to educate health professionals on epilepsy. *Arq Neuropsiquiatr* 2007; 65 (1):14–22.
33. Gourie-Devi M, Singh V, Bala K. Knowledge, attitude and practices among patients of epilepsy attending tertiary hospital in Delhi, India and a review of Indian studies. *Neurol Asia* 2010; 15:225–32.
34. Bhalla D, Chea K, Hun C, Vannareth M, Huc P, Chan S, *et al.* Population-based study of epilepsy in Cambodia associated factors, measures of impact, stigma, quality of life, knowledge-attitude-practice, and treatment gap. *PLoS One* 2012; 7:1–9.
35. Pandian JD, Santosh D, Kumar TS, Sarma PS, Radhakrishnan K. High school students' knowledge, attitude, and practice with respect to epilepsy in Kerala, Southern India. *Epilepsy Behav* 2006; 9:492–7.
36. Radhakrishnan K, Pandian JD, Santhoshkumar T, Thomas S V, Deetha TD, Sarma PS, *et al.* Prevalence, knowledge, attitude, and practice of epilepsy in Kerala, South India. *Epilepsia* 2000; 41:1027–35.
37. Hasan SS, Alen YKS, Wayne WGW, Ahmadi K, Anwar M, Goh GK. Understanding of and attitudes toward epilepsy among the urban Chinese population in Malaysia. *Singapore Med J* 2010; 51:290–9.
38. Seneviratne U, Rajapakse P, Pathirana R, Seetha T. Knowledge, attitudes, and practices of epilepsy in rural Sri Lanka. *Seizure* 2002; 11:40–3.
39. Fong CYG, Hung A. Public awareness, attitude, and understanding of epilepsy in Hong Kong Special Administrative Region, China. *Epilepsia* 2002; 43:311–6.

40. Mecarelli O, Messina P, Capovilla G, Michelucci R, Romeo A, Beghi E, *et al.* An educational campaign toward epilepsy among Italian primary school teachers: 1. Survey on knowledge and attitudes. *Epilepsy Behav* 2014; 32:84–91.
41. Mecarelli O, Capovilla G, Romeo A, Rubboli G, Tinuper P, Beghi E. Knowledge and attitudes toward epilepsy among primary and secondary schoolteachers in Italy. *Epilepsy Behav* 2011; 22:285–92.
42. Mugumbate J, Mushonga J. Myths. Perceptions and incorrect knowledge surrounding epilepsy in rural Zimbabwe: A study of the villagers in Buhera District. *Epilepsy Behav* 2013; 27:144–7.
43. Goel D, Dhanai JS, Agarwal A, Mehlotra V, Saxena V. Knowledge, attitude and practice of epilepsy in Uttarakhand, India. *Ann Indian Acad Neurol* 2011; 14:116–9.
44. Mecarelli O, Capovilla G, Romeo A, Rubboli G, Tinuper P, Beghi E. Past and present public knowledge and attitudes toward epilepsy in Italy. *Epilepsy Behav* 2010; 18:110–5.
45. Tran DS, Odermatt P, Singphouangphet S, Druet-Cabanac M, Preux PM, Strobel M, *et al.* Epilepsy in Laos: Knowledge, attitudes, and practices in the community. *Epilepsy Behav* 2007; 10:565–70.
46. Sirven JJ, Lopez RA, Vazquez B, Van Haverbeke P. Quéés la Epilepsia? Attitudes and knowledge of epilepsy by Spanish-speaking adults in the United States. *Epilepsy Behav* 2005; 7:259–65.
47. Ahmed NI, Aly SA, Shaaban EM. The nurses' knowledge and attitudes about epilepsy. *J Egypt Public Health Assoc* 1994; 69:277–92.
48. Sidig A, Mbbs GI, Hussein A, Rahman A. A study of knowledge, attitudes, practices towards epilepsy among relative of epileptic patients in Khartoum State. *Sudanese Journal of Public Health* 2009; 4:393-398.

49. Tiamkao S, Tiamkao S, Auevitchayapat N, Arunpongpaisal S, Chaiyakum A, Jitpimolmard S, *et al.* Basic knowledge of epilepsy among medical students. *J Med Assoc Thai* 2007; 90:2271–6.
50. Rafael F, Dubreuil CM, Burbaud F, Tran DS, Clement JP, Preux PM, *et al.* Knowledge of epilepsy in the general population based on two French cities: Implications for stigma. *Epilepsy Behav* 2010; 17:82–6.
51. Peltzer K. Perceptions of epilepsy among black students at a university in South Africa. *Curationis* 2001; 24:62–7.
52. Singh A, Arora AK. Knowledge, attitude and practices of relatives of epileptics towards epilepsy. *Neurosurgery and Midwifery Research Journal* 2005; 1: 77-81.
53. Davies D, Scambler G. Attitudes towards epilepsy in general practice. *Int J Soc Psychiatry* 1988; 34:5–12.
54. Beran RG, Read T. A survey of doctors in Sydney, Australia: Perspectives and practices regarding epilepsy and those affected by it. *Epilepsia* 1983; 24:79–104.
55. Al-Adawi S, Al-Ismaily S, Martin R, Al-Naamani A, Al-Riyamy K, Al-Maskari M, *et al.* Psychosocial aspects of epilepsy in Oman: Attitude of health personnel. *Epilepsia* 2001; 42:1476–81.
56. Shehata GA, Mahran DG. Knowledge and attitude of epilepsy among secondary schools students (epileptic and non-epileptic) in Assiut city “Egypt.” *Epilepsy Res* 2011; 95:130–5.
57. Goel S, Singh N, Lal V, Singh A. Knowledge, attitude and practices of students about first aid epilepsy seizures management in a Northern Indian City. *Ann Indian Acad Neurol* 2013; 16:538–43.
58. Saengsuwan J, Boonyaleepan S, Srijakkot J, Sawanyawisuth K, Tiamkao S. Factors associated with knowledge and attitudes in persons with epilepsy. *Epilepsy Behav* 2012; 24:23–9.
59. Sanya EO, Salami TAT, Goodman OO, Buhari OIN, Araoye MO. Perception and attitude to

- epilepsy among teachers in primary, secondary and tertiary educational institutions in middle belt Nigeria. *Trop Doct* 2005; 35:153–6.
60. Shibre T, Alem A, Tekle-Haimanot R, Medhin G, Tessema A, Jacobsson L. Community attitudes towards epilepsy in a rural Ethiopian setting: A re-visit after 15 years. *Ethiop Med J* 2008; 46:251–9.
61. Alaqeel A, Sabbagh AJ. Epilepsy: What does Saudi’s living in Riyadh know? *Seizure* 2013; 22:205–9.
62. Alaqeel A, Alebdi F, Sabbagh AJ. Epilepsy: What do health-care professionals in Riyadh know? *Epilepsy Behav* 2013; 29:234–7.
63. Bain LE, Awah PK, Takougang I, Sigal Y, Ajime TT. Public awareness, knowledge and practice relating to epilepsy amongst adult residents in rural Cameroon-Case study of the Fundong health district. *Pan Afr Med J* 2013; 14:32.
64. Njamnshi AK, Bissek ACZK, Yepnjio FN, Tabah EN, Angwafor SA, Kuate CT, *et al.* A community survey of knowledge, perceptions, and practice with respect to epilepsy among traditional healers in the Batibo Health District, Cameroon. *Epilepsy Behav* 2010; 17:95–102.
65. Njamnshi AK, Tabah EN, Bissek A-CZ-K, Yepnjio FN, Angwafor SA, Dema F, *et al.* Knowledge, attitudes and practices with respect to epilepsy among student nurses and laboratory assistants in the South West Region of Cameroon. *Epilepsy Behav* 2010; 17:381–8.
66. Njamnshi AK, Yepnjio FN, Tabah EN, Dema F, Angwafor SA, Fonsah JY, *et al.* Public awareness, perceptions, and attitudes with respect to epilepsy in Ebolowa and Sangmelima—Urban Cameroon. *Epilepsy Behav* 2009; 14:628–33.
67. Njamnshi AK, Tabah EN, Yepnjio FN, Angwafor SA, Dema F, Fonsah JY, *et al.* General public awareness, perceptions, and attitudes with respect to epilepsy in the Akwaya Health District, South-West Region, Cameroon. *Epilepsy Behav* 2009; 15:179–85.
68. NjamnshiAK, Yepnjio FN, Bissek ACZK, Tabah EN, Ongolo-Zogo P, Dema F, *et al.* A

- survey of public knowledge, attitudes, and practices with respect to epilepsy in Badissa Village, Centre Region of Cameroon. *Epilepsy Behav* 2009; 16:254–9.
69. Njamnshi AK, Angwafor SA, Tabah EN, Jallon P, Muna WFT. General public knowledge, attitudes, and practices with respect to epilepsy in the Batibo Health District, Cameroon. *Epilepsy Behav* 2009; 14:83–8.
70. Tuan NA, Cuong LQ, Allebeck P, Chuc NTK, Tomson T. Knowledge attitudes and practice toward epilepsy among adults in BaVi, Vietnam: First report from the population-based EPIBAVI study. *Epilepsia* 2007; 48:1914–9.
71. Bener A, Al-Marzooqi FH, Sztrihá L. Public awareness and attitudes towards epilepsy in the United Arab Emirates. *Seizure* 1998;7:219–22
72. Santos IC, Guerreiro MM, Mata A, Guimarães R, Fernandes L, Filho MDC, *et al.* Public awareness and attitudes toward epilepsy in different social segments in Brazil. *Arq Neuropsiquiatr* 1998; 56:32–8.
73. Lai CW, Huang X, Lai YHC, Zhang Z, Liu G, Yang MZ. Survey of public awareness, understanding, and attitudes toward epilepsy in Henan Province, China. *Epilepsia* 1990; 31:182–7.
74. Demirci S, Dönmez CM, Gündoğar D, Baydar ÇL. Public awareness of, attitudes toward, and understanding of epilepsy in Isparta, Turkey. *Epilepsy Behav* 2007; 11:427–33.
75. Yoo JK, Jung KY, Park KW, Lee DH, Lee SK, Lee IK, *et al.* Familiarity with, understanding of, and attitudes toward epilepsy among people with epilepsy and healthy controls in South Korea. *Epilepsy Behav* 2009; 16:260–7.
76. Spatt J, Bauer G, Baumgartner C, Feucht M, Graf M, Mamoli B, *et al.* Predictors for negative attitudes toward subjects with epilepsy: A representative survey in the general public in Austria. *Epilepsia* 2005; 46:736–42.
77. Chung MY, Chang Y, Lai YHC, Lai CW. Survey of public awareness, understanding, and attitudes toward epilepsy in Taiwan. *Epilepsia* 1995; 36:488–93.

78. Awad A, Sarkhoo F. Public knowledge and attitudes toward epilepsy in Kuwait. *Epilepsia* 2008; 49:564–72.
79. Al-Rashed H, Al-Yahya D, Al-Kandari A, Shehab A, Al-Sabah R, Al-Taiar A. Knowledge of, perceptions of, and attitudes toward epilepsy among university students in Kuwait. *Epilepsy Behav* 2009; 14:367–71.
80. Falavigna A, Teles AR, Roth F, Velho MC, Roxo MRR, Dal Bosco AL, *et al.* Awareness, attitudes and perceptions on epilepsy in Southern Brazil. *Arq Neuropsiquiatr* 2007; 65:1186–91.
81. Daoud A, Al-Safi S, Otoom S, Wahba L, Alkofahi A. Public knowledge and attitudes towards epilepsy in Jordan. *Seizure* 2007; 16:521–6.
82. Dawkins JL, Crawford PM, Stammers TG. Epilepsy: A general practice study of knowledge and attitudes among sufferers and non-sufferers. *Br J Gen Pract* 1993; 43:453–7.
83. Toli T, Sourtzi P, Tsoumakas K, Kalokerinou-Anagnostopoulou A. Association between knowledge and attitudes of educators towards epilepsy and the risk of accidents in Greek schools. *Epilepsy Behav* 2013; 27:200–3.
84. Hassona YM, Mahmoud AA, Ryalat SM, Sawair FA. Dental students' knowledge and attitudes toward patients with epilepsy. *Epilepsy Behav* 2014; 36:2–5.
85. Doshi D, Reddy BS, Kulkarni S, Karunakar PNA. Dentists' knowledge, attitudes and practices toward patients with epilepsy in Hyderabad city, India. *Epilepsy Behav* 2012; 23:447–50.
86. Panda SB, Prabhu K, Rao S, Rao A, Rao G, Datta A, *et al.* Evaluation of knowledge of and attitudes toward epilepsy among the health science students of Manipal University. *Epilepsy Behav* 2011; 20:447–9.
87. Young GB, Derry P, Hutchinson I, John V, Matijevic S, Parrent L, *et al.* An epilepsy questionnaire study of knowledge and attitudes in Canadian college students. *Epilepsia* 2002; 43:652–8.

88. Bielen I, Zobić I, Sruk A, Ivaković A, Dogan D. Changes of attitudes toward epilepsy in college-preparatory high school student's population: An indicator of global campaign successfulness? *Seizure* 2012; 21:775–9.
89. Ghanean H, Nojomi M, Jacobsson L. Public awareness and attitudes towards epilepsy in Tehran, Iran. *Glob Health Action* 2013; 6:216-18.
90. Saengpatrachai M, Srinualta D, Lorlertratna N, Pradermduzzadeeporn E, Poonpol F. Public familiarity with, knowledge of, and predictors of negative attitudes toward epilepsy in Thailand. *Epilepsy Behav* 2010; 17:497–505.
91. Thacker AK, Verma AM, Ji R, Thacker P, Mishra P. Knowledge awareness and attitude about epilepsy among schoolteachers in India. *Seizure* 2008; 17:684–90.
92. Kankirawatana P. Epilepsy awareness among school teachers in Thailand. *Epilepsia* 1999; 40:497–501.
93. Tekle-Haimanot R, Abebe M, Forsgren L, Gebre-Mariam A, Heijbel J, Holmgren G, *et al.* Attitudes of rural people in central Ethiopia towards epilepsy. *SocSci Med* 1991; 32:203–9.
94. Zainy LE, Atteyah DM, Aldisi WM, Abdulkarim HA, Alhelo RF, Alhelali HA, *et al.* A survey of public attitudes toward epilepsy in 1979 with an indication of trends over the past thirty years. *Epilepsy Behav* 2013; 14:182–7.
95. Youssef FF, Dial S, Jaggernauth N, Jagdeo CL, Pascall A, Ramessar L, *et al.* Knowledge of, attitudes toward, and perceptions of epilepsy among college students in Trinidad and Tobago. *Epilepsy Behav* 2009; 15:160–5.
96. Birbeck GL, Chomba E, Atadzhanov M, Mbewe E, Haworth A. Zambian teachers: What do they know about epilepsy and how can we work with them to decrease stigma? *Epilepsy Behav* 2006; 9:275–80.
97. Atadzhanov M, Chomba E, Haworth A, Mbewe E, Birbeck GL. Knowledge, attitudes, behaviors, and practices regarding epilepsy among Zambian clerics. *Epilepsy Behav* 2006; 9:83–8.

98. Matuja WBP, Rwiza HT. Knowledge, attitude and practice (KAP) towards epilepsy in secondary school students in Tanzania. *Cent Afr J Med* 1994; 40:13–8.
99. Mielke J, Adamolekun B, Ball D, Mundanda T. Knowledge and attitudes of teachers towards epilepsy in Zimbabwe. *Acta Neurol Scand* 1997; 96:133–7.
100. Jacoby A, Baker GA, Steen N, Potts P, Chadwick DW. The clinical course of epilepsy and its psychosocial correlates: Findings from a U.K. community study. *Epilepsia* 1996; 37:148–61.
101. Caixeta J, Fernandes PT, Bell GS, Sander JW, Li LM. Epilepsy perception amongst university students: A survey. *Arq Neuropsiquiatr* 2007; 65 (1):43–8.
102. Ekenze OS, Ndukuba AC. Perception of epilepsy among public workers: Perspectives from a developing country. *Epilepsy Behav* 2013; 26:87–90.
103. Shafiq M, Tanwir M, Tariq A, Kasi PM, Zafar M, Saleem A, *et al.* Epilepsy: Public knowledge and attitude in a slum area of Karachi, Pakistan. *Seizure* 2007; 16:330–7.
104. Ndoye NF, Sow AD, Diop AG, Sessouma B, Sne-Diouf F, Boissy L, *et al.* Prevalence of epilepsy its treatment gap and knowledge, attitude and practice of its population in sub-urban Senegal an ILAE/IBE/WHO study. *Seizure* 2005; 14:106–11.
105. Aydemir N, Trung DV, Snape D, Baker GA, Jacoby A. Multiple impacts of epilepsy and contributing factors: Findings from an ethnographic study in Vietnam. *Epilepsy Behav* 2009; 16:512–20.
106. Aragon CE, Hess T, Burneo JG. Knowledge and attitudes about epilepsy: A survey of dentists in London, Ontario. *J Can Dent Assoc (Tor)* 2009; 75.
107. Gambhir SK, Kumar V, Singhi PD, Goel RC. Public awareness, understanding & attitudes toward epilepsy. *Indian J Med Res* 1995; 102:34–8.
108. Park SJ, Jeong XK, Kim MK, Cho KH, Choi JS KS. Public attitude toward epilepsy in some Taegu-Kyungbook residents. *J Korean Neurol Assoc* 1996; 14:389–407.
109. Nyame PK, Biritwum RB. Epilepsy: Knowledge, attitude and practice in literate urban

- population, Accra, Ghana. *West Afr J Med* 1997; 16:139–45.
110. Chomba EN, Haworth A, Atadzhanov M, Mbewe E, Birbeck GL. Zambian health care workers' knowledge, attitudes, beliefs, and practices regarding epilepsy. *Epilepsy Behav* 2007; 10:111–9.
111. Al-Adawi S, Al-Salmy H, Martin RG, Al-Naamani A, Prabhakar S, Deleu D, *et al.* Patient's perspective on epilepsy: Self-knowledge among Omanis. *Seizure* 2003; 12:11–8.
112. Bekiroğlu N, Özkan R, Gürses C, Arpacı B, Derwent A. A study on awareness and attitude of teachers on epilepsy in Istanbul. *Seizure* 2004; 13:517–22.
113. Njamnshi AK, Angwafor SA, Baumann F, Angwafo FF, Jallon P, Muna WFT. Knowledge, attitudes, and practice of Cameroonian medical students and graduating physicians with respect to epilepsy. *Epilepsia* 2009; 50:1296–9.
114. Sidig A, Ibrahim G, Hussein A, RahmanSAA, Babikir A, Yassien F, Hamad A, el-Adil O, Saad A, Mubark B, Eltoum HAA, Aldar MM, WidaaEsam YY AM. A study of Knowledge, Attitude, Practice towards Epilepsy among relative of epileptic patients in Khartoum State. *Sudan J Public Heal* 2009; 4:313–5.
115. Win N, Soe C. Public awareness, attitude and understanding toward epilepsy among Myanmar people. *Neurol J Southeast Asia* 2002; 7:81–8.
116. Degirmenci Y, Kabay SC, Yilmaz Z, Bakar C, Karaman HIO. Perception of epilepsy in Turkey in the light of two different cities. *Acta Clin Croat* 2013; 52:59–67.
117. Zainy LE, Atteyah DM, Aldisi WM, Abdulkarim HA, Alhelo RF, Alhelali HA, *et al.* Parents' knowledge and attitudes toward children with epilepsy. *Neurosciences (Riyadh)* 2013; 18:345–8.
118. Toli T, Sourtzi P, Tsoumakas K, Kalokerinou-Anagnostopoulou A. Association between knowledge and attitudes of school nurses towards epilepsy and the risk of accidents in Greek schools. *Epilepsy Behav* 2013; 27:333–6.
119. Okumura A, Nakazawa M, Abe S, Shimizu T. Attitude toward epilepsy after media

- coverage of car accidents related to persons with epilepsy in Japan. *Epilepsy Behav* 2013; 27:264–6.
120. Njamnshi AK, Tabah EN, Bissek A-CZ-K, Yepnjio FN, Kuate C, Angwafor SA, *et al.* Knowledge, attitudes and practice with respect to epilepsy among secondary school students in the Kumbo West Health District - North West Region- Cameroon. *Epilepsy Behav* 2010; 18:247–53.
121. Neni SW, Latif AZA, Wong SY, Lua PL. Awareness, knowledge and attitudes towards epilepsy among rural populations in East Coast Peninsular Malaysia: A preliminary exploration. *Seizure* 2010; 19:280–90.
122. Chung K, Ivey SL, Guo W, Chung K, Nguyen C, Nguyen C, *et al.* Knowledge, attitudes, and practice toward epilepsy (KAPE): A survey of Chinese and Vietnamese adults in the United States. *Epilepsy Behav* 2010; 17:221–7.
123. Atadzhanov M, Haworth A, Chomba EN, Mbewe EK. NIH Public Access. East 2011; 19:414–8.
124. Njamnshi AK, Angwafor SA, Jallon P, Muna WFT. Secondary school students' knowledge, attitudes, and practice toward epilepsy in the Batibo Health District--Cameroon. *Epilepsia* 2009; 50:1262–5.
125. Goel S, Singh N, Lal V, Singh A. Evaluating the impact of comprehensive epilepsy education programme for school teachers in Chandigarh city, India. *Seizure* 2014; 23:41–6.
126. Province KK, Tiamkao S, Aauevitchayapat N, *et al.* Knowledge of epilepsy among teachers in IchonKaen Province, Thailand. *J Med Assoc Thai* 2005; 88:1802–8.
127. Mecarelli O, Li Voti P, Vanacore N, D'Arcangelo S, Mingoia M, Pulitano P, *et al.* A questionnaire study on knowledge of and attitudes toward epilepsy in schoolchildren and university students in Rome, Italy. *Seizure* 2007; 16:313–9.
128. McEwan L, Taylor J, Casswell M, Entwistle R, Jacoby K, Gorry J, *et al.* Knowledge of and attitudes expressed toward epilepsy by carers of people with epilepsy: A UK perspective.

- Epilepsy Behav 2007; 11:13–9.
129. Iivanainen M, Uutela A, Vilkkumaa I. Public awareness and attitudes towards epilepsy in Finland. *Epilepsia* 1980; 21:413–23.
  130. Jensen R, Dam M. Public attitudes toward epilepsy in Denmark. *Epilepsia* 1992; 33:459–63.
  131. Hermann B, Jacoby A. The psychosocial impact of epilepsy in adults. *Epilepsy Behav* 2009; 15.
  132. Jacoby A, Austin JK. Social stigma for adults and children with epilepsy. *Epilepsia* 2007; 48: 6–9.
  133. Higgins JPT, Thompson SG. Controlling the risk of spurious findings from meta-regression. *Stat Med* 2004; 23:1663–82.
  134. Doughty J, Baker GA, Jacoby A, Lavand V. Cross-cultural differences in levels of knowledge about epilepsy. *Epilepsia* 2003; 44:115-23.
  135. Gove WR, McCorkel J, Fain T, Hughes MD. Response bias in community surveys of mental health: systematic bias or random noise? *Social Sci Med* 1967; 10:497-502.
  136. Baker GA, Brroks J, Buck D, Jacoby A. The stigma of epilepsy: A European perspective. *Epilepsia* 2000; 41: 98-104.

## **Legends to Figures**

**Fig. 1.** Flowchart depicting the selection process of studies for this review.

**Fig. 2.** Forest plot depicting the proportion of positive responders according to the type of question posed on marriage (generic versus personal) in the KAP survey.

**Fig. 3.** Forest plot depicting the proportion of positive responders according to the continent of origin of the KAP survey.

**Table 1:** Questions posed in the KAP surveys reviewed.

<b>Generic questions and statements</b>	
<i>Questions</i>	
1	Should PWE get married? [27-29]
2	Can PWE get married? [30-33]
3	Should children with epilepsy get married?[34]
5	Is it possible for PWE to lead a married life? [35-37]
6	Should PWE get married like any other non-epileptic person? [38]
7	Can women with epilepsy get married?[39]
8	Would you agree to PWE getting married? [29]
9	Could a child with epilepsy get married in the future? [34,40]
10	Do you think epilepsy limits marriage? [105,106]
<i>Negative statements</i>	
1	A person with epilepsy should not marry. [43,44]
2	Epilepsy limits the extent of marrying. [45]
3	PWE may be restricted from marriage. [46]
4	A person with epilepsy is unlikely to get married. [47]
5	An epileptic should be unmarried. [48]
6	I agree that an epileptics have less chance to marry. [49]
7	PWE cannot marry. [31]
<i>Positive statements</i>	
1	PWE should not be prohibited from marrying. [50]

2	Adults with epilepsy should be able to marry. [51]
3	An epileptic should marry. [52,53]
4	PWE should be free to marry. [54]
5	PWE should not marry. [55-57]
6	Epilepsy is not a hinderance to marriage. [58]
7	Epilepsy influences the opportunities to find the spouse? [59]
8	Cautioned marrying into epileptic family. [15,60]
<b>Personal questions and statements</b>	
<i>Questions</i>	
1	Would you allow anyone in your family to marry someone with epilepsy? [61]
2	Would you object to having a son or daughter of yours marry a person who sometimes had seizures? [14,18,21,39,46,54,62-78]
3	Do you oppose your kids marrying a person with epilepsy? [79]
4	Will you marry with a person having epilepsy? [80,81]
5	Would you let your child to marry with PWE? [82-84]
6	Would you object to a person with epilepsy marrying a close relative (brother, sister or child) of yours? [85-88]
7	Would you permit your healthy child to marry a person with epilepsy?[82,117]
8	Would you agree yourself to marry a PWE? [76,81]
9	Would you object to your relatives marrying someone with epilepsy? [85]
10	Would you agree to marry (yourself or your children) an epileptic person? [85]
11	Would you mind if one of your closest friend or family members marry a person with epilepsy? [89]
12	Would you allow your child to marry a PWE? [20,61,90-94]

13	Would you object if your son or daughter wanted to marry a person who sometimes had seizures? [62,71,82]
14	Would you refuse to marry a person who sometimes had seizures? [67,95]
15	Would you object to a person in your family to marry someone with epilepsy? [96]
16	Would you agree to PWE getting married? [29]
17	Would you be willing personally to marry someone with epilepsy? [80]
18	Would you allow your son or daughter to marry a PWE? [97,98]
19	Will you marry with a person having epilepsy? [99]
20	Can you marry an epileptic? [100]
<i>Positive statements</i>	
1	Do you accept to marry a PWE? [57]
2	I can marry someone with epilepsy.[27,101]
3	I would marry someone who has epilepsy. [102,103]
4	I can marry someone with epilepsy. [32]
5	I would not object to my child marrying an epileptic person [104]
6	My child can marry a PWE. [105]
<i>Negative statements</i>	
1	I would object to the marriage of my child with someone who has epilepsy. [106]
2	I would object marriage between a close relative and PWE? [107]

Table 2: Study characteristics included in the meta-analysis.

Study level variable items	Study level variable categories	No. of studies (%)
Decade of publication	1980-89	3 (3.0%) [7,54,55]
	1990-99	12 (11.7%) [48,72-74,78,83,93,94,99,100,108-110]
	2000-09	50 (48.5%) [14,18-21,30-32,36-39,45,46,50,52,53,56,60,61,67-69,71,75,76,80,81,88,92,97,98,102,104,105,107,111-116]
	2010-16	38 (36.9%) [27-30,33,34,37,41-45,51,57-59,62-66,85-87,89-91,103,117-123]
Continent	Africa	29 (28.2%) [27,28,43,48,52,57,60,61,64-68,94,97,99,100,103,105,110,111,114,115,121,124,125]
	Asia	46 (44.7%) [18-21,29,30,33-37,44,50,53,56,59,63,71,72,74-76,78-80,82,85-87,90-93,95,104,108,109,112,113,116,122,126,127]
	Australia	2 (1.9%) [14,54]
	Europe	13 (12.6%) [41,42,45,51,54,83,84,89,128-131]
	North America	6 (5.8%) [7,47,88,92,123]
	South America	7 (6.8%) [31,32,73,81,96,102]
Economic status of country of origin	High income country	35 (34.0%) [7,14,18,20,29,39,41,42,45,51,56,62,63,72,76-80,83,84,88,89,92,96,112,118,120,123,128]
	Upper middle income country	36 (35.0%) [19,30-33,37,50,52,59,73-75,81,82,85,90,91,93,102,113,117,122,127]

	Low middle income country	7 (6.8%) [34,43,61,94,99,100,116]
	Low income country	25 (24.3%) [21,27,28,33,35,36,38,44,46,53,54,57,58,60,64-67,71,86,87,92,97,98,103,105,108,110,111,114,115]
Base population characteristics	General public	47 (45.6%) [7,18-21,28,30,37,39,45,47,51,53,61,62,64,65,67-75,77-79,81,82,90,91,94,98,104,105,108-110,115,117,118,122,123]
	People with epilepsy (PWE)	12 (11.7%) [14,33,34,36,38,43,46,59,76,83,112]
	Caregivers of PWE	1 (0.9%) [118]
	Health care providers	13 (12.6%) [32,48,50,54,55,57,63,85,86,103,107,111,114,118]
	School teachers	9 (8.7%) [29,30,42,60,84,92,93,97,100,113]
	Students	21 (20.4%) [27,31,35,37,42,44,52,56,58,66,88,89,91,96,99,102,114,125,128]
Setting of survey	Hospital-based*	19 (18.4%) [32,33,36,38,43,48,50,54-56,63,76,83,85,107,111,112,114,119]
	Others	84 (81.6%) [7,18-21,27-31,34,37,39,41,42,44-46,51-53,57,58,60-62,64,66,67,70-75,77-82,87-94,97-100,102-105,108-110,113,115,116,118-123,125,127,128]
Total		103

\*: Studies performed in hospital (including studies on health-personnel and PWE)

**Table 3: Overall meta-regression of all study level variables analyzed.**

Meta-regression	Number of obs =	113
REML estimate of between-study variance	tau2 =	.05382
% residual variation due to heterogeneity	I-squared_res =	99.61%
Proportion of between–study variance explained	Adj R-squared =	24.99%
Joint test for all covariates	Model F (6,106) =	7.10
With Knapp-Hartung modification	Prob > F =	0.0000

Variable	Estimate	Standard Error	t	F >  t	[95% Interval]	Confidence
Continent of origin of study	.0517466	.0157193	3.29	0.001	.0205815	.0829118
Income status of country of origin of study	-.0130567	.0192102	-0.68	0.498	-.0511427	.0250293
Subject population characteristics	.0268569	.0136179	1.97	0.051	-.0001419	.0538556
Setting of survey	.0379702	.057941	0.66	0.514	-.0769034	.1528438
Decade of publication	-.0428623	.0304717	-1.41	0.162	-.1032754	.0175508
Type of question (Generic Vs. Personal)	-.1846221	.0479852	-3.85	0.000	-.2797573	-.0894869
Intercept	.7147201	.1825785	3.91	0.000	.3527404	1.0767

## **Bullet points**

- In this meta-proportion analysis, regression of selected study-level variables showed that responses to the KAP question on marriage in relation to epilepsy depend on the type of question posed.
- Questions of a personal nature elicit negative responses towards marriage more often than general questions about the marriage-worthiness of people with epilepsy.
- Careful framing of questions in relation to marriage is warranted during the design of KAP surveys.