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The Thai Violence Risk Scale (TVRS) persons with schizophrenia: Development and initial validation

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Introductions : *Persons with schizophrenia have a clear association with increased violence in community than the general population. At present, there has not been any scale developed to estimate risk of violence, particularly in persons with schizophrenia.*

Objectives : *To develop a clinically useful for evaluation violence risk among persons with schizophrenia, and to carry out an initial validation of the scale.*

Setting : *Out patient department of a psychiatric hospital*

Research design : *Instrument development*

Sample : *Persons with schizophrenia who had committed violence (n = 300)*

Methods : *A 29-item Thai Violence Risk Scale (TVRS) was constructed on the base of the literature review and Psychology of Criminal Conduct (PCC) as guideline for selection of significant characteristics and circumstances that are risk factors associated with violence among persons with schizophrenia in community. Scale development procedures composed of 10 steps guide by Crocker and Algina. Content validity of the TVRS was evaluated by nine content experts, internal consistency was evaluated with Cronbach alpha, and construct validity was evaluated with exploratory factor analysis (EFA).*

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Results : *The number of 29 items in the item pool of the first draft of the TVRS was reduced to 27 items in content validity step with an I-CVI score ranged from .78 - 1.0 and an S-CVI/Ave score of .86. After completing item analysis, the number of 27 items in the second draft scale was reduced to 17 in this step. Cronbach's alpha coefficient of the second draft scale was high (α = .92). Findings from the EFA (varimax rotation) showed that the TVRS was composed of 2 factors. Factor I was the characteristics (15 items) and factor II was the circumstances (2 items).*

Conclusions : *The suitability of development procedures of the TVRS that seems to be clinically and practically useful in identifying persons with schizophrenia in community with a particularly high risk for violence.*

Keywords : *Violence, risk, violent, schizophrenia, scale, development, community, questionnaire, interview, procedure.*

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อุทยา นาคเจริญ, จินตนา ยูนิพันธุ์, วราภรณ์ ชัยวัฒน์. เครื่องมือประเมินความเสี่ยงต่อการเกิดพฤติกรรมรุนแรงในผู้ป่วยจิตเภท: การพัฒนาและการตรวจสอบคุณภาพเครื่องมือเบื้องต้น. จุฬาลงกรณ์เวชสาร 2555 พ.ย. – ธ.ค.; 56(6): 699 – 718

บทนำ : *ผู้ป่วยจิตเภทที่อาศัยอยู่ในชุมชนสัมพันธ์กับการเกิดพฤติกรรมรุนแรงมากกว่า บุคคลทั่วไป แต่กลับพบว่ายังไม่มีเครื่องมือประเมินความเสี่ยงต่อการเกิดพฤติกรรมรุนแรง ที่พัฒนาขึ้นมาสำหรับผู้ป่วยในกลุ่มนี้โดยตรง*

วัตถุประสงค์ : *เพื่อพัฒนาเครื่องมือประเมินความเสี่ยงต่อการเกิดพฤติกรรมรุนแรงในผู้ป่วยจิตเภทที่อาศัยอยู่ในชุมชนและนำเสนอผลการตรวจสอบคุณภาพเครื่องมือเบื้องต้น*

สถานที่ศึกษา : *แผนกผู้ป่วยนอก โรงพยาบาลจิตเวช*

รูปแบบการวิจัย : *การวิจัยพัฒนาเครื่องมือ*

กลุ่มตัวอย่าง : *ผู้ป่วยจิตเภทที่เคยกระทำพฤติกรรมรุนแรง จำนวน 300 ราย*

วิธีการ : *เครื่องมือประเมินความเสี่ยงต่อการเกิดพฤติกรรมรุนแรงในผู้ป่วยจิตเภท ฉบับร่าง ประกอบด้วยข้อคำถามจำนวน 29 ข้อ พัฒนามาจากการทบทวนวรรณกรรมที่เกี่ยวข้องและใช้ทฤษฎี Psychology of Criminal Conduct เป็นแนวทางในการคัดเลือกคุณลักษณะและสภาพการณ์ต่าง ๆ ซึ่งเป็นปัจจัยเสี่ยงที่มีผลต่อการเกิดพฤติกรรมรุนแรงในผู้ป่วยจิตเภทที่อาศัยอยู่ในชุมชน โดยการพัฒนาเครื่องมือมีทั้งหมด 10 ขั้นตอน ตามแนวคิดของ Crocker และ Algina นอกจากนี้ ได้ทำการตรวจสอบความตรงเชิงเนื้อหาของเครื่องมือ โดยผู้เชี่ยวชาญจำนวน 9 ท่าน ตรวจสอบความเที่ยงโดยใช้สัมประสิทธิ์ความสอดคล้องภายในของครอนบาค และ ตรวจสอบความตรงเชิงโครงสร้างแบบการวิเคราะห์องค์ประกอบเชิงสำรวจ*

ผลการศึกษา : *ผลการพัฒนาเครื่องมือประเมินความเสี่ยงต่อการเกิดพฤติกรรมรุนแรงในผู้ป่วยจิตเภทในเบื้องต้น พบว่าภายหลังการตรวจสอบความตรงเชิงเนื้อหา ข้อคำถามลดลงเหลือ จำนวน 27 ข้อ มีค่าความตรงเชิงเนื้อหารายข้อ (I-CVI) = .78-1.0 และค่าความตรงเชิงเนื้อหาของเครื่องมือทั้งชุด (S-CVI/Ave score) = .86 นอกจากนี้ ภายหลังการวิเคราะห์ ข้อคำถามรายข้อ พบว่าข้อคำถามลดลงเหลือ จำนวนทั้งหมด 17 ข้อ มีค่าสัมประสิทธิ์สหสัมพันธ์สูง (α = .92) ส่วนการวิเคราะห์องค์ประกอบเชิงสำรวจ (varimax rotation, n = 300) พบว่าเครื่องมือนี้มี 2 องค์ประกอบ คือ คุณลักษณะต่างๆที่สัมพันธ์กับการเกิดพฤติกรรมรุนแรง (15 ข้อ) และ สภาพการณ์ต่างๆที่สัมพันธ์กับการเกิดพฤติกรรมรุนแรง (2 ข้อ)*

สรุป : *การพัฒนาเครื่องมือประเมินความเสี่ยงต่อการเกิดพฤติกรรมรุนแรงในผู้ป่วยจิตเภท มีขั้นตอนการพัฒนาที่ถูกต้องและเหมาะสม เพื่อให้ได้เครื่องมือที่มีคุณภาพ และสามารถนำใช้ในการประเมินความเสี่ยงต่อการเกิดพฤติกรรมรุนแรงในผู้ป่วยจิตเภทที่อาศัยอยู่ในชุมชนได้ต่อไป*

คำสำคัญ : *พฤติกรรมรุนแรง, ความเสี่ยง, โรคจิตเภท, เครื่องมือ, การพัฒนา, ชุมชน, แบบสอบถาม, การสัมภาษณ์, ขั้นตอน.*

Schizophrenia is one of the main psychiatric diagnoses associated with violence, [1-7] especially, those who are living with schizophrenia in community have a clear association with increased violence than the general population; [2, 3, 6, 8] the situation is also true in Thailand.

Some researchers reported that this association is related to several risk factors.[9 - 11] Not only psychotic symptoms but also other characteristics and circumstances that can increase chance of future violence among persons with schizophrenia in the community. According to the World Health Organization's report[12] on violence and health, no single risk factor can explain why some individuals behave violently toward others or why violence is more prevalent in some communities than others. Therefore, risk factors for violence can elevate the violence risk. Identifying and assessing these risk factors, particularly when they are applied to patients with potential risks, is an important step in assessing the underlying causes of violence.

Therefore, making an accurate assessment of violence risk is the first step for effective prevention. This is particularly important in the community setting where violent patients not only harm others but also demoralize family members who cared for them. It is thus important to determine the risk factors for risk of violence among persons with schizophrenia in the community for establishing effective prevention strategies of future violence. [13-15]

Although the benefits of assessment of the risks of violence in detecting highly violent schizophrenic patients who are in need of help are well developed by other disciplines in the west, the technology to assess and predict when the risks have evolved, producing a number of generations of risk assessment tools. The first generation of the tool relies on nothing more than unstructured professional opinions that may vary from one assessor to another depending on their training, background, and experience. This approach tends to lack consistency or agreement among assessors with low reliability.[14] The second generation of the tool uses essentially static predictors or fixed risk markers[16] such as the Violence Risk Appraisal Guide (VRAG)[17]and the Violence Screening Checklist (VSC). [18] They also have major shortcomings. First, tools with mostly static or historical variables cannot assess changes in risk. [16] Second, the results of risk assessments using such tools tell the assessor very little about the client's areas of problems, treatment potential, current function, etc. The third generation uses dynamic or changeable variables and, in some cases, are theory based such as the Level of Service Inventory-Revised (LSI-R) [19] and Historical, Clinical and Risk Management-20 Item version 2 (HCR-20). [19] They are designed primarily for the assessment of general criminality. Lastly, the fourth generation develops to fulfill specialized functions like the assessment and management of offenders, especially the treatment of violence such as the Level of Service/Case Management Inventory (LS/CMI) [19] and the Violence Risk Scale (VRS). [20]

However, the fourth generation of risk assessment tools or other violence risk assessment tools as described above to measure violence risk among Thai persons with schizophrenia in community is problematic for several reasons. First, they have not been developed to assess specific types of risk factors as violence risks among persons with schizophrenia. Second, they take times for use as a

screener in a setting like community, out patient departments, or justice systems where there is limited time or limited staff resources. They are time consuming procedures which preclude routine clinical uses as they need careful file reviews and semi-structured interviews. Therefore, it appears that the measurement of violence risk can be improved for assessing persons with schizophrenia in the community. Currently, there is no violence risk scale developed particularly for persons with schizophrenia. Thus, the researchers developed violence risk assessment scale for Thai persons with schizophrenia in the community, the Thai Violence Risk Scale (TVRS).

The aims of this paper are, namely: (1) to develop a clinically useful dichotomous scale for the assessing of violence risk among persons with schizophrenia in the community, and (2) to carry out an initial validation of the scale by content validity, internal consistency, and construct validity was evaluated with exploratory factor analysis (EFA). However, the psychometric properties of the TVRS will be reported in the future.

Methods

Procedures of developing the Thai Violence Risk Scale (TVRS)

The development procedures comprised ten steps guided by Crocker and Algina,[21] including: step 1, identify the primary purpose for which the test scores will be used; step 2, identify behaviors that represent the construct or define the domain; step 3, prepare a set of test specifications, delineating the proportion of items that should focus on each type of behavior identified in step 2; step 4, construct an initial pool of items; step 5, have items reviewed (and revise as necessary); step 6, hold preliminary item tryouts (and revise as necessary); step 7, field-test the items on a large sample representative of the examinee population for whom the test is intended; step 8, determine the statistical properties of item scores and, when appropriate, eliminate items that do not meet pre-established criteria; step 9, design and construct reliability and validity studies for the final form of the test; and step 10, develop guidelines for administration, scoring, and interpretation of the test score.

Subjects

The samples of the item analysis and EFA were persons with schizophrenia in the community that had committed violence at the Out-patient Department of the Galya Rajanagarindra Institute, the Department of Mental Health, Ministry of Public Health, Thailand. They were 1) being diagnosed with schizophrenia by ICD-10, 2) being 18 years of age or older, 3) living in the community, 4) being able to use Thai verbal communication, and 5) willing to participate in this study. Criteria for exclusion from the study include: 1) being diagnosed with schizophrenia and other disorders such as mental retardation (IQ less than 70), organic brain syndrome, and neurological problems, 2) having hostility, agitation, shouting, or throwing objects, 3) committing violently to themselves or others, or 4) carrying a weapon. A sample size of 270 in an item analysis and EFA for the 27-item TVRS was required. For the current study, however, the actual sample comprised 300 persons with schizophrenia in the community. Recruiting the samples via convenient sampling was employed to select samples.

Instrument

The Sociodemographic data sheet was developed by the researcher. This instrument was used for collecting demographic and socioeconomic data including age, gender, religion, marital status, education level, occupational, income, age at first instance of psychiatric illness, length of psychiatric illness, previous psychiatric inpatient hospitalizations, number of previous psychiatric inpatient hospitalizations, age when first admitted in relation to psychiatric illness, having a history of violence, number of incidences of violence, medication noncompliance, length of medication noncompliance, substance use history, and substance abuse.

Data Collection

In this study, protection of human subjects was performed before data collection in order to ensure that there was not risk to subjects. Informed consent was requested from each patients prior to participation. In case of agitated patients in whom it was difficult to obtain consent, informed consent was requested from patient's relatives. Once their participation in the study was approved, the study evaluation was performed.

The data collection was started after receiving the certificate of approval from the Ethics Committee of Galya Rajanagarindra Institute. Then, the researcher and research assistants started to collect data after having the permission from their legal authorities. Each participant completed the questionnaires consisting of informed consent and demographic data sheet. The face-to-face interviews of participants by researcher or research assistants were used for data collection.

Statistical analysis

1. Sociodemographic features of the subjects were assessed by descriptive statistics which consists of frequency and percentage, mean, standard deviation, and range.

2. As for item analysis, descriptive statistic, Chronbach's alpha coefficient, corrected item-total correlation, and item-item correlation were examined. The results of the various analyses were used as criteria to eliminate the poorly performing items.

3. Construct validity was evaluated by using exploratory factor analysis (EFA).

4. Internal consistency reliability of the second draft of the TVRS was made by using Cronbach's alpha coefficient.

Results

Results of conducting items review by content validity analysis

Content validity of the first draft of the TVRS was determined by Items Content Validity Index (I-CVI) and Scale Content Validity Index/Average Proportion (S-CVI/Ave) based on Polit and Beck.[22, 23] After completing content validity process, 29 items of the pool were revised, reshaped, deleted or added together following comments and suggestions of the experts. Regarding the items that are irrelevant to the operational definitions meaning, there were 2 items (item 4 and 14) which were deleted. Therefore, the number of 29 items in the item pool was reduced to 27 items in this step with an I-CVI score ranged from .78 -1.0 and an S-CVI/Ave score = .86.

In this step, after evaluating content validity, other nine mental health experts were invited to weight the score. After the nine experts weighted the 27 items, there were 3 items = 1 score, 6 items = 2 scores, and 18 items = 3 scores.

Sociodemographic Features of Sample for Item Analysis and EFA

Data for the item analysis and the EFA were collected through convenient sampling method from the Galya Rajanagarindra Institute, Department of Mental Health. The total samples of persons with schizophrenia (n = 300) comprises 82.00% men and 18.00% women between 17 - 60 years of age ($\bar{X}$ = 37.04, SD = 9.38). Moreover, more than one-third of them (39.00%) were 31 - 40 years old. Most of them were Buddhist (97.70%) and single (70.60%). They had completed elementary school (37.30%), high school (29.70%), and secondary school (17.30%), respectively. More than half of the samples were unemployed (52.70%). Sample incomes per month ranged from 200 - 200,000 baht ($\bar{X}$ = 5,884.67, SD = 16736.29) and most of them had incomes of less than 5,000 baht per month (67.70%).

Moreover, the age at first instance of psychiatric illness ranged from 13 to 55 years ($\bar{X}$ = 28.09, SD = 9.15). A total of 40.70% of the samples were 21 - 30 years of age at first instance of psychiatric illness. The length of the psychiatric illness from 1 to 44 years ($\bar{X}$ = 9.78, SD = 8.43) and a total of 30.30% of them had experienced a psychiatric illness more than 10 years. Most of them had previous inpatient hospitalizations (87.00%) and the number of previous inpatient hospitalizations ranged from 1 to 21 times ($\bar{X}$ = 3.01, SD = 3.25). The samples had previous inpatient hospitalizations 1 time (27.00%), 2 times (19.00%), and more than 5 times (15.70%), respectively. The age when the samples were first admitted to the hospital in relation to a psychiatric illness ranged from 12 to 53 years ($\bar{X}$ = 25.05, SD = 13.02) and more than one-third of them (36.00%) were 21 to 30 years of age when they were admitted to the hospital in relation to psychiatric illness. Regarding medication noncompliance before committing violence, 63.30% were medication noncompliant and length of medication noncompliance ranged from 2 to 730 days ($\bar{X}$ = 54.98, SD = 120.64). Moreover, the samples were medication noncompliant from 15 to 30 days (16.70%).

Additionally, most subjects had abused a substance before committing violence (68.70%), with alcohol (49.30%), amphetamines (10.30%), and marijuana (8.30%), respectively. Regarding violence history, they had committed violence ranging from 1 - 50 times ($\bar{X}$ = 4.15, SD = 4.84) and the number of previous instances of violence was 2 times (22.00%), 3 times (19.70%), and 1 time (16.70%), respectively (Table 1).

Results of Conducting Preliminary Item Tryout by Item Review

Before starting the item analysis and EFA, the second draft of the TVRS was determined for its appropriateness and clarity of each item, i.c., wording through face-to-face interviews with 10 schizophrenic patients in order to improve the items that were difficult to understand or answer. After the item review, all items were not improved.

The time used for answering the TVRS varied, ranging from 5 minutes to 10 minutes. The time taken

Table 1. Sociodemographic features of the sample (n = 300).

Sociodemographic features	n	%
Age 17-60 years, $\bar{X}$ = 37.04, SD = 9.38		
15-20 years	7	2.30
21-30 years	76	25.30
31-40 years	117	39.00
41-50 years	71	23.70
51-60 years	29	9.70
Gender		
Male	246	82.00
Female	54	18.00
Religion		
Buddhism	293	97.70
Christianity	5	1.70
Islam	2	0.60
Marital status		
Single	212	70.70
Married	35	11.70
Widowed	7	2.30
Divorced	46	15.30
Education level		
No education	8	2.70
Elementary school	112	37.30
Secondary school	52	17.30
High school	89	29.70
Diploma	14	4.70
Bachelor's degree	25	8.30
Occupational		
Unemployed	158	52.70
Student	5	1.70
Government officer	1	0.30
Employee	76	25.30
Merchant	38	12.60
Company officer	11	3.70
Agriculture	11	3.70

Table 1. Sociodemographic features of the sample (n = 300). (Continued)

Sociodemographic features	n	%
Income 200-200,000 baht/month, $\bar{X}$ = 5884.67, SD = 16736.29		
Less than 5,000 baht/month	203	67.70
5,001-10,000 baht/month	79	26.30
10,001-15,000 baht/month	11	3.70
15,001-20,000 baht/month	1	0.30
20,001-25,000 baht/month	-	-
25,001-30,000 baht/month	2	0.70
More than 30,001 baht/month	4	1.30
Age at first instance of psychiatric illness 12 - 52 years, $\bar{X}$ = 28.09, SD = 9.15		
12-20 years	76	25.30
21-30 years	122	40.70
31-40 years	61	20.30
41-50 years	37	12.30
51-60 years	4	1.40
Length of psychiatric illness 1 - 44 years, $\bar{X}$ = 8.90, SD = 8.09		
0-2 years	66	22.10
3-5 years	61	20.30
6-10 years	82	27.30
More than 10 years	91	30.30
Previous psychiatric inpatient hospitalizations	261	87.00
Number of previous psychiatric inpatient hospitalizations 1-21 times, $\bar{X}$ = 3.01, SD = 3.25		
No	39	13.00
1 time	81	27.00
2 times	57	19.00
3 times	35	11.70
4 times	27	9.00
5 times	14	4.70
More than 5 times	47	15.60
Age at first of admitted in relation to psychiatric illness 12 - 53 years, $\bar{X}$ = 25.05, SD = 13.02		
No	39	13.00
12-20 years	60	20.00
21-30 years	108	36.00
31-40 years	54	18.00
41-50 years	35	11.70
51-60 years	4	1.30

Table 1. Sociodemographic features of the sample (n = 300). (Continued)

Sociodemographic features	n	%
Number of instances of history of violence		
1 time	50	16.70
2 times	66	22.00
3 times	59	19.70
4 times	37	12.20
5 times	44	14.70
More than 5 times	44	14.70
Medication noncompliance before committing violence	190	63.30
Length of medication noncompliance before committing violence		
2-730 days, $\overline{X}$ = 54.98, SD = 120.64		
No	110	36.70
1-7 days	42	14.00
8-14 days	32	10.70
15-30 days	50	16.70
31-60 days	13	4.30
61-90 days	11	3.70
91-180 days	17	5.70
181-365 days	21	7.00
More than 365 days	4	1.20
Substance abuse before committing violence	206	68.70
Alcohol abuse	148	49.30
Amphetamine abuse	72	24.00
Marijuana abuse	56	18.70
Inhalants abuse	24	8.00
Cocaine abuse	1	0.30
Kratom abuse	13	14.30
Opiates abuse	3	1.00
Heroin abuse	10	3.30

for the process depends on the age of patient; the older they were, the more time they used. After completing the questionnaires, a briefing was organized in which patients were invited to comment on each item and they offered suggestions. However, they did not comment nor made any suggestion.

Results of Determining Statistical Properties of Item Scores by Item Analysis and EFA

1. Results of item analysis

Item analysis was used to determine the items in the second draft of the TVRS that were appropriate for constructing the final draft. The results of the item analysis are presented as follows:

Item distribution was examined by using mean, standard deviation, skewness, and kurtosis. As for the 27 items of the second draft scale, their means ranging from 0.07 to 2.54, with standard deviation ranging from 0.38 to 1.49. Two statistic indicators, representing normal distribution, were skewness and kurtosis. In this study, there were 21 items that obtained skewness values falling inside the range of -1 to +1, which represented normal distribution.[24] There were 19 items which had negatively high skewness, ranging from -.19 to -1.48.

Moreover, the items were examined by using corrected item-total correlations. The results of the item analysis show that 16 of all 27 items had an item-total correlation greater than .3. For the correlation matrix, when considered, there were 7 paired-items; 3/11, 3/15, 3/21, 8/26, 11/15, 15/21, and 19/20, which had inter-item correlation ≥ 7.

The Cronbach's alpha coefficient of the second draft of the scale was high (α = .921), which indicated that a number of items of the second draft of scale would be reduced due to many redundant items. Additionally, the value of Cronbach's alpha coefficients, if any item was deleted, was also still high and ranged from 0.911 to 0.927 (Table 2).

In this study, guidance for selection of appropriate items was conducted from item distribution, the results of item analysis, and the number of samples. Although the statistical data was useful for item selection, the final decision to include or reject any item in the final scale was primarily based on human judgment regarding what the item analysis revealed.[25] Therefore, the corrected item-total, the inter-item correlation, and the operational definition of the TVRS constructs were cooperated on making decision to select the items.

Based on the findings from the item analysis, 17 items were retained and 10 items were excluded (Table 3). The final outcome of the scale construction phase became the final draft of the TVRS, which was composed of 17 items covering the two components of the violence risk concept - circumstances (2 items) and characteristics (15 items) - for violence risk among persons with schizophrenia in the community. The final draft scale also reflected all aspects of violence risk among persons with schizophrenia in community as provided in the operational definitions.

2. Results of the EFA

A principle components analysis was selected as the factor extraction technique. Varimax orthogonal rotation was used to maximize the variance among the loadings on each factor. The first factor included fifteen of the original items developed to examine the characteristics component of this factor. The loadings of items on this factor ranged from .413 to .831, with an eigenvalue of 7.93, accounted for 46.65% of variance, and cumulative 46.65% of variance.

The second factor contained 2 items that were proposed to measure the circumstances component. Factor loadings ranged from .824 to .825, with an eigenvalue of 1.89, accounted for 11.10% of variance, and cumulative 57.76% of variance (Table 4).

Table 2. Item description of the second draft of the TVRS (n = 300).

Item No.	CVI	Mean	SD	Skewness	Kurtosis	Corrected Item-Total Correlation	Chronbach's Alpha if Item Deleted	No. of samples answer "Yes" (%)
1	.89	1.5933	.80630	-1.482	.196	.203	.897	239 (79.70)
2	.89	2.5400	1.08273	-1.934	1.752	.426	.894	254 (84.70)
3	.78	1.8900	1.45083	-.541	-1.719	.713	.887	189 (63.00)
4	.78	1.6400	1.49595	-.188	-1.978	.329	.897	164 (54.70)
5	.89	1.1100	1.45083	.541	-1.719	.294	.897	111 (37.00)
6	1	.0733	.37651	4.955	22.707	.090	.898	11 (3.70)
7	.78	5600	.49722	-.243	-1.954	.085	.898	168 (56.00)
8	1	2.0100	1.41300	-.202	-1.482	.719	.887	201 (67.00)
9	.89	1.3200	1.49165	.243	-1.954	.436	.894	132 (44.00)
10	1	1.9800	1.42350	-.679	-1.549	.376	.895	198 (66.00)
11	.89	1.8900	1.45083	-.541	-1.719	.715	.887	189 (63.00)
12	.78	1.0900	1.44529	.571	-1.685	.249	.898	109 (36.30)
13	.78	1.3267	.94672	-.695	-1.528	.198	.898	199 (66.30)
14	.89	.5467	.49865	-.188	-1.978	.118	.898	164 (54.70)
15	1	1.9100	1.44529	-.571	-1.685	.725	.887	191 (63.7)
16	1	1.9400	1.43641	-.617	-1.631	.713	.887	194 (64.70)

Table 2. Item description of the second draft of the TVRS (n = 300). (Continued)

Item No.	CVI	Mean	SD	Skewness	Kurtosis	Corrected Item-Total Correlation	Chronbach's Alpha if Item Deleted	No. of samples answer "Yes" (%)
17	.78	2.0300	1.40559	-.759	-1.433	.705	.887	203 (67.70)
18	.89	2.1000	1.37707	-.877	-1.239	.691	.888	210 (70.00)
19	.78	2.0900	1.38140	-.860	-1.269	.691	.888	209 (69.70)
20	.89	1.4133	.91210	-.912	-1.175	.726	.889	212 (70.70)
21	.78	1.9300	1.43945	-.601	-1.649	.702	.887	193 (64.30)
22	.89	.1867	.39029	1.616	.617	.236	.897	56 (18.70)
23	.89	.7200	1.28339	1.224	-.506	.194	.899	72 (24.00)
24	.78	.5267	.88236	1.080	-.839	.164	.898	79 (26.30)
25	.78	2.0000	1.41658	-.711	-1.505	.536	.891	200 (66.70)
26	.89	2.0900	1.38140	-.860	-1.269	.708	.887	209 (69.70)
27	.78	.5933	.91510	.895	-1.208	.285	.896	89 (29.70)

Table 3. Descriptive statistic of the 17 item-TVRS (n = 300).

17 item-TVRS	Mean	SD	Min	Max	Skewness	Kurtosis
Item1	1.64	1.49	0	3	-0.188	-1.978
Item2	1.11	1.45	0	3	.541	-1.791
Item3	2.54	1.08	0	3	-1.943	-1.752
Item4	1.89	1.45	0	3	-0.541	-1.719
Item5	2.01	1.41	0	3	-0.727	-1.482
Item6	1.03	1.43	0	3	0.663	-1.571
Item7	1.98	1.42	0	3	-0.679	-1.549
Item8	1.89	1.45	0	3	-0.541	-1.719
Item9	1.91	1.45	0	3	-0.571	-1.685
Item10	1.94	1.44	0	3	-0.617	-1.631
Item11	2.03	1.40	0	3	-0.759	-1.433
Item12	2.10	1.38	0	3	-0.877	-1.239
Item13	2.09	1.38	0	3	-0.860	-1.269
Item14	1.41	0.91	0	2	-0.912	-1.175
Item15	1.93	1.44	0	3	-0.601	-1.649
Item16	2.00	1.42	0	3	-0.711	-1.505
Item17	2.09	1.38	0	3	-0.860	-1.269

Table 4. Factor loadings, Eigenvalues, Percent of Variance, and Communallities for Varimax factor Rotation.

Factors/Items	Eigenvalues	Percent of Variance	Comulative % of variance	Factor loading	Communalities
Factor I Characteristics	7.93	46.65%	46.65%	-	-
Cha3				.413	.633
Cha4				.814	.714
Cha5				.811	.665
Cha6				.460	.345
Cha7				.434	.570
Cha8				.818	.712
Cha9				.831	.714
Cha10				.794	.632
Cha11				.805	.661
Cha12				.801	.653
Cha13				.796	.642
Cha14				.800	.643
Cha15				.811	.685
Cha16				.644	.450
Cha17				.810	.666
Factor II Circumstances	1.89	11.10%	57.76%		
Cir1				.824	.764
Cir2				.825	.728

Note:
Cha = Characteristics
Cir = Circumstances

Discussions

When sociodemographic features were analyzed, persons with schizophrenia who had committed violence were similar to the findings from that reported in the literature. It was observed that the persons with schizophrenia who had committed violence were younger age (40 years or under), [26 - 29] male gender, [30 - 34] Buddhist, [35 - 37] single, [13, 27, 33 - 39] poorly educated, [40,41] unemployed, [13, 34 - 37] low income, [35 - 37] younger age at the first of psychiatric episode, [29, 38, 39] previous inpatient hospitalizations, [28, 39] with a greater number of previous inpatient hospitalizations, [28, 39] younger age at first of admitted in psychiatric hospital, [39] violence history, [13, 28, 29, 33, 42, 43] more than one committed violence, [6, 43, 44] noncompliance to average more previous medications, [5, 29, 30, 38] history of substance use, [29, 34] and presence of substance abuse. [1,13, 27 - 29, 39, 41]

The first and second drafts of the TVRS have several properties that may make it appropriate for psychometric properties testing and, then, attractive to mental health professionals and researchers. First, all items of the TVRS were developed based on literature review and the Psychology of Criminal Conduct (PCC) [19] guided to select significant characteristics and circumstances which are variables, risk factors, as being associated with violence risk among persons with schizophrenia in community. So, the TVRS reflects the characteristics and circumstances of persons with schizophrenia in community which were assumed to be violence risks.

The 29 items of the pool were revised, reshaped, deleted or added together following comments and suggestions of the nine content experts who experienced in the area of mental health and violence among persons with schizophrenia. According to DeVellis[45] it was suggested that asking for feedback in relation to accuracy, appropriateness, relevant to the test specification, wording, vocabulary, sentence structure, and readability of each item; all these were recommended. Then, the first draft of the TVRS indicated good content validity (I-CVI = .78-1.0 and S-CVI/Ave score = .86). Regarding content analysis, the items with an I-CVI score should be .78 or higher[22,46,47] and an S-CVI/Ave score of .80 or better indicate good content validity. [48 - 50]

Each item score of the second draft of the TVRS was weighted by other nine mental health experts who experienced in persons schizophrenic violence. According to Prentky and Righthand,[51] risk assessment scale may work better when items are properly weighted. Item weighting was then taken into consideration. Some items are simply more important than others when it comes to outcome prediction.

Regarding the exploratory factor analysis (EFA), from the literature review, the TVRS was hypothesized to have 2 factors: a 2-factor solution using varimax rotation was originally specified. The result showed that the two factors include factor I, characteristics (15 items), and factor II, circumstances (2 items).

Regarding the characteristics, the first factor contained 15 items, with a factor loading of .413 to .831. All of the items in this factor included personality or features or attributes, background, social status, and the conditions of Thai persons with schizophrenia in the community. Regarding the circumstances, the second factor contained 2 items with a factor loading of .824 to .825. All items in this factor included events

or situations in the family of Thai persons with schizophrenia in the community, for example, poor family relationships (item 1) and expressed emotions in family (item 2). Both of the factors in this study are similar to those of Andrews and Bonta[19], who stated that risk factors refer to the characteristics of people and their circumstances that are associated with an increased chance of future criminal activity.

The scale is sensitive to Thai persons with schizophrenia in the community which does not exist in other violence risk scales based on western culture. When considering the item statements, the TVRS is more practical persons with schizophrenia in the community measure. The scale provides item statements which reflect specific questions on actual risk factors emerging within the persons with schizophrenia in previously and daily life that easily recall and answer.

Conclusions

The suitability of the development procedures for the TVRS seems to be clinically and practically useful in assessing persons with schizophrenia in community with a particularly high risk for violence. Moreover, it can help mental health professionals to identify characteristics and circumstances which are risk factors associated with violence risk among the persons with schizophrenia in the community. In addition, the TVRS can help mental health professionals in preventing violence before it begins and designing appropriate intervention strategies to reduce violence among persons with schizophrenia in community.

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