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ORIGINAL ARTICLE

Comparative cultural study using the Public Attitudes Toward Epilepsy Scale (PATE scale) in Japan and Malaysia

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Abstract

Aim: Epilepsy-related stigma significantly impacts quality of life, with severity noted in Asian countries. This study compared public attitudes towards epilepsy in Japan and Malaysia, two Asian nations with distinct religious and healthcare backgrounds.

Methods: We used the Public Attitudes Toward Epilepsy (PATE) scale, including its Japanese version (PATE-J), to survey 113 Japanese and 130 Malaysian participants. Demographic data and PATE scores were compared using *t*-tests and χ^2 tests. Covariance analysis (ANCOVA) was conducted to adjust for potential confounding factors such as age and education level.

Results: No significant differences were found in PATE total scores ($P = 0.484$), general domain ($P = 0.101$), or personal domain ($P = 0.217$) between Japan and Malaysia. However, after adjusting for age and education using ANCOVA, education significantly influenced the general domain ($F = 4.512$, $P = 0.012$) and total scores ($F = 3.302$, $P = 0.038$), while country ($F = 7.191$, $P = 0.008$) and age ($F = 6.633$, $P = 0.011$) were significant for the personal domain. Malaysian participants were significantly younger ($P < 0.001$) and had higher education levels ($P < 0.001$) compared to Japanese participants.

Conclusion: While no significant differences in epilepsy-related stigma were observed between Japan and Malaysia, demographic variations in age, education, and regional characteristics may have masked potential cultural differences. The adjusted analysis underscores the importance of controlling for these factors to better elucidate cultural influences on epilepsy stigma formation in Asia.

KEYWORDS

cross-cultural study, general domain, personal domain, people with epilepsy (PWE), stigma

INTRODUCTION

Cultural and social factors influencing epilepsy stigma in Asia

Prejudice against epilepsy stems from societal misconceptions, with stigma being a key factor impacting the quality of life (QoL) for people with epilepsy (PWE). Stigma manifests as a multifaceted phenomenon, extending from social identity to social disability. While societal attitudes are shaped by cultural contexts, cross-cultural studies on public attitudes toward epilepsy are scarce in Asia.[1–5] Most existing studies are concentrated in high-income countries, lacking a unified index.[6] Research shows that psychosocial factors often have a greater impact on health-related (HR) QoL than physical factors.[7] Boling et al. noted that stigma in Asia and sub-Saharan Africa deeply affects both PWE and their families.[8] Despite advancements in treatment, the lack of comprehensive data regarding the psychosocial effects of epilepsy highlights the need for regional studies to address stigma and enhance PWE's QoL.[9] On the issues mentioned above, Lim and Tan highlighted the need for more research in Asian contexts, where societal norms differ significantly from Western countries.[7]

The cultural context in Asia presents unique challenges, with societal norms prioritizing familial honor over individual well-being.[7,10] In China and Vietnam, prevalent myths such as “epilepsy is a hereditary disease” and “daily life activities cannot be performed” create substantial barriers to marriage and employment opportunities.[8] Lee et al. emphasizes that cultural elements, including language and societal norms, profoundly influence public perceptions of epilepsy, presenting distinct challenges for intervention initiatives.[11,12] In addition, the impact of inadequate healthcare access further compounds these challenges. Trinka et al. reported that approximately 90% of PWE in resource-constrained regions of Asia receive insufficient care, which intensifies stigma and results in increased marginalization.[10] Moreover, Dorji et al. noted that inadequate diagnostic tools and antiseizure medications in Bhutan significantly impact QoL for people with epilepsy.[13] Research into comparative cultures by Iwayama et al. revealed cultural variations in self-stigma across Japan, Malaysia, and Turkey.[14] The stigma surrounding epilepsy has significant adverse effects in Asia on a global scale.[15]

Cultural and healthcare contexts in Japan and Malaysia

Given the need for a comparative study of stigma related to epilepsy in the cultural context described above, our study focused on data from two Asian countries: Japan and Malaysia, two Asian nations with distinct religious and healthcare landscapes. The selection of these countries enables examination of how different cultural and religious contexts may influence epilepsy stigma.

Malaysia is a multiethnic nation composed of Malay, Chinese, and Indian populations, resulting in a complex religious background. The religious composition is 64% Islam, 19% Buddhism, 9% Christianity, and 6% Hinduism (2023 Malaysian Statistics Department). In contrast, Japan's religious composition is 47.1% Shinto, 42.9% Buddhism, and 2.7% Christianity,[16] with Shinto and Buddhism accounting for the majority of followers. The intersection of religious beliefs and epilepsy stigma represents a complex and multifaceted relationship.[17] Historically, religious beliefs contributed to prejudice against epilepsy, viewing it as a curse or punishment.[18] In addition to cultural factors, healthcare system differences may also affect stigma. Malaysia has a two-tier healthcare structure comprising public and private sectors. The public sector is government-funded but often overcrowded due to limited healthcare workers. The private sector primarily serves high-income individuals, creating healthcare disparities. In contrast, Japan's national health insurance system provides universal coverage, allowing citizens to access both public and private healthcare facilities. While Francesco Brigo et al. suggested that healthcare system development has minimal impact on epilepsy-related prejudice in Europe,[19] the applicability of this finding to Asian countries remains uncertain, particularly given the contrasting healthcare systems of Japan and Malaysia.

Research framework and objectives

This study utilized two validated instruments—the Public Attitudes Toward Epilepsy Scale (PATE)[20] and its Japanese version (PATE-J)[21]—to conduct a cross-cultural comparison of epilepsy stigma between Japan and Malaysia. These countries were selected for their distinct cultural, religious, and healthcare contexts, which may influence public perceptions of epilepsy.

Epilepsy stigma varies across cultures due to differences in societal norms and beliefs. In Japan, public attitudes are shaped by social values that emphasize conformity, while in Malaysia, religious and ethnic diversity plays a key role. Understanding these cultural factors is essential for addressing stigma effectively.

This study's objectives were (i) to examine how cultural differences influence stigma formation, (ii) to investigate the relationship between demographic factors (e.g., age, education) and public attitudes, and (iii) to identify key cultural factors contributing to stigma formation.

By exploring these aspects, the study aimed to inform culturally sensitive interventions to reduce stigma and improve the QoL for PWE in Asian contexts.

METHODS

Participants and procedure

The Japanese data was collected through an online survey targeting general citizens without epilepsy who were registered with an internet research company (Intage Inc., Intage Akihabara Building, 3

Kanda-nishikicho, Chiyoda-ku, Tokyo 101-8201, Japan). The survey period was three days from February 28 to March 1, 2024, with 113 respondents (response rate of 45.2%). For comparison, we used data from 130 participants in Malaysia collected during the original PATE scale development. In Malaysia, 130 participants were selected from two cities: Petaling Jaya and Kuala Lumpur. These cities have the highest population density in the country, experience significant migration from rural to urban areas, and have a high proportion of foreigners.

The overall study design, participant recruitment process, and key procedural steps are illustrated in Figure 1.

Scales

Sociodemographic data

We systematically instructed participants to respond to the questionnaire, and in addition to the following scale, we also asked for responses to various demographic variables: age, gender, duration of education, employment status, and presence or absence of family history of epilepsy.

PATE scale

The PATE scale, developed by KS Lim et al., is a two-dimensional, 14-item scale that measures public attitudes towards epilepsy.[20] Each item is scored on a five-point Likert scale, with 1 being "strongly disagree" and 5 being "strongly agree." Higher total scores reflect more negative attitudes towards epilepsy. The original PATE, through exploratory factor analysis, revealed two factors: general domain and personal domain. The Cronbach's α coefficients for each factor showed acceptable internal consistency. (Cronbach α for general and personal domains = 0.868, 0.633)

The Japanese version of PATE (PATE-J) was translated by Hatada et al.[21] Hatakeda et al. modified the original questions 2, 5, 10, 11, and 14, and questions 3 and 8 were newly added as reverse items after conducting cognitive debriefing. The internal consistency of PATE-J was verified and ensured (Cronbach α for general and personal domains = 0.87, 0.75).

Statistical analyses

To compare perceptions and stigma related to epilepsy among the general public between Japan and Malaysia, as well as to examine

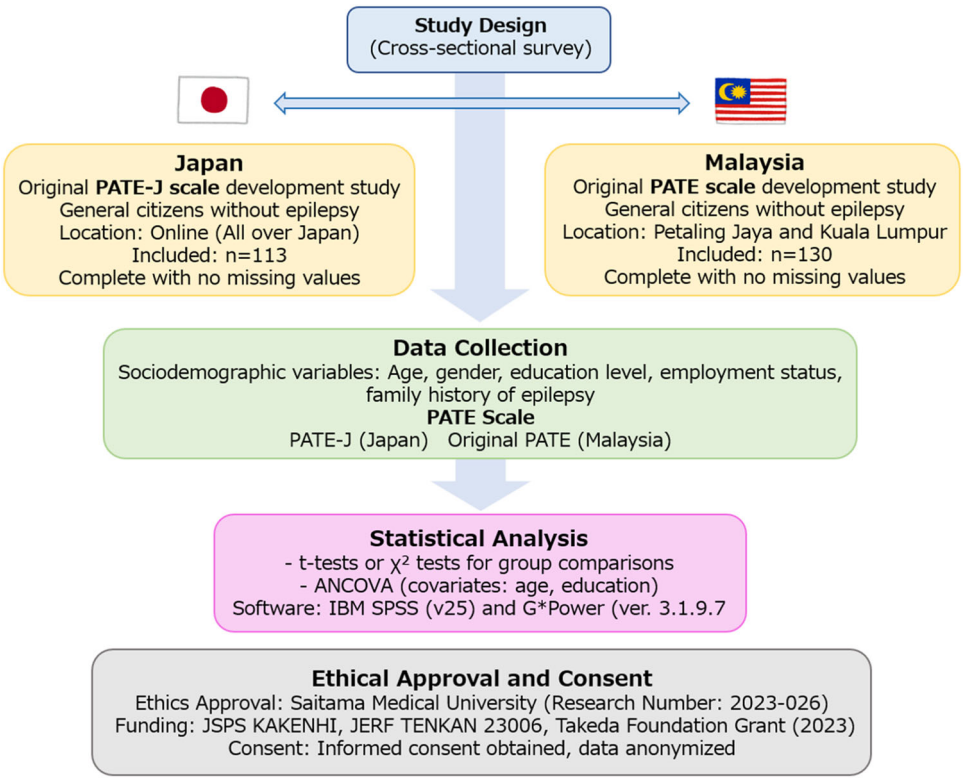

FIGURE 1 Flowchart of study design and participant selection illustrating the study design, participant recruitment process, and key procedural steps. The study used a cross-sectional survey to compare public attitudes toward epilepsy between Japan and Malaysia. Participants in Japan were recruited through an online survey targeting general citizens without epilepsy, achieving a response rate of 45.2%. Malaysian participants were selected from two urban areas (Petaling Jaya and Kuala Lumpur) as part of the original Public Attitudes Toward Epilepsy (PATE) scale development. The data collection included demographic information and PATE scale responses. Statistical analyses, including *t*-tests, χ^2-tests, and ANCOVA, were conducted to adjust for potential confounding factors such as age and education level. The study followed ethical guidelines, with informed consent obtained and data anonymized.

background factors, *t*-tests or χ^2 tests were conducted on each demographic variable and the PATE scale. For the demographic variables where significant differences were observed, covariance analysis (ANCOVA) was performed to adjust for potential confounding factors. Specifically, age and education level, which showed significant differences between the two groups, were included as covariates to control for their potential influence on the results. The adjusted comparisons of PATE scores (general domain, individual domain, and overall scores) between Japan and Malaysia were subsequently conducted.

Statistical analysis was performed using IBM SPSS for Windows (v25), with the criterion for statistical significance set at $P < 0.05$. A post hoc power analysis was conducted using G*Power software (ver. 3.1.9.7) to evaluate the adequacy of the sample size. Assuming a medium effect size (Cohen's $d = 0.5$), a significance level of 0.05, and a total sample size of 243 (Japan 113, Malaysia 130), the analysis revealed a power of 0.99. This indicates that the sample size was more than sufficient to detect meaningful differences between the two countries.

RESULTS

Comparison of demographic variables

In Japan, out of 250 people invited to participate in the survey, 113 responded (response rate 45.2%), and all analyzed questionnaires were complete without any missing values.

Table 1 shows the demographic variables and clinical characteristics for the data from Japan and Malaysia. Comparing the proportions of gender, employment status, and family history of epilepsy between the two countries, no significant differences were found. However, the average age in Malaysia was significantly lower compared to Japan ($t = -9.33$, $P < 0.001$).

Regarding the education period, considering the educational systems of both countries, we analyzed the data by defining secondary education as 12 years up to high school completion in Japan and 11 years up to secondary school completion in Malaysia. Higher education was defined as any education beyond these levels. The analysis revealed that the proportion of individuals with higher education or above was significantly higher in Malaysia compared to Japan ($\chi^2 = 15.538$, $P < 0.001$).

Comparison of PATE in Japan and Malaysia

Table 2 presents the results of the PATE scale, comparing scores between Japan and Malaysia across the general domain, personal domain, and total score. The mean scores for the general domain were 19.90 (standard deviation [SD] = 5.33) in Japan and 18.78 (SD = 5.30) in Malaysia, with no statistically significant difference observed ($t = -1.647$, $P = 0.101$). Similarly, the personal domain scores averaged 13.12 (SD = 2.97) in Japan and 13.58 (SD = 2.82) in Malaysia, also showing no significant difference ($t = 1.239$, P = 0.217). The total PATE scores were 33.03 (SD = 7.76) for Japan and 32.36 (SD = 7.02) for Malaysia, again with no significant difference ($t = -0.701$, $P = 0.484$). These results indicate that public attitudes toward epilepsy, as assessed by the PATE scale, are comparable between the two countries.

TABLE 1 Characteristics of Japanese and Malaysian survey participants.

Characteristics	Japan	Malaysia	χ2/*t*	*P*
Age, years (SD)	57.4 (11.9)	41.4 (14.6)	−9.33	<0.001***
Age range	28–83	19–74		
Gender				
Male	69 (61.1%)	66 (50.8%)		
Female	44 (38.9%)	64 (49.2%)	2.595	0.107
Education level[a]				
Secondary level or lower	44 (38.9%)	22 (16.9%)		
Tertiary level	67 (59.3%)	108 (83.1%)	15.538	<0.001***
Employment status				
Currently working	61(54.0%)	84 (64.6%)	3.234	0.072
Family member with epilepsy				
Yes	5(4.4%)	12 (9.2%)	2.146	0.143

Note: The *t*-test was performed for age only, and the *t* values are shown.
Abbreviation: SD, standard division.
*$P < 0.05$; **$P < 0.01$; ***$P < 0.001$.
[a]In Japan, compulsory education consists of 6 years of elementary school and 3 years of junior high school. Typically, children start compulsory education at age 6 and finish at age 15. The education system is uniform nationwide, with the national government determining the curriculum and standardizing educational content. On the other hand, Malaysia's compulsory education consists of 6 years of primary school education from ages 6 to 12, and 5 years of secondary school education from ages 13 to 17. In Malaysia, there are national schools, Chinese schools, and Tamil schools. Each type of school has a different curriculum, and education is primarily conducted in the respective language. The education system is managed by each state, with slight differences between states. For national schools, the Ministry of Education determines the curriculum, and education is also based on international examinations.

TABLE 2 Results of the PATE scale in Japan and Malaysia.

Average total score	Japan	Malaysia	*t*	*P*
General domain (SD)	19.90 (5.33)	18.78 (5.30)	−1.647	**0.101**
Personal domain (SD)	13.12 (2.97)	13.58 (2.82)	1.239	**0.217**
PATE total score (SD)	33.03 (7.76)	32.36 (7.02)	−0.701	**0.484**

Note: Significant statistics are indicated in bold font.
Abbreviations: PATE, Public Attitudes Toward Epilepsy; SD, standard division.

Adjusted comparison of public attitudes toward epilepsy using ANCOVA

To account for potential confounding factors, ANCOVA was performed with age and education level as covariates. Before conducting the ANCOVA, interactions between country and age, and between country and education level, were tested for the total PATE score, general domain score, and individual domain score. No significant interactions were observed, indicating that the assumption of parallelism was valid. After adjusting for age and education level, the analysis revealed the following results.

General domain and overall score: No significant differences were found between countries or age groups. However, education level had a significant impact on both the general domain ($F = 4.512$, $P = 0.012$) and the overall score ($F = 3.302$, $P = 0.038$).

Individual domain: No significant differences were observed based on education level. However, significant differences were found between countries ($F = 7.191$, $P = 0.008$) and age groups ($F = 6.633$, $P = 0.011$).

While the overall stigma level measured by the PATE scale was comparable between Japan and Malaysia, specific domains of stigma were influenced by these demographic factors.

DISCUSSION

The purpose of this study was to compare stigma formation factors between Japan and Malaysia, two countries in Asia where epilepsy stigma is severe. The analysis revealed no significant differences in the general domain, personal domain, or total scores of the PATE scale. However, an adjusted analysis using ANCOVA highlighted the nuanced role of demographic variables, such as education level, age, and country, in shaping specific domains of stigma.

First, the average age in the Malaysian sample was lower than in the Japanese sample. Previous research has associated older age with stronger epilepsy stigma.[9,20,22–26] However, findings in Japan have been mixed. For example, a study using the PATE-J reported no correlation between age and PATE-J scores,[21] whereas another study using the "Caveness question" found older individuals held more negative attitudes toward marrying or hiring individuals with epilepsy.[27] These mixed results highlight the complexity of the relationship between age and stigma, emphasizing the need to account for demographic differences in cross-cultural research.

Second, the Malaysian sample had a significantly higher proportion of individuals with higher education. While higher education is generally associated with less stigma,[9,20,22,23,25–28] studies in Japan have shown conflicting results. Some research found no correlation,[21,24] while others identified a negative correlation, where higher education was associated with more negative attitudes toward epilepsy.[29] These contrasting findings suggest that cultural factors may moderate the effects of education on stigma, warranting further investigation.

Third, the adjusted comparison using ANCOVA revealed important findings. Education level significantly influenced the general domain and overall scores, indicating that higher education may reduce stigma in these areas. However, cultural factors in Japan and Malaysia might moderate this effect, as reflected in the divergent trends observed in previous studies. Additionally, country and age differences were significant in the individual domain, with older individuals and participants in Japan showing more negative attitudes. These findings highlight the importance of disaggregating stigma into specific domains to better understand its underlying drivers.

Lastly, regional characteristics may play a role in stigma formation. While Japan's nationwide sample reflects a relatively uniform education system,[30] the Malaysian sample was predominantly urban. Urban–rural differences in education, healthcare access, and cultural attitudes might have influenced stigma levels.[15,27,31] Interestingly, studies in Japan have not shown significant regional differences in stigma levels.[32] Future research should explore regional factors in greater detail to provide a more comprehensive understanding.

These findings underscore the need for targeted interventions to address domain-specific stigma issues. For instance, efforts to improve public knowledge about epilepsy could focus on general attitudes, while interventions aimed at reducing personal biases might need to address age- and culture-specific concerns. Collecting more detailed data on regional characteristics and individual experiences could provide deeper insights into the mechanisms underlying stigma formation and inform the development of tailored public health campaigns.

LIMITATIONS

This study has several limitations. Demographic differences in age and education between the Japanese and Malaysian samples may have masked potential cultural differences in stigma formation. Additionally, the Malaysian sample was drawn primarily from urban areas, whereas the Japanese sample included participants from both urban and rural regions. This discrepancy may have introduced biases related to regional characteristics.[15,27,31] Collecting more representative samples in future studies could address these issues. Another limitation is the reliance on the PATE scale as the sole measure of public attitudes toward epilepsy. While the PATE is a validated tool,[20,21] additional assessment methods could provide a more nuanced understanding of stigma. For example, combining qualitative and quantitative approaches or employing culturally adapted tools may enhance sensitivity to cross-cultural differences. Lastly, the online survey methodology used for the Japanese sample may introduce selection bias, as it limits participation to individuals with internet access. Future studies should consider mixed-method recruitment strategies to ensure more diverse and representative samples.

CONCLUSION

In this study using the original and Japanese versions of PATE, there was no significant difference in the level of stigma among the general public in Japan and Malaysia. However, covariance analysis, adjusted

for age and education level, indicated substantial effects of these demographic variables. The education level affected the overall scores and general domain, although variations in nation and age were important for the individual domain.

These findings underscore the necessity of considering demographic variables in cross-cultural stigma research. Enhancing education and customizing interventions for particular age demographics may mitigate epilepsy stigma. Notwithstanding its constraints, this study offers significant insights into the impact of cultural and demographic factors on epilepsy stigma in Asia, establishing a foundation for subsequent research and focused treatments.

AUTHOR CONTRIBUTIONS

This study was designed by Izumi Kuramochi and Takayuki Iwayama. Hiroumi Shimazaki, Izumi Kuramochi, and Takayuki Iwayama analyzed the data and wrote the manuscript. Sayaka Kobayashi, Junichi Hatakeda, Haruo Yoshimasu, and Kheng Seang Lim were involved in the research design and critically reviewed the manuscript for intellectual content. All authors contributed to the article and approved the submitted version. We also acknowledge Dr. Izumi Kuramochi and Dr. Takayuki Iwayama for designing the study, and Dr. Hiroumi Shimazaki, Dr. Izumi Kuramochi, and Dr. Takayuki Iwayama for analyzing the data and drafting the manuscript. Dr. Sayaka Kobayashi, Dr. Junichi Hatakeda, Dr. Haruo Yoshimasu, and Dr. Kheng Seang Lim were involved in the research design and critically reviewed the manuscript for intellectual content. Special thanks to Dr. Zhi Jien Chia for managing and overseeing the data collection process in Malaysia. All authors contributed to the article and approved the submitted version.

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CONFLICT OF INTERESTS STATEMENT

All authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest. The funding sources had no role in the study design, data collection, analysis, interpretation of the data, writing of the manuscript, or decision to submit the manuscript for publication.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article have been archived by the authors. Due to confidentiality obligations, the data will not be made available to the general.

ETHICS APPROVAL STATEMENT

This study was conducted following the approval of the study protocol by the institutional review board of Saitama Medical Center, Saitama Medical University (Approval No. 2023-026). Participation in this study was voluntary, and confidentiality was maintained throughout the data collection process. Anonymous information was collected after obtaining consent from each respondent.

PATIENT CONSENT STATEMENT

Participation was voluntary, and information was collected anonymously after obtaining written consent from each respondent. Participants were assured that their data would be kept confidential throughout the data collection period. We confirm that we have read the journal's position on issues involved in ethical publication and affirm that this report is consistent with those guidelines.

CLINICAL TRIAL REGISTRATION

N/A

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