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Chinese Public Attitudes Toward Epilepsy (PATE) scale: translation and psychometric evaluation

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Abstract

Introduction: None of the quantitative scale for public attitudes toward epilepsy was translated to Chinese language. This study aimed to translate and test the validity and reliability of a Chinese version of the Public Attitudes Toward Epilepsy (PATE) scale. *Methods:* The translation was performed according to standard principles and tested in 140 Chinese-speaking adults aged more than 18 years for psychometric validation. *Results:* The items in each domain had similar standard deviations (equal item variance), ranged from 0.85-0.95 in personal domain and 0.75-1.04 in general domain. The correlation between an item and its domain was 0.4 and above for all, and higher than the correlation with the other domain. Multitrait analysis showed the Chinese PATE had a similar variance, floor and ceiling effects, and relative relationship between the domains, as the original PATE. The Chinese PATE scale showed a similar correlation with almost all demographic variable except age. Item means were generally clustered in the factor analysis as hypothesized. The Cronbach's α values was within acceptable range (0.773) in the personal domain and satisfactory range (0.693) in the general domain.
Conclusion: The Chinese PATE scale is a validated and reliable translated version in measuring the public attitudes toward epilepsy.

INTRODUCTION

People with epilepsy are burdened by a multitude of social, psychological and economic consequences of stigmatization which leads to poor quality of life.[1,2] There are great variations in social stigma among various countries, ethnicities and cultural groups, affected by various socio-economic and cultural factors. Assessment of the public attitudes toward epilepsy is therefore best conducted in different cultures in their own languages.

Public surveys on attitudes toward epilepsy had been conducted in many countries in local languages.[3-5] However, a standardized and quantitative scale was not used in most studies, resulting in difficulty in comparing the results across populations.

There were a few quantitative assessment tools for public attitudes toward epilepsy, such as the Attitudes and Beliefs about Living with Epilepsy (ABLE) scale[6], the Attitudes Toward Persons with Epilepsy (ATPE)[7,8], the Epilepsy Attitude Scale[9], and the Elementary School Epilepsy Survey (ESES)[10] for elementary school children, but not all can be applied cross-culturally as limited by items related to local perception of epilepsy and none was translated into Chinese language. The Public Attitudes Toward Epilepsy (PATE) scale was designed to be applied cross-culturally, as characterized by the following: (1) including statements related to separation and disadvantages in Link's stigmatization model[11], which are universally applicable, and (2) excluding questions testing the participants' knowledge and perception of epilepsy, which are culturally dependent. The PATE scale is a valid and reliable tool in measuring public attitudes toward epilepsy in a homogenous population.[12] This scale was also applied among secondary and college students, and was shown to be a valid and reliable scale to be applied in a homogenous group.[13]

The aim of this study was to test the validity and reliability of a Chinese version of the Public Attitudes Toward Epilepsy (PATE) scale.

METHODS

The Public Attitudes Toward Epilepsy (PATE) scale is a two-dimensional 14-item scale measuring public attitudes toward epilepsy.[12] The personal dimension/domain includes items that require participants to consider personal involvement and commitment with people of

Epilepsy. The General domain consists of items that gauge general opinion of patients on Epilepsy. Each item on the PATE is scored using a 5-point Likert's Scale with 1 being "strongly disagree" and 5 being "strongly agree". A higher total score reflects more negative attitudes towards epilepsy. PATE scale is a valid and reliable test instrument, demonstrating appropriate content and construct validity, and Cronbach's coefficient of 0.633 and 0.868 for the respective subscales.

The translation process of PATE scale was performed in a three-stage cross-cultural adaptation process as developed by the International Quality of Life Assessment project[14], i.e. (1) Translation and cultural adaptation of the original scale into the Chinese language, and evaluation to ensure conceptual equivalence; (2) Formal psychometric testing of the assumptions underlying item scoring and construction of multi-item scales, to ensure that the scoring algorithms can be applied to the population concerned; and (3) Validation and norming studies that provide a basis for interpretation.

Participants

Ten Chinese-speaking adults from various socioeconomic backgrounds were included in the translation and cultural adaptation process. For psychometric validation, a convenience sampling of 140 Chinese-speaking adults aged more than 18 years, from a wide range of age and socioeconomic background, were recruited from Petaling Jaya and Kuala Lumpur in Malaysia. Answering the questionnaire was regarded as having given consent. All questionnaires were administered anonymously. Demographic information on age, gender, education level, and social strata by occupation were also obtained. This study was approved by the ethics committees at the University Malaya Medical Center, Malaysia (MEC Ref No: 878.10).

Translation and cultural adaptation

The Chinese translations of the PATE scale was performed according to the Principles of Good Practice Translation and Cultural Adaptation of Patient Reported Outcomes Measures[15], which include preparation, forward translation and reconciliation, backward translation, harmonization, cognitive debriefing, and finalization. With these principles, the aim was to develop a culturally sensitive version of the scale that was equivalent to the original in the following aspects: item, semantic, operational and measurement equivalence.

Translation: The PATE scale was first transferred to an Excel file for translation. Forward translation was performed by two independent translators and the two translations was reconciled into a single form. The reconciled form was back translated into English by two independent translators, and combined into one back translation. The back translation was compared with the original version. Differences was highlighted and discussed by a panel consisted of two neurologists, a psychologist and a statistician, and changes were made accordingly to ensure consistency in the concepts between the original and the translations. This resulted in the Chinese translated versions of PATE.

Cognitive debriefing: Ten adults knowledgeable in the Chinese language were pretested using semistructured interviews to explore whether questions are relevant and understandable, as well as to identify potential difficulties in answering.

Finalization: An expert panel meeting was organized to evaluate the content and face validity of the translated versions, the results of the pretesting, and the equivalence with the original i.e. conceptual, semantic and normative equivalence for each item.

Statistical analysis

This study employed Statistical Package for Social Sciences version 19 (SPSS 19.0) for data analyses. All demographic data were analyzed descriptively and presented as frequencies as well as percentages. For continuous data, independent t-tests were used for group comparison.

Psychometric and validation testing

Validity: Multitrait analysis and principal-axis factoring were used to evaluate the validity of the translation based on the following assumptions:

1. Equal item variance: Items measuring the same concept should have approximately equal variances (standard deviations).
2. Convergent validity: Items in a given scale should contain approximately the same proportion of information about a concept, with roughly equal item-total correlation.
3. Discriminant validity: An item should correlate higher with its hypothesized scale than with scales measuring other concepts, tested with correlation analysis.

4. Construct validity: The construct of the translated version as assessed by principal-axis factor analysis should be similar to the initial study. In addition, it was hypothesized that (a) the scale means and standard deviations, and floor and ceiling effects of this translation, and (b) the relative relationship between the personal and general domain, were comparable to the initial results of PATE scale in Malaysian population.[12] Correlation between the mean score of each domain and the demographic variables were also assessed with a hypothesis that the current study should have similar correlation patterns as reported previously.[12]

Reliability: Item analysis was performed to assess the internal consistency of the overall scale and its components. Cronbach's α values of 0.7 to 0.9 were considered acceptable[16]; whereas values of 0.6 to 0.7 are considered satisfactory. Mean inter-item correlation was used if α values are below 0.7, and a range of 0.2 to 0.4 are used to ensure that items are measuring the same construct.[17] Item-total correlation of 0.3 and above was used to indicate that the item correlated well with the scale overall.[18]

RESULTS

One hundred and forty Chinese-speaking adults with mean age of 41.8 years (SD=15.2 and range=18-76) were recruited. There were 43.6% male, 62.9% married, 55.7% with tertiary education level, 49.3% with full-time employment, and 5.7% with family history of epilepsy. (Table 1)

Translation equivalence and acceptability

The back-translation of the Chinese PATE was equivalent to the original PATE for all the

Table 1: Demographic characteristics of the respondents (n=140)

		Number (%)
Gender	Male	61 (43.6)
	Female	79 (56.4)
Marital status	Married	88 (62.9)
	Single	51 (36.4)
	Divorced	1 (0.7)
Education level	No formal education	1 (0.7)
	Primary	16 (11.4)
	Secondary	45 (32.1)
	Pre-University	39 (27.9)
	Degree	30 (21.4)
	Post graduate	9 (6.4)
Employment status	Fulltime student	15 (10.7)
	Housewife	25 (17.9)
	Employed part time	6 (4.3)
	Employed full time	69 (49.3)
	Unemployed	5 (3.6)
	Retired	19 (13.6)
	Others	1 (0.7)
Individual monthly income (Ringgit Malaysia*)	None	42 (30.0)
	1000 and below	12 (8.6)
	1001-2000	27 (19.3)
	2001 and above	59 (42.1)
Family history of epilepsy/seizures	Yes	8 (5.7)

*1 USD = 3.2 Ringgit Malaysia

questions and responses. All ten participants involved in the cognitive debriefing indicated that the items were relevant, easy to understand, and had no difficulty in answering the questions. No change was made in the final expert panel meeting to the reconciled Chinese translation of the scale. The final Chinese version of PATE is as in Appendix 1.

Table 2: Mean score, SD, floor and ceiling effects of the Chinese PATE, as compared with the initial results in a Malaysian population[12]

No.	Item	Mean (SD)		Floor/Ceiling effects (%)	
		Chinese PATE (n=140)	General populations (n=130)	Chinese PATE (n=140)	General populations (n=130)
	Personal domain	2.41 (0.66)	2.72 (0.56)***		
1	I feel uncomfortable working with someone who has epilepsy.	2.00 (0.87)	2.42 (0.87)***	26.4/1.4	10.8/1.5
2	I will advise my family members against marrying someone with epilepsy.	2.38 (0.95)	2.95 (0.91)***	17.1/1.4	6.9/2.3,3
3	I would marry someone with epilepsy, even though he/she has epilepsy.#	2.91 (0.94)	3.03 (0.85)	5.7/7.1	2.3/3.8,5
5	I would date someone even though he/she has epilepsy.#	2.54 (0.93)	2.78 (0.84)*	8.6/3.6	3.1/3.1
7	If I am an employer, I would give equal employment opportunities to someone with epilepsy.#	2.24 (0.85)	2.41 (0.96)	16.4/0.7	10.8/4.6
	General domain	2.08 (0.49)	2.09 (0.59)		
4	I will not mind being seen in the company with someone known to have epilepsy.#	1.94 (0.94)	2.06 (0.77)	31.4/3.6	16.9/1.5
6	I would stay away from a friend if I knew she/he had epilepsy.	1.71 (0.84)	2.08 (0.92)**	42.9/2.9	21.5/3.8
8	People with epilepsy have the same rights as all people.#	1.90 (0.93)	2.05 (0.91)	35.0/2.1	26.2/2.3
9	People with epilepsy should be isolated from others.	1.70 (0.75)	1.94 (0.84)*	42.1/0.7	32.3/0.8
10	People with epilepsy should not marry.	2.26 (0.92)	2.06 (0.78)	19.3/1.4	22.3/0.8
11	People with epilepsy should not participate in social activities.	1.86 (0.85)	2.00 (0.78)	34.3/1.4	22.3/0.8
12	People with epilepsy should not study in college or university.	1.95 (0.89)	1.82 (0.70)	30.0/2.1	32.3/0.8
13	People with epilepsy should study in a special school.	2.81 (1.04)	2.43 (0.97)**	9.3/3.6	16.9/1.5
14	Schools should not place children with epilepsy in regular classrooms.	2.59 (1.03)	2.35 (0.90)*	10.0/5.7	13.8/2.3

#These items were reversely scored. *p <0.05, ** p <0.01 and *** p <0.001, as compared to current study.

Table 3: Item-domain and corrected item-total correlations

No.	Correlation	Personal domain	General domain	Corrected Item-total correlation
1	I feel uncomfortable working with someone who has epilepsy.	**.594****	.522**	.420
2	I will advise my family members against marrying someone with epilepsy.	**.749****	.421**	.596
3	I would marry someone with epilepsy, even though he/she has epilepsy.#	**.844****	.369**	.785
5	I would date someone even though he/she has epilepsy.#	**.722****	.225**	.597
7	If I am an employer, I would give equal employment opportunities to someone with epilepsy.#	**.568****	.265**	.346
4	I will not mind being seen in the company with someone known to have epilepsy. #	.258**	**.563****	.247
6	I would stay away from a friend if I knew she/he had epilepsy.	.303**	**.503****	.227
8	People with epilepsy have the same rights as all people. #	.400**	**.587****	.341
9	People with epilepsy should be isolated from others.	.295**	**.669****	.546
10	People with epilepsy should not marry.	.474**	**.542****	.375
11	People with epilepsy should not participate in social activities.	.209*	**.640****	.462
12	People with epilepsy should not study in college or university.	.276**	**.565****	.403
13	People with epilepsy should study in a special school.	.384**	**.644****	.476
14	Schools should not place children with epilepsy in regular classrooms.	.179*	**.493****	.277

*p <0.05, and ** p <0.01. Number in bold indicated that the correlation of item is higher with its hypothesized scale than with scales measuring other concepts.

Psychometric and validation testing

1. Equal item variance

The mean score and standard deviation (SD), floor and ceiling effects of each item in the Chinese PATE were shown in Table 2, according to the domain and were compared to the results performed in the initial study.[12] The items in each domain had similar standard deviations (equal item variance), ranged from 0.85-0.95 in personal domain and 0.75-1.04 in general domain. (Table 2)

2. Convergent and discriminant validity

The correlation between an item and its domain was 0.4 and above for all, and higher than the correlation with the other domain, as highlighted in bold in Table 3.

3. Construct validity

(a) Compatibility with previous study

The scale means and standard deviations, the floor and ceiling effects of the Chinese PATE were compared with the initial results in Malaysian general population in Table 2. The means of items 1, 2, 5, 6 and 9 were significantly lower,

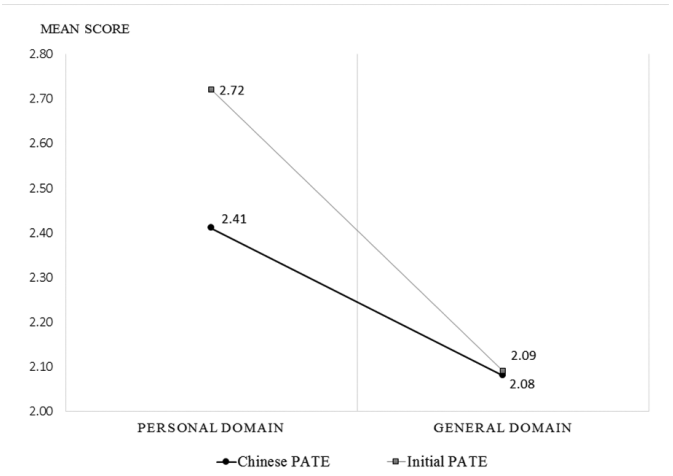

Figure 1 The relative relationship between the mean scores of the personal and general domain, in current (Chinese) and initial PATE studies.

except items 13 and 14 with higher mean, than the initial PATE. The standard deviations were comparable between the two groups. The floor and ceiling effects followed the same pattern as initial study, in which the floor effect was greater than the ceiling effect in all items. However, in four items (1, 4, 6 and 11) the floor effect of the Chinese PATE was greater (more than 25%) that those in the initial study.

As shown in Figure 1, the mean score in the personal domain of Chinese PATE was significantly lower than the initial study ($p<0.001$). The relative relationship between the personal and general domains were similar between the Chinese and initial PATE.

Table 4: Mean scores by domains and demographic characteristics (n=140)

Variable	Group (n)	Personal domain	General domain	Total
Age[1]		0.111	0.176*	0.189*
		Mean score (SD)	**Mean score (SD)**	**Mean score (SD)**
Gender	Male (61)	2.48 (0.66)	2.15 (0.49)	2.27 (0.47)
	Female (79)	2.36 (0.66)	2.03 (0.49)	2.15 (0.48)
Marital status	Single (51)	2.37 (0.51)	2.06 (0.48)	2.17 (0.44)
	Others (89)	2.44 (0.73)	2.09 (0.50)	2.21 (0.50)
Education level	Tertiary (78)	2.35 (0.63)	1.99 (0.49)	2.12 (0.45)
	Others (62)	2.48 (0.69)	2.20 (0.47)*#	2.30 (0.49)*
Employment status	Employed full time (69)	2.39 (0.66)	2.04 (0.56)	2.16 (0.52)
	Others (71)	2.43 (0.66)	2.12 (0.42)	2.23 (0.44)
Monthly income in Ringgit Malaysia	2000 and above (59)	2.40 (0.75)	2.01 (0.51)	2.15 (0.49)
	Others (81)	2.42 (0.58)	2.13 (0.47)	2.24 (0.46)
Family history of epilepsy/seizures	Yes (8)	2.30 (0.73)	2.08 (0.59)	2.16 (0.62)
	No (132)	2.42 (0.66)	2.08 (0.49)	2.20 (0.47)

[1]Based on Pearson correlation. *$p < 0.05$. #This difference was comparable to the initial PATE study.

Table 5: Correlation between the hypothesized domain and rotated principal components

No.	Item	Hypothesized Domain	Factor	
			Personal	General
3	I would marry someone with epilepsy, even though he/she has epilepsy.	Personal	1.028	-.189
2	I will advise my family members against marrying someone with epilepsy.	Personal	.701	.050
5	I would date someone even though he/she has epilepsy.	Personal	.675	-.074
1	I feel uncomfortable working with someone who has epilepsy.	Personal	.412	.236
7	If I am an employer, I would give equal employment opportunities to someone with epilepsy.	Personal	.367	.071
13	People with epilepsy should study in a special school.	General	.339	.327
10	People with epilepsy should not marry.	General	.335	.300
9	People with epilepsy should be isolated from others.	General	-.137	.831
11	People with epilepsy should not participate in social activities.	General	-.179	.760
12	People with epilepsy should not study in college or university.	General	.053	.415
8	People with epilepsy have the same rights as all people.	General	.219	.359
6	I would stay away from a friend if I knew she/he has epilepsy.	General	.034	.265
4	I will not mind to be seen in the company with someone known to have epilepsy.	General	.026	.250
14	Schools should not place children with epilepsy in regular classrooms.	General	.123	.212

Extraction Method: Principal Axis Factoring. Rotation Method: Oblimin with Kaiser Normalization.

Table 6: Internal reliability and convergent validity of each domain

Domain (number of items)	Mean (SD)	Reliability (Cronbach's α)	Mean inter-item correlation	Convergent Validity (correlation with total score)
General domain (9)	2.08 (0.49)	0.693	0.206	0.899*
Personal domain (5)	2.41 (0.66)	0.773	0.399	0.785*

*significant at $p<0.001$

(b) Correlation of mean scores with demographic characteristics

The mean scores in general domain were significantly lower in those with tertiary education (p<0.05), comparable with the result in the initial PATE study. There was also positive correlation between the mean scores in general domain and age (p<0.05), but no correlation with gender, marital status, employment status, monthly income and family history. For personal domain, there were no significant correlation between the mean scores and all demographic factors. (Table 4)

(c) Correlation between the items and rotated principal components

Table 5 showed the factor loadings of the items using a principal axis factor analysis and their correlation with the hypothesized domain. The results fit the hypothesized personal and general domains, although items 10 and 13 had a slightly higher loading on the personal domain than the hypothesized.

Reliability

The Cronbach's α values of the personal domain was within acceptable range and of the general domain was satisfactory. The mean inter-item correlations for both general and personal domains were within the range of 0.2 to 0.4. The mean scores of both general and personal domain had a strong correlation with the total mean score, as shown in Table 6. Corrected item-total correlation of all items were 0.3 and above except items 4, 6 and 14 (Table 3).

DISCUSSION

This study showed that the Chinese PATE scale is a validated and reliable version, which was translated according to standard principles[15], and tested with multitrait analysis and principal-axis factor analysis. Our findings also suggest that the instrument has an acceptable internal consistency with Cronbach's α values of 0.693 and 0.773 for the general and personal domains.

Though a convenient sampling was employed in this study, an attempt to recruit participants with a wide-range of age (18-72 years) and socio-economic background, with equal gender representation and the mean age of this cohort was compatible to the initial cohort[12] (41.8 vs. 41.4 years respectively). This will ease the generalisation of the results to the general Chinese population from the same region.

The translated version had fulfilled the criteria for equal item variance, convergent and discriminant validity.

Multitrait analysis showed the Chinese PATE had a similar variance, floor and ceiling effects, and relative relationship between the domains, as the original PATE. Some items in the Chinese PATE had greater floor effects, probably related to better attitudes toward epilepsy among Chinese-speaking population as compared with the general population. All items in the translated version had greater floor than ceiling effects, compatible to the original PATE study.

The Chinese PATE scale showed a similar correlation with almost all demographic variables except age. In this study, there was a positive correlation between the mean scores in general domain and age (r =0.176) as compared with a positive correlation between the mean scores in personal domain and age (r =0.175) in the original study. However, the correlation coefficient, r, were low and close to each other in both studies.

The deviation of items 10 and 13 from the hypothesized domain resulted in a re-examination of the concepts of these two items. The factor loading in the hypothesized domain of these items were lower than the other domain, but the differences were small (0.035 and 0.012 respectively). Though items 10 and 13 are general statement without involving personal commitment, they measures aspects of life (i.e. education and marriage) which are likely personal for some Chinese-speaking population. Therefore, it is not surprising that the loading is higher with the personal domain. However, the panel decided that conceptually these two items are more consistent with the general domain and thus no change was made to the factoring of these two items.

The reliability of the Chinese PATE was confirmed by a Cronbach's α value that was within acceptable range in the personal domain and satisfactory range in the general domain. In addition, the mean inter-item correlations were within the acceptable range. Though there were three items with corrected item-total correlation below 0.3, they were nonetheless all above 0.2. Corrected item-total correlation above 0.2 was viewed as acceptable by some authors[19], and was decided by the panel that these items were retained in the scale based on theoretical consideration.

In conclusion, the Chinese PATE scale is a validated and reliable translated version in measuring the public attitudes toward epilepsy.

The transferability of developed instruments from one culture to other populations should be evaluated.

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Appendix 1.

“公众对癫痫的态度”的衡量

这调查表为要了解公众对癫痫发作和癫痫有关的看法。回答这些问题，表明你已同意参与这项研究。

说明: 尽可能自发地回答以下问题。答案并无对和错。每个问题有如下五种选择。请圈出最靠接近你的想法的答案。	非常不认同	不认同	不肯定	认同	非常认同
1. 有癫痫症的人不应该在学院或大学读书。	1	2	3	4	5
2. 有癫痫症的人拥有和全部人同等的权利。	1	2	3	4	5
3. 有癫痫症的人应该和其他人隔绝。	1	2	3	4	5
4. 有癫痫症的人不应该参加社会活动。	1	2	3	4	5
5. 我不介意被人看见和一位有癫痫症的人在一起。	1	2	3	4	5
6. 有癫痫症的人不应该结婚。	1	2	3	4	5
7. 我会远离一个朋友，如果我知道她/他有癫痫症。	1	2	3	4	5
8. 有癫痫症的人应在特殊学校学习。	1	2	3	4	5
9. 学校不应该把有癫痫病的儿童纳入普通课室。	1	2	3	4	5
10. 我会和男/女生约会，就算他/她有癫痫症。	1	2	3	4	5
11. 我会和有癫痫症的人结婚，就算他有癫痫症。	1	2	3	4	5
12. 和有癫痫症的人一起工作，我会觉得不舒服。	1	2	3	4	5
13. 我会劝告我的家人不要和有癫痫症的人结婚。	1	2	3	4	5
14. 如果我是雇主，我会给有癫痫症的人同等的就业机会。	1	2	3	4	5