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RESEARCH ARTICLE

Validity and reliability of the Indonesian version of the Self-Efficacy for Appropriate Medication use Scale (SEAMS-I)

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Abstract

Background: A keystone to achieving successful therapy is medication adherence, supported by the patient's self-efficacy on using medication. In Indonesia, the development of quality instruments to measure patient adherence based on self-efficacy remains limited. **Objective:** This study aimed to evaluate the validity and reliability of the Indonesian version of the Self-Efficacy for Appropriate Medication use Scale (SEAMS-I) in patients with stroke. **Methods:** After forward and backward translations, a cross-sectional survey was conducted among ambulatory patients with stroke attending a neurology clinic of a public hospital in Jember, East Java, Indonesia, to evaluate the instrument's structural validity and reliability using convenience sampling. **Results:** A total of 114 participants (62, 54.4% males) signed the informed consent, and exploratory factor analysis was performed on the 12-item SEAMS-I. The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.815, with a significant Bartlett's sphericity test $p < 0.001$ and a Cronbach's alpha value of 0.851. **Conclusion:** The SEAMS-I demonstrated good structural validity and reliability when tested in patients with stroke.

Introduction

Among non-communicable diseases in Indonesia, stroke is of primary importance as it has become the leading cause of morbidity and mortality (Kusuma *et al.,* 2009; Hoy *et al.,* 2013; Purnamasari, 2018; Turana *et al.,* 2021). Post-stroke patients are at risk for developing recurrent stroke, a unique feature for the population of Southeast Asia, mainly due to the high prevalence of intracranial atherosclerotic disease (Ng *et al.,* 2019). Increased persistence to stroke medications can reduce the risk for recurrent stroke and other adverse outcomes (L. Zhang *et al.,* 2021). Despite the benefits of medication persistence and adherence, a meta-analysis of 63 observational studies found overall low rates for both (J. Zhang *et al.,* 2019). Poor adherence among post-stroke patients could be attributable to cognitive decline (Tang *et al.,* 2018) and chronic emotional distress (Kronish *et al.,* 2012; McCurley *et al.,* 2019).

Self-efficacy is an essential factor for stroke patients, as it is associated with post-stroke outcomes (Jones & Riazi, 2011; Korpershoek, van der Bijl & Hafsteinsdóttir, 2011). Indeed, many studies have reported a positive association between self-efficacy and medication adherence (Náfrádi, Nakamoto & Schulz, 2017; Shen *et al.,* 2020). Several instruments were developed to measure medication adherence based on self-efficacy, including the Self-Efficacy for Appropriate Medication use Scale (SEAMS) (Risser, Jacobson & Kripalani, 2007). This scale has been adapted into several versions and showed good psychometric properties (Polsook *et al.,* 2014; Dong *et al.,* 2016; Pedrosa *et al.,* 2016; Bozada-Gutiérrez, Fresán-Orellana & Yamamoto-Furusho, 2019). This study aimed to evaluate the validity and reliability of the Indonesian version of the Self-Efficacy for Appropriate Medication use Scale (SEAMS-I) in patients with stroke.

Methods

Study design and settings

A cross-sectional survey with convenience sampling was conducted face-to-face at a neurology clinic of a B-type and teaching public hospital in Jember Regency, East Java, Indonesia, during November-December 2019.

Instrument translation

Adopting the available methods (Al-Qazaz *et al.,* 2010; World Health Organization, 2010), the English version of SEAMS was translated to Bahasa Indonesia then back-translated. Any discrepancies were resolved after each translation. The final version was tested for face validity in a pilot survey with 30 participants.

Sample size and participants

The minimum sample size was determined by using items to participant ratio of 1:5 (Osborne, Costello & Kellow, 2011; Tsang, Royse & Terkawi, 2017). Participants were stroke patients with or without comorbid conditions aged 18 years or more who received post-stroke therapy in the last 30 days. Participants or their caretakers must be literate in Bahasa Indonesia. Incomplete questionnaires were excluded.

Data collection

Each potential participant was approached, informed of the aim of the study, and asked if they agreed to join by signing the consent form.

Statistical analysis

Structural validity was assessed with Exploratory Factor Analysis (EFA) to determine Kaiser-Meyer-Olkin (KMO) sample adequacy, Bartlett's test of sphericity, and the number of factors. A cut-off value of less than 0.4 for removing a factor loading was used. Internal consistency reliability was assessed using Cronbach's alpha. A *p*-value of less than 0.05 was considered statistically significant. All statistical procedures were performed with Stata 13 (Stata Corp., College Station, Texas, USA).

Permissions and ethical consideration

Permission was obtained from Dr Jessica Risser to use SEAMS and from the hospital management (No. 423.4/9097/610/2019). All participants who agreed to join the study signed an informed consent form. The research protocol was approved by the Medical Research Ethics Committee of the Faculty of Dentistry, Universitas Jember (No 608/UN25.8/KEPK/DL/2019) dated 30 October 2019.

Results

Response rate

Of the 198 patients with stroke approached, 114 patients (57.6%) agreed to participate in this study. Reasons for not joining were lack of interest (n=3, 1.5%) and unmet inclusion criteria distributed as follows: 25(12.56%) did not take stroke medications in the last 30 days, 51(25.7%) were not stroke patients, and 5(2.5%) or their caretakers could not read and write well in Bahasa Indonesia.

Table I: Characteristics of participants

Characteristics	Number, n=114 (%)
Mean of age (± SD) [years]	55 (± 10.7)
Gender	
Females	62 (54.4)
Males	52 (45.6)
Highest education attainment	
No education	15 (13.2)
Elementary school (SD)	44 (38.6)
Junior High School (SMP)	18 (15.8)
Senior High School (SMA)	20 (17.5)
Tertiary Education	17 (14.9)
Marital status	
Widowed	15 (13.2)
Married	99 (86.8)
Job status	
Indonesian Military and Police Forces	2 (1.8)
Professionals	10 (8.8)
Assisstants and Professional Technicians	3 (2.6)
Administrative staff	2 (1.8)
Services and Sales personnels	17 (14.9)
Skilled workers in Agriculture, Forestry, and Fisheries	35 (30.7)
Blue-collar workers	6 (5.3)
Retirees	8 (7.0)
Housewives	31 (27.2)
Mean of months after stroke diagnosis (± SD) [years]	15.6 (± 24.5)

Characteristics of participants

Of the 114 participants, 62(54.4%) participants were males, and the mean age±SD was 55±10.7 years (Table I). More than a third of participants (n=44, 38.6%) had an elementary education level, and most participants were married (n=99, 86.8%). In terms of job status, 35 (30.7%) worked in the agricultural sector, and 31 (27.2%) were housewives. Furthermore, amlodipine (n=104, 45.4%) and low-dose aspirin (n=65, 28.4%) were the two most frequently used medications by the patients (Table II).

Table II: Post-stroke medications

Drugs	Number (%)
Antihypertensive agents	
Amlodipine	104 (45.4)
Bisoprolol	13 (3.1)
Spironolactone	2 (0.9)
Nifedipine	2 (0.9)
Nimodipine	2 (0.9)
Ramipril	6 (2.6)
Candesartan	7 (5.7)
Captopril	9 (3.9)
Antiplatelets	
Low-dose aspirin	65 (28.4)
Clopidogrel	5 (2.2)
Others	
Gabapentin	5 (2.2)
Divalproex sodium	1 (0.4)
Valproate	1 (0.4)
Methylcobalamin	1 (0.4)
Diazepam + metamizole	1 (0.4)
Mefenamic acid	2 (0.9)
Vitamin B	3 (1.3)
Total	**229 (100)**

Structural validity and internal consistency reliability

Initially, the EFA procedure was performed on all 13 items, resulting in a KMO value of 0.805 and Bartlett's test $p < 0.001$ (Table III). Four factors were formed, but one item (Q6) was only loaded to one factor; therefore, it was deleted in the subsequent analysis (Kripalani *et al.*, 2009). The second EFA procedure was conducted on 12 items, yielding a KMO value of 0.815 and Bartlett's test $p < 0.001$. Three factors emerged after varimax rotation with Kaiser normalisation with a total variance of 68.03%. The first factor consisted of seven items (Q3-Q5 and Q7-Q10) about medication adherence in uncertain situations. The second factor included three items (Q11-Q13) regarding medication adherence in complex situations. The remaining items (Q1 and Q2) formed the last factor, measuring medication adherence in mandatory cases. Cronbach's alpha value for this 12-item SEAMS-I was 0.851, indicating this instrument is sufficiently reliable.

Table III: The psychometric properties of the final Indonesian version of the Self-Efficacy for Appropriate Medication use Scale (SEAMS-I)

Variables and Items	Factors and loading values with 13 Items				Factors and loading values with 12 Items		
	1	**2**	**3**	**4**	**1**	**2**	**3**
Eigenvalues	5.08	1.46	1.31	1.06	5.01	1.42	1.29
[i]*Seberapa yakin Anda bisa minum obat dengan benar, ...* [How confident are you that you can take your medicines correctly, ...]							
Q1. *Ketika Anda minum beberapa obat yang berbeda setiap hari?* [When you take several different medicines each day?]			0.76				0.75
Q2. *Ketika Anda minum obat lebih dari satu kali dalam sehari?* [When you take medicines more than once a day?]			0.80				0.79
Q3. *Ketika Anda sedang bepergian?* [When you are away from home?]	0.62				0.65		
Q4. *Ketika jadwal Anda padat seharian?* [When you have a busy day planned?]	0.83				0.83		
Q5. *Ketika obat tersebut menyebabkan efek samping?* [When they cause some side effects?]	0.62				0.59		
Q6. *Ketika tidak ada orang yang mengingatkan Anda untuk minum obat?* [When no one reminds you to take the medicine?]				0.93			
Q7. *Ketika jadwal untuk minum obat merepotkan?* [When the schedule to take the medicine is not convenient?]	0.84				0.84		
Q8. K*etika rutinitas Anda menjadi berantakan?* [When your normal routine gets messed up?]	0.87				0.86		
Q9. *Ketika Anda tidak yakin bagaimana caranya minum obat?* [When you are not sure how to take the medicine?]	0.75				0.78		
Q10. *Ketika Anda tidak yakin pada jam berapa saja waktunya minum obat?* [When you are not sure what time of the day to take your medicine?]	0.52				0.56		
Q11. *Ketika Anda merasa sakit (seperti meriang atau flu)?* [When you are feeling sick (like having a cold or the flu)?]		0.77				0.79	
Q12. *Ketika Anda membeli lagi obat-obat lama Anda dan beberapa obat terlihat berbeda dari biasanya?* [When you get a refill of your old medicines and some of the pills look different than usual?]		0.67				0.65	
Q13. *Ketika dokter mengganti obat Anda?* [When a doctor changes your medicines?]		0.78				0.78	
% Variance for each factor	38.6	11.2	10.1	8.2	41.78	11.87	10.77
% Total variance		68.03				64.42	
Kaiser-Meyer-Olkin statistic		0.805				0.815	
Bartlett's test of sphericity		$p < 0.001$				$p < 0.001$	
Cronbach's alpha		0.815				0.851	

[i]**Response options:** *Tidak yakin* (Not confident), *Sedikit yakin* (Somewhat confident), *Sangat yakin* (Very confident). Item in bold was removed during the second Exploratory Factor Analysis with Principal Component Analysis. Varimax rotation with Kaiser Normalization was applied to determine the loading values.

Discussion

To the authors' knowledge, this study was the first in Indonesia to translate the SEAMS questionnaire into Bahasa Indonesia. The response rate was not high due to the convenience sampling method, as the main proportion of non-included participants were not stroke patients. In this study, the number of items was reduced to 12, unlike in other versions that could retain all 13 items as the original version (Risser, Jacobson & Kripalani, 2007; Dong *et al.,* 2016; Pedrosa *et al.,* 2016; Bozada-Gutiérrez *et al.,* 2019). The omission of one item (Q6) was done because, despite a high loading value, the corresponding factor (Factor 4) only loaded one item. This specific item related to self-efficacy of medicine use "*when no one reminds to take medicines*", which is a challenging situation for people with a post-stroke condition. Stroke is correlated with an increased risk of declining cognitive functions (Tang *et al.,* 2018). Therefore, this cognitive decline creates an exclusive situation different from other situations represented by other items. Moreover, unlike the results from other studies, three medication-related self-efficacy dimensions were revealed in this study. The original, the Chinese, and the Brazilian versions of SEAMS reported two dimensions (Risser, Jacobson & Kripalani, 2007; Dong *et al.,* 2016; Pedrosa *et al.,* 2016) while the Spanish version in Mexico showed one dimension only (Bozada-Gutiérrez *et al.,* 2019). Furthermore, in terms of KMO, Bartlett's test, and Cronbach's alpha values, the results in this study were good and comparable with previous findings (Risser, Jacobson & Kripalani, 2007; Dong *et al.,* 2016; Pedrosa *et al.,* 2016; Bozada-Gutiérrez *et al.,* 2019).

The main limitation of this study is not comparing the level of literacy among participants, although the original SEAMS was intended for those with inadequate literacy skills (Risser, Jacobson & Kripalani, 20017), and more than half of our participants had a low level of education. The second limitation is that the evaluation of SEAMS-I was carried out in one centre, thereby hindering the generalisation of our study results to the entire Indonesian patients with stroke.

Conclusion

The SEAMS-I was successfully translated and demonstrated good structural validity and reliability when tested in patients with stroke. As the original SEAMS is intended to measure self-efficacy in various chronic diseases, further works are necessary to assess the SEAMS-I among patients with other chronic diseases. It is recommended that Indonesian health professionals practising in similar settings as this study, especially pharmacists, use this scale to evaluate and improve patient adherence to stroke medications.

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