Validity and Reliability of WHO Schedules for Clinical Assessment in Neuropsychiatry (SCAN)-Thai Version: Cognitive Impairment or Decline Section

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Objective: *To determine the validity and reliability of the Thai version of the Cognitive Impairment or Decline section of WHO Schedules for Clinical Assessment in Neuropsychiatry (SCAN) version 2.1.*
Material and Method: *The SCAN interview version 2.1 Cognitive Impairment or Decline Section was translated into Thai and its content validity tested by back translation. Psychiatrists competent in the use of the schedules and aware of their underlying objectives tested the linguistic clarity of the psychiatric schedules for Thais from the country's four regions. The reliability of SCAN: Cognitive Impairment or Decline Section was tested between June and November 2005 on 30 participants, including 15 patients with cognitive impairment and 15 normal volunteers.*
Results: *Based on reactions from Thais and consultations from competent psychiatrists, content validity was indeed established. The duration of interviews for the Cognitive Impairment or Decline Section averaged 48.99 min (59.71 for patients with cognitive impairment and 33.77 for normal subjects). The respective mean inter- and intra-rater reliability kappa was 0.72 (SD = 0.31) and 0.78 (SD = 0.23). The reliability of the majority of items reached a substantial to almost perfect level; however, three items (3.66%) had poor and nine (6.67%) only slight inter-rater agreement. Some items needed clarification of the scoring method. The respective inter- and intra-rater reliability of the continuous data was 0.93 and 0.96.*
Conclusion: *The Cognitive Impairment or Decline Section of the WHO Schedules for Clinical Assessment in Neuropsychiatry (SCAN Thai Version) is demonstrably an effective tool for diagnosing cognitive impairment disorders among Thais.*

Keywords: *Schedules for clinical assessment in neuropsychiatry, Reliability study, Validity study, Semi-structured interview schedules, Dementia, Alzheimer's, Multi-infarct dementia, Organic personality disorder, Mild cognitive disorder*

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Cognitive impairment among the elderly is relatively common. The prevalence rate (95% confidence interval) of dependence regarding self-care activities vis-à-vis daily living in samples from Thai communities 60 years of age or over was 5.9% (range, 4.2-7.6%)[1]. The burden in taking care of this group is greater among those with dementia. A national cross-sectional survey by Jitapunkul et al documented the prevalence of dementia at 3.3% of the Thai elderly 60 and over[2]. Senanarong et al reported a prevalence of dementia of 9.88% among those 60 and over living in the community[3].

Early detection and diagnosis of, and intervention in, this condition would help reduce the social and treatment costs and increase the quality of life for the affected individual and his/her family. In Thailand,

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the clinical diagnosis of dementia and other cognitive impairment disorders are made according to the Diagnostic and Statistical Manual of Mental Disorder (DSM IV) and the International Classification of Disease (ICD-10). There are some instruments in the Thai language, but they are all screening tests (*i.e.*, the Thai Mental State Examination (TMSE)[4], the Mini-Mental State Examination-Thai version (MMSE-T)[5], the Chula Mental Test[6] and the Modified Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE)[7]).

Diagnosing these disorders is based on clinical interviews. Clinical judgments, even those based on well-trained/experienced physicians, are not always concordant. There exists no true gold standard against which to test the validity of any new psychiatric diagnostic technique(s), and the traditional use of the interview can produce variable diagnostic conclusions depending on the interviewer, the interviewee and the interaction between them. To develop a standardized interview schedule that is universally accepted and adaptable to each culture, where it is to be used, is an important and challenging task.

The Schedules for Clinical Assessment in Neuropsychiatry (SCAN) constitute a semi-structured clinical interview for use by trained clinicians to assess and diagnose psychiatric disorders among adults. At its core is the Present State Examination (PSE) that has been validated globally. SCAN was developed within the framework of the WHO and the National Institute of Mental Health (NIMH) Joint Project on Diagnosis and Classification of Mental Disorders, Alcohol, and Related Problems. The use of SCAN gives flexibility in the diagnosis of mental disorders, based on the current International Classification of Disease (ICD), Diagnostic and Statistical Manual (DSM) systems, and other diagnostic systems that may be developed in the future. A major purpose of SCAN is to allow worldwide comparisons of psychiatric diagnoses[8-10].

The authors' objective, then, was to test the validity and reliability of the Cognitive Impairment Section of SCAN's Thai version.

Material and Method

After translating the original English version of SCAN to Thai, and back-translating to establish its validity (Paholpak et al, 2003), the SCAN cognitive impairment section was used to conduct interviews on psychiatric patients and controls.

The Ethics Committee for Khon Kaen University reviewed and approved the authors' study protocols and informed consent was obtained from patients before conducting the interviews. Between June and November 2005, the authors conducted semi-structured interviews using the Cognitive Impairment Section of the Thai version of SCAN on both cognitive impairment patients and normal volunteers at Srinagarind Hospital, Khon Kaen, Thailand.

The process of validity and reliability testing were accomplished as follows:

1. Content validity: two psychiatrists, well-versed in SCAN, arrived at a consensus on the original meaning of each item and whether the Thai version conserved this. The comprehensibility of language was then tested among Thais from all four putatively linguistic regions of the country. Reflections, comments, and suggestions from the Thais interviewed were assessed then summarized during a consensus meeting of the two psychiatrists (NP and TK).

2. Reliability study: The authors' sample size comprised 30 subjects (15 patients with cognitive impairment and 15 normal volunteers). The patients (from either the in- or out-patient departments) were identified using either the ICD-10 or DSM-IV criteria. All subjects had to be over 18 years of age, Thais (*i.e.* speaking Thai as their mother tongue and *lingua franca*). All subjects were interviewed by a psychiatrist familiar with SCAN. With permission from each subject, the interviews were video-recorded.

2.1 Inter-rater reliability: two psychiatrists (trained in the use of SCAN) independently rated the interviews; either live or on video; and,

2.2 Intra-rater reliability: one of the psychiatrists re-rated the video two weeks later.

Statistical analysis

Inter- and intra-rater reliability was determined from the agreement between raters; calculated using the kappa statistic (κ) for categorical data or the Intra-class Correlation for continuous data[11]. The simple percentage of agreement was used whenever the κ statistic could not be calculated. All statistics were done using STATA 7.0.

The pre-defined level for the degree of agreement was: 1 = poor agreement ($\kappa < 0.00$); 2 = slight (κ: 0.00-0.20); 3 = fair (κ: 0.21-0.40); 4 = moderate (κ: 0.41-0.60); 5 = substantial (κ: 0.61-0.80); and, 6 = near perfect (κ: 0.81-1.00)[12,13].

Results

Content validity was performed by two psychiatrists (NP and TK). Some adaptations were made

to words or sequence of sentences describing symptoms to make them more understandable in the Thai (cultural and linguistic) context.

The linguistic test was done by one of the researchers (KT) who interviewed 80 volunteers, representing the four regions of Thailand (20 volunteers per region) to test their understanding of the terms used in the SCAN (Thai version). All of the comments and suggestions (*i.e.* for comparable meanings using local idioms) were gathered and the most suitable (*i.e.* understandable and conserving the original meaning) chosen.

The reliability study commenced with 30 subjects including 15 patients with cognitive impairment and 15 normal volunteers to ensure a full range of scores and spectra of symptoms. The cognitive impairment group comprised of 11 male and four female patients between 18-80 years of age (mean 54.27, median 52.00). The normal volunteers group comprised of six male and eight female patients between 26-69 years of age (mean 45.9, median 45.00). The interviews took between 46.57 and 86 min (average, 64.18 $\pm$ 13.17) for the patients with cognitive impairment and between 22.00 and 58.46 min (average, 33.79 $\pm$ 11.72) for the normal controls. None of the subjects dropped out during the interviews.

There are 163 items in this Section. After excluding the items that have constant values and for which validation is not necessary there are 157 items remaining for analysis. Of these, the Kappa value could be calculated for 133 items, while for another 24 items the data were continuous for which an alpha value was calculated.

Inter-rater reliability

The mean inter- rater reliability-κ for the 133 items was 0.72 (0.31). The majority of the κ values indicated near perfect to moderate agreement; six had but fair agreement, nine had slight agreement and three had poor agreement (*viz.,* 21.024, 21.132, and 21.134) (Tables 1, 2). However, these items had a high percent of inter-rater agreement (91.63 $\pm$ 2.12, 76.67-96.67). κ values could not be computed for 18 items because they were rated in the same value, however, there was 100% agreement in the rating.

The alpha correlations of the continuous data were 0.81-1 (mean 0.93 $\pm$ 0.06) (Table 3). When the limit of agreement was analyzed and plotted, the results correlated with the intra class-correlation.

Intra-rater reliability

The mean intra-rater reliability-κ was 0.79 (0.25). Again, the majority of the κ values indicated near perfect to moderate agreement, while two items had but fair agreement and another five slight agreement (Tables 1, 2). However, these items also had a high percent of intra-rater agreement (91.43 $\pm$ 6.04, 83.33-96.67). The κ values for 20 items could not be calculated because they were rated all in the same value; however, there was 100% of agreement in the rating.

The alpha correlation of the continuous data are 0.86-1 (mean 0.96 $\pm$ 0.04) (Table 3) and the analysis and plot of the limit of agreement indicated a strong correlation with the intra class-correlation.

Discussion

SCAN (Thai version) is a semi-structured interview adapted in the content validity process to make it more understandable in the Thai linguistic and social context while conserving the original meaning. SCAN (Thai version) groups symptoms as much as possible before making a diagnosis and provides well-defined symptoms-criteria to help psychiatrists match their own clinically-relevant symptom-concepts with the symptoms experienced/expressed by the patients.

The inter- and intra-rater reliability scores for "SCAN (Thai version): the Cognitive Impairment Section (Sections 21)" were acceptable with κ values were between moderate and near perfect agreement. Some items had statistically fair to poor κ agreement, although their absolute percentage of agreement seemed high. The good agreement might be due to the authors' use of psychiatrists well-versed in SCAN to rate (and re-rate) the interviews. The authors' results agreed with a Spanish reliability study (of SCAN Spanish version), which also reported a high degree of reliability[14].

However, there were some difficulties in rating this section. Some items were rated based on clinical examination and judgments, so that the rater has to be a trained clinician in order to rate these items properly. The items with slight or poor agreement (items 21.001 and 21.024) were designed to assess the evidence of cognitive decline without any explicit interview questions so that the status of the patient could have more than one correct answer. This weakness could be improved by training raters. Rijnders et al suggested that special attention should be paid to items that have no explicit interview questions[15] although for this item they showed that less experienced (but well-trained) interviewers could reliably apply SCAN[15].

Some caution should be exercised when using the items with poor to moderate agreement.

Table 1. Agreement of each sub-section determined by κ statistic

Subsections		Items and sub-items	Inter-rater reliability						Intra-rater reliability					
			Unable to compute kappa (number)	Mean	Median	STD	Min	Max	Unable to compute kappa (number)	Mean	Median	STD	Min	Max
1. Screening for cognitive decline or impairment	Evidence of cognitive decline or impairment	2	-	-0.60	-0.60	0.80	-0.12	0	-	0.49	0.49	0.02	0.47	0.50
	Verbal trial test	(cont data)	-	-	-	-	-	-	-	-	-	-	-	-
	Mini-mental state exam	18	-	0.87	0.91	0.14	0.62	1.00	-	0.86	0.89	0.14	0.65	1.00
2. Pattern and severity of cognitive impairment	Level of consciousness	7	2	0.64	0.72	0.42	0	1.00	2	0.64	0.84	0.41	0	1.00
	Memory	5	-	0.87	0.91	0.16	0.60	1.00	-	0.82	0.86	0.10	0.66	0.90
	Language	2	-	0.85	0.85	0.22	0.69	1.00	-	0.87	0.87	0.18	0.74	1.00
	Calculation	2	-	0.24	0.24	0.07	0.29	0.19		0.27	0.27	0.11	0.29	0.35
	Praxis	3	-	0.72	0.71	0.27	0.46	1.00	-	0.78	0.71	0.19	0.64	1.00
	Abstraction	6	-	0.88	0.86	0.10	0.74	1.00	-	0.94	0.94	0.06	0.85	1.00
	Fund of knowledge	5	-	0.75	0.84	0.22	0.36	0.90	-	0.83	0.87	0.11	0.66	0.95
	Executive function (frontal-subcortical)	(cont data)	-	-	-	-	-	-	-	-	-	-	-	-
	Associated features-changes in personality	7	-	0.82	0.88	0.18	0.55	1.00	-	0.82	0.87	0.14	0.63	1.00
	Other symptoms associated with cognitive impairment	12	2	0.79	0.83	0.30	0	1.00	3	0.74	0.82	0.34	0	1.00
3. Clinical rating and differential diagnosis	Cognitive impairment present	18	-	0.65	0.68	0.28	0	1.00	-	0.76	0.77	0.19	0.35	1.00
	Clinical history	10	3	0.77	0.80	0.21	0.48	1.00	3	0.84	0.85	0.16	0.57	1.00
	Aetiology of cognitive impairment	17	8	0.53	0.73	0.41	-0.03	1.00	8	0.69	0.74	0.30	0	1.00
	Cause of delirium and amnesic syndromes	10	3	0.45	0.59	0.46	-0.03	1.00	4	0.75	1	0.42	0	1.00
	Optional checklist (mild cognitive disorder)	9	-	0.87	0.93	0.20	0.42	1.00	-	0.87	0.94	0.16	0.55	1.00
Total		133	18	0.72	0.84	0.31	-0.12	1.00	20	0.78	0.85	0.23	0	1.00

Table 2. Inter-rater and intra-rater reliability profile for each sub-section

Subsections		Items and sub-items	Inter-rater rating (Items) Degree of agreement							Intra-rater rating (Items) Degree of agreement						
			Unable to compute	AP	Sb	M	F	S	P	Unable to compute	AP	Sb	M	F	S	P
1. Sscreening for cognitive decline or impairment	Evidence of cognitive decline or impairment	2	-	-	-	-	-	1	1	-			2			
	Verbal trial test	(cont data)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Mini-mental state exam	18	-	12	6	-	-	-	-	-	11	7	-	-	-	-
2. Pattern and severity of cognitive impairment	Level of consciousness	7	2	2	1	1	-	1	-	2	3	-	1	-	1	-
	Memory	5	-	4	-	-	1	-	-	-	3	2	-	-	-	-
	Language	2	-	1	1	-	-	-	-	-	1	1	-	-	-	-
	Calculation	2	-	-	-	-	1	1	-	-	-	-	-	1	1	-
	Praxis	3	-	1	1	1	-	-	-	-	1	2	-	-	-	-
	Abstraction	6	-	5	1	-	-	-	-	-	6	-	-	-	-	-
	Fund of knowledge	5	-	4	-	-	1	-		-	3	2	-	-	-	-
	Executive function (frontal-subcortical)	(cont data)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Associated features-changes in personality	7	-	4	2	1	-	-	-	-	4	3	-	-	-	-
	Other symptoms associated with cognitive impairment	12	2	6	3	-	-	1	-	3	5	2	1	-	1	-
3. Clinical rating and differential diagnosis	Cognitive impairment present	18	-	8	2	4	3	1	-	-	7	7	3	1	-	-
	Clinical history	10	3	3	2	2	-	-	-	3	4	2	1	-	-	-
	Aetiology of cognitive impairment	17	8	3	2	-	1	2	1	8	3	3	2	1	-	-
	Cause of delirium and amnesic syndromes	10	3	2	1	1	2	-	1	4	4	-	1	1	-	-
	Optional checklist (mild cognitive disorder)	9	-	7	1	1	-	-	-	-	7	1	1	-	-	-
Total		133	18	62	23	13	6	9	3	20	62	32	12	2	5	0

AP = almost perfect, Sb = substantial, M = moderate, F = fair, S = slight, P = poor

Table 3. Inter-rater and intra-rater reliability profile for continuous data

Item	Inter-rater reliability			Intra-rater reliability		
	Intra-class correlation coefficient	95% CI		Intra-class correlation coefficient	95% CI	
		Lower	Upper		Lower	Upper
21.002(1)	0.88	0.69	0.96	0.91	0.76	0.97
21.002(2)	0.81	0.61	0.91	0.98	0.96	0.99
21.013(1)	1.00	1.00	1.00	1.00	1.00	1.00
21.013(2)	…	…	…	…	…	…
21.014(1)	0.98	0.95	0.99	0.97	0.94	0.99
21.014(2)	0.98	0.95	0.99	0.99	0.99	1.00
21.014(3)	0.99	0.98	0.99	0.99	0.99	1.00
21.023	0.84	0.68	0.92	0.97	0.93	0.98
21.032(1)	0.82	0.65	0.91	0.97	0.95	0.99
21.032(2)	0.88	0.76	0.94	0.88	0.77	0.94
21.032(3)	0.86	0.72	0.93	0.88	0.76	0.94
21.033	0.99	0.99	1.00	1.00	0.99	1.00
21.034	0.97	0.93	0.98	0.98	0.95	0.99
21.035	0.98	0.95	0.99	0.99	0.98	1.00
21.036	0.89	0.78	0.95	0.90	0.80	0.95
21.043	0.98	0.96	0.99	0.99	0.98	0.99
21.044(1)	0.94	0.87	0.97	1.00	1.00	1.00
21.044(2)	0.88	0.76	0.94	0.97	0.93	0.98
21.044(3)	0.94	0.87	0.97	0.98	0.96	0.99
21.045	1.00	1.00	1.00	1.00	1.00	1.00
21.049	0.94	0.88	0.97	0.96	0.93	0.98
21.050	0.95	0.90	0.98	0.86	0.71	0.93
21.065	0.98	0.97	0.99	0.98	0.96	0.99
21.066	0.99	0.98	1.00	0.99	0.98	1.00

… = could not compute the ICC because there was 100% agreement

Andrews et al reported that whenever clinical judgment are involved in administering SCAN, agreement between the interviewer and observer is limited to moderate levels, which is less than that for CIDI, a highly structured interview[16]. The solution then is to re-check the score and criteria used for rating (among raters) by consulting the SCAN glossary when in doubt[17] and to pay special attention to these items during the training process.

Limitations

1. The authors recruited only participants from Srinagarind Hospital, Khon Kaen (Northeast Thailand);

2. The authors excluded some of those items in which the rating was based on clinical judgments (such as making a diagnosis); and,

3. The authors did not evaluate SCAN vs. a clinical interview for diagnostic agreement since such an analysis was beyond the objective of the present study; notwithstanding, further study of concurrent validity *should* be done.

Conclusion

The "SCAN (Thai version): Cognitive Impairment Section (Sections 21)" has good validity and reliability. Using this semi-structured interview would help with the consistency of diagnosis among interviewers. Training in the use of SCAN in Thailand should be set up to build familiarity with the terms and approach.

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ความถูกต้องและความเชื่อถือได้ของ WHO Schedules for Clinical Assessment in Neuropsychiatry ฉบับภาษาไทย: หมวด Cognitive Impairment or Decline

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วัตถุประสงค์: *ศึกษาความถูกต้องและความเชื่อถือได้ของ WHO Schedules for Clinical Assessment in Neuropsychiatry ฉบับภาษาไทย หมวด ความบกพร่องทางพุทธิปัญญา*

วัสดุและวิธีการ: *คณะผู้นิพนธ์ได้แปล WHO Schedules for Clinical Assessment in Neuropsychiatry (SCAN) version 2.1 หมวด Cognitive Impairment or Decline เป็นภาษาไทย ตรวจสอบความถูกต้องของการแปลด้วยการแปลกลับเป็นภาษาอังกฤษ และทดสอบความถูกต้องเชิงภาษาจากประชากรทั่วไปทั้ง 4 ภาคของประเทศไทยและจากผู้เชี่ยวชาญ ทดสอบความเชื่อถือได้ในกลุ่มตัวอย่างที่ประกอบด้วยผู้ป่วยที่มีความบกพร่องทางพุทธิปัญญา จำนวน 15 ราย และอาสาสมัครปกติ จำนวน 15 ราย*

ผลการศึกษา: *ผู้ถูกสัมภาษณ์สามารถเข้าใจความหมายของข้อคำถามและรักษาความหมายได้ตรงกับต้นฉบับภาษาอังกฤษ ใช้เวลาในการสัมภาษณ์เฉลี่ย 48.99 นาที (59.71 นาทีในกลุ่มผู้ป่วย และ 33.77 นาทีในกลุ่มคนปกติ) ค่าความเชื่อถือได้เฉลี่ยจากการวัดความสอดคล้องตรงกันระหว่างผู้สัมภาษณ์ 2 คนเท่ากับ 0.72 (SD = 0.31) และความสอดคล้องตรงกันในผู้สัมภาษณ์คนเดียวกันที่ให้คะแนน 2 ครั้ง เท่ากับ 0.78 (SD = 0.23) ซึ่งเป็นระดับความสอดคล้องมาก มีข้อคำถามที่มีค่าความสอดคล้องระหว่างผู้สัมภาษณ์ 2 คนในระดับไม่ดี 3 ข้อ (ร้อยละ 2.66) และในระดับเล็กน้อย 9 ข้อ (ร้อยละ 6.67) ส่วนข้อมูลที่เป็น continuous data มีค่าความเชื่อถือได้จากการวัดความสอดคล้องตรงกันระหว่างผู้สัมภาษณ์ 2 คนเท่ากับ 0.93 และ ในผู้สัมภาษณ์คนเดียวกันที่ให้คะแนน 2 ครั้ง เท่ากับ 0.96*

สรุป: *แบบสัมภาษณ์กึ่งโครงสร้าง WHO Schedules for Clinical Assessment in Neuropsychiatry ฉบับภาษาไทย หมวด ความบกพร่องทางพุทธิปัญญามีความถูกต้องเชิงภาษา และมีความเชื่อถือได้สูง*