Original Article

The Development, Validity and Reliability of Psychotic Symptoms Rating Scale for Patients with Schizophrenia (Prasrimahabhodi Assessment Schizophrenia Scale: PASS8)

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Objective: To develop and test the validity and reliability of PASS8-a psychotic symptoms rating scale for the assessment of patients with schizophrenia which was designed for use in primary or secondary health care units.

Materials and Methods: The present study consisted of 2 stages. The first stage involved the development of psychotic symptoms rating scale; it composed of 8 items, 3 dimensions, and 5-point severity rating scales. In the second stage, a cross-sectional study was conducted to test the validity and reliability of PASS8 in patients with schizophrenia who were treated at Prasrimahabhodi Psychiatric Hospital. The patients were diagnosed with schizophrenia according to ICD-10 or DSM-IV diagnostic criteria and varied in phase of treatment; acute, stabilization and stable. The total of 150 volunteers aged 18 years and older were interviewed by psychiatric nurses using PASS8 before the patients were evaluated by psychiatrists with CGI-SCH. Data analysis was done by calculating Cronbach 's alpha coefficient, Pearson's correlation coefficient (r), sensitivity, specificity, and likelihood ratio of cut-off point categorized level of symptoms severity according to assessment by using PASS8

Results: Out of the total of 150 participants, they were predominantly single male between the ages of 31 to 40 years old. More than half of volunteers had an income of less than 1,000 baht a month and lived in Ubon Ratchathani Province with their parents. After performing a statistical analysis, the Cronbach's alpha indicated acceptable internal consistency. When comparing between PASS8's range of score categorized according to the severity of the symptoms and symptoms of patients with schizophrenia assessed by 2 psychiatrists using CGI-SCH, Pearson's correlation coefficient (r) was 0.741 (*p*-value <0.001). This test showed that sensitivity, specificity, and likelihood ratio in mild severity level were 64%, 64% and 1.78 (0.38 to 0.85), respectively, in moderate severity level were 37%, 67 % and 1.11 (0.65 to 1.91), respectively, and in severe severity level were 75%, 93% and 11.25 (2.84 to 244.64), respectively. The mean duration of completing this rating scale was 6.0 minutes (SD 2.6). Minimum and maximum duration were 2.0 minutes and 14.0 minutes, respectively.

Conclusion: PASS8 had acceptable internal consistency and statistic results indicated good correlation with CGI-SCH. It contained high sensitivity and specificity in separating schizophrenic patients with high severity and was adequate for evaluating patients with mild severity. It had low sensitivity in detection that was moderately severe. It used for evaluation of psychotic symptoms in patients with schizophrenia in short duration by trained primary/secondary health care provider.

Keywords: Psychotic symptoms rating scale, Schizophrenia, Validity, Reliability

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Schizophrenia is considered a chronic health disease with high severity[1]. The age of onset is generally during adolescence or throughout adulthood with 0.6 to 1.9% lifetime prevalence[1]. In Thailand, the prevalence rate of schizophrenia between the age of 15 and 59 years old was approximately 8.8 in 1,000[2]. After the initial diagnosis, the relapse rates remained high in patients who were on medications, at 16 to 23%, and patients who were not, at 53 to 72%. The treatment process could be hindered by inconsistent medication intake as well as drug abused problems which attributed to worsen of symptoms, displayed symptoms of social disabilities, and higher tendencies of aggressive behaviors[3]. The high relapse rate of this disorder emphasized the importance of continuously up to date treatment to match with current symptoms.

Previous studies found several assessment tools used in evaluation of schizophrenia patients. Brief psychiatric rating scales [BPRS] developed by Overall-Gorham in 1962[4] are used with general psychiatric patients and not limited to patients with schizophrenia. The Thai-version of the BPRS was statistically reliable and valid. It consisted of 16 or 18 items, and evaluation time takes approximately 30 minutes. However, one of the BPRS limitations was that it did not included list of negative symptoms that must be evaluated as well. The clinical global impression schizophrenia scale [CGI-SCH] comprised of 7 levels of severity of the illness in 5 domains of schizophrenic symptoms, namely positive symptoms, negative symptoms, depressive symptoms, cognitive symptoms and overall severity. It served as an assessment tool that measures the overall severity in patients with schizophrenia during treatment. The measurement ranges on a 7 point scale where 1 indicated 'normal, not at all ill 'to 7 which indicated 'among the most extremely ill patients'. Although it is concise, the measurement is not clearly defined regarding ranges of severity and heavily depends on clinical judgement. Thus, CGI-SCH is only suitable for psychiatrists or experts in the field of psychiatry to be an evaluator[5,8]. The scale for the assessment of negative symptoms [SANS] and the scale for the assessment of positive symptoms [SAPS] comprised to be an inclusive scale that covered both negative and positive symptoms of schizophrenia and other psychiatric disorders with similar symptoms. It was developed by Nancy C. Andreasen in 1983 and 1984, respectively[10,11]. The scale included 57 items, takes approximately 40 minutes to complete and is appropriate for assessment in psychiatric wards. A Thai language version of this assessment is not yet available. On the other hand, the positive and negative syndrome scale [PANSS] which comprised of 30 questions on a 7 point scale have a Thai version developed by Tana Nilchaikovit and his colleagues which is statistically valid and reliable. The criterion validity is similar to the English version of the scale. Each question has a clear and specific scope that concurrent with diagnostic criteria of DSM-IV which are psychoticism (reality distortion), disorganisation, and negative symptoms. The limitation of this scale mainly attributed to the duration of the assessment which can take 30 to 45 minutes. The longer time consumption resulted in general use in in-patient psychiatric ward and clinical researches[5,6,12,13]. If the scale was conducted in a primary or secondary care setting, it would be less practical as there are higher numbers of patients in the outpatient departments.

Other forms of assessments are also applicable to patients with schizophrenia as followed: The psychotic inpatient profile[6] which was developed by Maurice Lorr to conduct behavioral assessments in psychiatric patients of all ages and ranges of symptoms. The assessment used ordinal rating scale and a checklist which included 96 items. Although the assessments could be conducted by both registered nurses and practical nurses, its limitation scoped to the usage of in-patient assessments; a Thai language version is not available. From Behavior and Symptom Identification Scale [BASIS-32], which had a Thai language version available[6], was developed and made available by Ronnachai Kongsakon and available to the public as a self-assessment to screen possible psychotic symptoms and behaviors. In addition, another instrument which is available in Thai language is the Mini International Neuropsychiatric Interview [MINI][14]. This instrument,is in a format of structured interviews, which was translated into Thai language by Phunapa Kittirattanapaiboon and Maturin Khamwongpin, to diagnose psychiatric disorders according to the American Psychiatric Associations [APA] and World Health Organization [WHO] in general population and psychiatric patients. A specific set of questions in module L. inquired about psychotic disorders, in particular whether the patient had psychotic symptoms or not. However, it did not assess the severity of the symptoms. The psychotic screening test developed by Apichai Mongkol and his team is in interview format with accompanying manual as an assessment tool to screen psychotic symptoms in the patients or high risk relatives of the patients in the community, but it is not used for evaluation of the

symptoms severity[15].

The literature review demonstrated that the tools in assessment of patients with schizophrenia have limitations as followed: the assessments usually takes at least 30 minutes, and many tools have not been translated into Thai language and required the assessors to be trained and experienced in conducting assessments. There is no assessment tool that is applicable to evaluate schizophrenic patients with relapse-remission symptoms that is quicker, concise and suitable to healthcare settings in Thailand. Most Thai patients are treated in local healthcare facilities such as the district's local hospital or the province's main hospital. In other provinces, rural areas in particular, there are shortages in the number of practicing psychiatrists and the assessments were conducted by the nurses or general practitioners who were responsible for large numbers of psychiatric patients per day. Therefore, the screening process must be conducted quickly before providing appropriate treatments. Prasrimahabhodi Psychiatric Hospital, a hospital that is part of hospital networks in Northeastern part of Thailand, developed a concept to create an assessment that measures psychotic symptoms in patients with schizophrenia in Thai language that is short-duration and that healthcare professionals could utilize for schizophrenic follow-up in local communities. The developed assessment tool is derived from 8 items of the PANSS (Thai version) which has specific and correspond for diagnosis criteria of remission in patients with schizophrenia as proposed by Andreasen NC, et al[16-20] for using as an assessment tool that assist in monitoring, categorizing and detecting signs of relapse in schizophrenic symptoms especially for patients with moderate or severe symptoms of schizophrenia. This tool might be able to support systematization of treatment for patients with schizophrenia. Subsequently, there should be a decrease in aggressive behaviors, its effects, and contributing to assist patients with schizophrenia to adapt to society.

Objective

To develop and test the validity and reliability of the PASS8-a psychotic symptoms rating scale for assessing patients with schizophrenia designed for use in primary or secondary health care units.

Materials and Methods

The present study was divided into 2 stages as followed:

Stage 1: a development of assessment tool for evaluating severity of symptoms in patients with schizophrenia.

Conducting literature and medical records review, then draft the pilot assessment tool for evaluating severity of symptoms in patients with schizophrenia within the scope of PANSS (Thai version) and remission criteria proposed by Nancy C. Adreason and then obtained the consensus of 3 Thai psychiatrists as experts.

The pilot assessment tool was assessed by a focus group with psychiatric nurses who were specially trained in psychiatry and mental health. These 20 nurses were stationed in the psychiatric clinic of a community hospital and were trained to use this pilot assessment tool. Subsequently, the pilot assessment tools were used to interview of 20 patients with schizophrenia admitted to Prasrimahabhodi Psychiatric Hospital.

The feedback was used to modify the assessment tools in addition to opinion derived from the 9 psychiatrists who worked at Prasrimahabhodi Psychiatric Hospital. The modified final version of the assessment tool, Prasrimahabhodi Assessment Schizophrenia Scale [PASS8] consisted of 8 items within 3 main primary symptoms of patients with schizophrenia as follows:

1) Dimension P: psychoticism consisted of item 2 (delusions), item 3 (unusual thought content), and item 4 (hallucination behaviors).

2) Dimension D: disorganization consisted of item 6 (conceptual disorganization), and item 8 (mannerism and posturing).

3) Dimension N: negative symptoms consisted of item 1 (passive/apathetic social withdrawal), item 5 (blunt affect), and item 7 (lack of spontaneity and flow of conversation).

The severity of the symptoms could be rate on a 5-point scale with 1 indicated no symptoms/normal behavioral responses to 5 indicated extremely severe.

Stage 2 the validity and reliability of the assessment tool were examined by diagnostic test study design (a cross-sectional study). The correlation test was done to compare PASS8 results interviewed by the nurses and CGI-SCH (The Clinical Global Impression-Schizophrenia scale) interviewed by psychiatrists.

Participants

The PASS8 were used to assess both male and female patients with schizophrenia who received out-patient and in-patient treatment at Prasrimahabhodi

Psychiatric Hospital during 16 to 27 June 2009.

Sample size is calculated based on the accuracy of PASS8 compared to CGI-SCH (gold standard). With the estimated sensitivity of 90% and 95% CI of 90% and 10% error, a sample of relapsed schizophrenic patients of 42.7 is required.

According to 'One year outcome in first episode schizophrenia predictors of relapse' by Ashihan Polat, Sibel Cakir and Aysun Genc in 2006[21], the relapse rate after the first episode of schizophrenic symptoms is 33%. Therefore, 130 patients with schizophrenia are required. However, in order to collect complete data of the sample group that is divided into 3 phases of treatment, the research team decided to collect the sample of 150 patients.

The inclusion criteria of the participants are as follows:

1) The patient must be diagnosed with schizophrenia according to DSM-IV-TR or ICD-10, and categorized into acute, stabilization, or stable phase.

2) At least 18 years old age.

3) Able to communicate fluently in Thai language.

4) The patients and their relatives give their consent to participate in the present study.

The exclusion criteria of the participants are as follows:

1) Patients who received diagnosis with schizophrenia for the first time on the day of data collection.

2) The patients have comorbidity such as if they were also diagnosed with substance related disorders, organic brain disorder, or mood disorder.

3) The patients have been diagnosed with other psychiatric disorder such as schizoaffective disorder.

4) The patients were in an emergency state and unable to cooperate.

The process of data collection was conducted by 6 registered nurses with at least 5 years of mental health and psychiatry experiences. They underwent training with the psychiatrists of the research team to use this assessment tool.

Before the data collection process, the research team explained and protected the rights of the participants, and the patients were random sampling. Then, the patients were interviewed to collect general information.

The first research team, consisted of 3 nurses, used PASS8 to evaluate the participants. The second research team consisted of 2 psychiatrists-the first one was an interviewer who used CGI-SCH, while the other was an observer who also used CGI-SCH to assess the patients. After the assessments by using CGI-SCH, the psychiatrists discussed their findings to determine the results. The research team then specified the range of symptoms' severity scores for use in interpreting the results from PASS8. The range of the symptom severity score and its cut-off point of each severity level were set by using the results from the scores of symptomatic remission criteria proposed by Andreasen and her working group[16] and clinical consensus from 3 psychiatrists. The range of symptoms severity score were analyzed and statistically calculated.

Ethic consideration

The present study was approved by the ethical review committee for research in Prasrimahabhodi Psychiatric Hospital.

Statistical analysis

Internal consistency of PASS8 was determined using Cronbach's alpha. Correlation coefficient between PASS 8 and CGI-SCH was calculated using Pearson's correlation. Validity of PASS8 in differentiating severity of symptoms (normal-mild, moderate and severe) compared to CGI-SCH (gold standard) was reported as accuracy in each category.

Results

The results were divided into two parts where one is the general information of participants and the other is the information regarding the developments of the assessment tools as follows:

Part 1: Information regarding the participants

Demographic data of the sample group (n = 150)

Two-thirds of the participants were male (n = 100, 66.7%). Participants were predominantly between the ages of 31 to 40 years old (n = 69, 46.0%) and the average age was 35.9 years old (SD 1.0). Most of the participants were single (n = 102, 68.0%), and almost half of the participants answered that they were in an adequate socioeconomic status and replied that they were not in debt (n = 70, 46.7%), while more than half did not have an income or had an income of less than 1,000 baht (n = 89, 59.0%). Almost half of the participants graduated at elementary level (n = 72, 48.0%), and were in agricultural industry (n = 63, 42.0%). The main caretakers were their parents (n = 94, 62.7%), and more than half of the participants resided in Ubon

Ratchatani (n = 90, 60.0%).

Personal illness history (n = 150)

The participants were first diagnosed within 1 to 5 years (n = 58, 38.7%), followed by 6 to 10 years (n = 39, 26.0%). Two-third of the participants had a history of inpatient treatment (n = 100, 66.7%). Almost half of the patients who had a history of inpatient treatment were admitted 2 to 5 times (n = 40, 26.7%). Most of them never received electroconvulsive therapy (n = 133, 88.7%). In psychopharmacological treatment, the typical antipsychotic drug were primarily chlorpromazine (n = 63, 42.0%) followed by fluphenazine (n = 57, 38.0%), haloperidol (n = 52, 34.7%), and perphenazine (n = 44, 29.3%), respectively. In atypical antipsychotic drug mostly the patients received clozapine (n = 57, 38.0%).

Table 1, it was found that more than half of the participants received out-patient treatments (male: n = 68, 45.3%, female: n = 35, 23.3%). When categorized by phase of treatment, more than half of the participants were in the stabilization phase (male: n = 64, 42.7%, female: n = 26, 17.3%), followed by stable phase (male: n = 30, 20.0%, female n = 20, 13.3%), and acute phase (male: n = 6, 4.0%, female: n = 4, 2.7%), respectively.

Part 2 the results of validity and reliability of the assessment tool

For the time duration, the nurses' application of PASS8 was no difference to the interviews conducted by the psychiatrists with CGI-SCH. The average time of completion for the nurse who used PASS8 was 6.0 minutes (SD = 2.6), the nurse was quickest at 2.0 minutes and took the most time at 14.0 minutes.

Table 2, the results revealed that the reliability value of PASS8 had the Cronbach's alpha coefficient of 0.794 which considered reliable. The value of Cronbach's alpha coefficient if "Item deleted" was at least 0.766. When inspected each question separately, correlation between each question and the total PASS8 score found low correlation in item 5 (blunted affect) and item 8 (mannerism and posturing).

The score of PASS8 were categorized into 3 categories according to the severity of the symptoms by application of the scores of symptomatic remission criteria proposed by Andreasen and her working group[16], using statistical data, and clinical judgement from 3 psychiatrists as demonstrated in Table 3.

Moreover, it was found that the relationship between the total scores of PASS8 and CGI-SCH overall correlated at 0.741 (p<0.05), which considered a good level of positive correlation. A closer inspection revealed that items in dimension P, psychoticism of the PASS 8 (item 2, 3, 4) correlated with 'positive' category of CGI-SCH have (r) value of 0.833 (p<0.05), which considered excellent. The item 1, 5 and 7 in the N, negative symptoms of the PASS8 correlated with CGI-SCH's 'negative' category have (r) value of 0.685 (p = 0.005) which considered acceptable. However, there is no concordant

Table 1. Numbers of patients categorized according to types of services and phase of treatment (n = 150)

	Number (%)	
	Male	Female
Types of services		
OPD	68 (45.3)	35 (23.3)
IPD	32 (21.4)	15 (10.0)
Phase of treatment		
Stable	30 (20.0)	20 (13.3)
Stabilization	64 (42.7)	26 (17.3)
Acute	6 (4.0)	4 (2.7)

Table 2. Item-total correlationand alpha coefficient if item deleted ofPASS 8

Items	Correlation with total PASS8 score	Cronbach 's alpha if item deleted
1) Passive/apathetic social withdrawal	0.583	0.789
2) Delusions	0.606	0.785
3) Unusual thought content	0.613	0.784
4) Hallucinatory behavior	0.604	0.787
5) Blunted affect	0.394	0.814
6) Conceptual disorganization	0.710	0.766
7) Lack of spontaneity and flow of conversation	0.508	0.799
8) Mannerism and posturing	0.267	0.826
9) Cronbach's alpha of PASS8	0.794	

'disorganization' category in CGI-SCH. Thus, dimension D, disorganization of the PASS8's correlation with CGI-SCH could not be determined.

The results of the reliability and validity cut-off point found statistical data as follows: sensitivity, specificity, and likelihood ratio. 'Normal to mild' category had the scores of 64%, 64%, and 1.78 (0.38 to 0.85), respectively. 'Moderate' category had the scores of 37%, 67%, and 1.11 (0.65 to 1.91), respectively. 'Severe' category had the scores of 75%, 93% and 11.25 (2.84 to 244.64), respectively.

Discussion

The PASS8 assessment tool contained sub-scales that in accordance with 3 aspects of the primary symptoms in patients with schizophrenia and other schizophrenic assessment tools. In other words, the item delusions, unusual thought content, hallucinatory behavior in psychoticism dimension resonated that of the SAPS assessment questions regarding delusions and hallucinations. Furthermore, it concurred with criteria A of diagnosing schizophrenia in DSM-5, specifically delusions and hallucinations. Regarding the item conceptual disorganization and mannerism/posturing in disorganization category of the PASS8, they were in accord with questions about positive formal thought disorder and bizarre behavior of the SAPS assessment as well as diagnosis criteria A of schizophrenia in DSM-5 particularly disorganized speech and grossly disorganized or catatonic behavior. For "blunted affect" item, passive/apathetic, social withdrawal, lack of spontaneity, and flow of conversation in negative symptoms category of the PASS8 were similar to the SANS's item affective flattening, avolition-apathy, anhedonia-asociality and alogia as well as negative symptoms list in criteria A of the DSM-5[5].

The reliability of the PASS8 was determined with Cronbach's alpha coefficient with the score 0.794 which considered reliable. The value of Cronbach's alpha coefficient if item deleted were at least 0.766 (0.766 to 0.826). On closer inspection of the details, only a few questions had low correlation with total PASS8 score which were item 5 (blunted affect) (r = 0.394) in

Table 3. The correlation when comparing between PASS8's range of score categorized according to the severity of the symptoms and symptom of schizophrenic patient assessed by using CGI-SCH

	PASS 8		CGI-SCH	r (*p*-value)
Category	score	Dimension P, D		
Normal, mild	8-16	And every item in P (item 2,3,4) and D (item 6,8) <4	Normal, not ill, minimally ill, mildly ill	0.68 (0.005)
Moderate	17-30		Moderately ill Markedly ill	0.85 (0.000)
Severe	>30	or any item in P (item 2, 3, 4) or D (item 6, 8) ≥4	Severely ill, among the most severely ill	0.74 (0.000)

Table 4. Sensitivity, specificity, positive predictive value [PPV], negative predictive value [NPV] and likelihood ratio of cut off point categorized level of symptoms severity according to assessment by using PASS8

Level	Cut-off point	Sensitivity (95% CI)	Specificity (95% CI)	PPV (95% CI)	NPV (95% CI)	LR (95% CI)
Normal-mild	8 to16	64% (50 to 78)	64% (55 to 73)	45% (33 to 57)	80% (71 to 88)	1.78 (0.38 to 0.85)
Moderate	17 to 30	37% (24 to 50)	67% (53 to 180)	57% (41 to 74)	47% (35 to 59)	1.11 (0.65 to 1.91)
Severe	>30	75% (51 to 100)	93% (84 to 100)	82% (59 to 100)	90% (80 to 100)	11.25 (2.84 to 44.64)

dimension N (negative symptoms), item 7 (lack of spontaneity and flow of conversation) (r = 0.508) in dimension N (negative symptoms) and item 8 mannerism and posturing (r = 0.267) in dimension D (disorganization). These items could only be assessed by clinical observation. Thus, these items in the PASS8 should be considered the factors that influenced low correlation. Moreover, these items' scoring rubric or the training manual of this rating scale should be revised before implementation.

When considered each dimension separately, the correlation between overall score of PASS8 and overall CGI-SCH had positive association with the score 0.741 (p<0.05). Specifically, item 2, 3, 4 in psychoticism of the PASS8 correlated with CGI-SCH in the positive category where (r) was equivalent to 0.833 (p<0.05) which considered good. In item 1, 5 and 7 of the PASS8 in the negative symptoms dimension correlated with CGI-SCH's negative category had the relationship of (r) equivalent to 0.68 (p = 0.005) considered adequate correlation. This was supported by Haro JM et al[8] that found correlation coefficients between PANSS scores and CGI-SGH were high (most above 0.75), and were highest for positive and negative symptom. The questions that were selected from the PANSS, a widely accepted assessment tools, to modified in PASS8 in the categories of psychoticism and negative symptoms were the items that were representatives of primary symptoms as well as remission criteria as proposed by Andreason NC, et al[16-20].

The validity of the PASS8, in comparison to other assessment tools[22] was compared to another acceptable measure, the CGI-SCH, due to its inclusion of the severity rating scale. As there is no available gold standard measures, PASS8's 'normal to mild' were compared to CGI-SCH's 'normal, not ill, minimally ill, and mildly ill' and found to have Pearson's correlation (r) equivalent to 0.68 (p-value = 0.005*). Hence, the PASS8 was able to assessed similar results to the CGI-SCH although not completely. The PASS8's moderate score as compared with CGI-SCH's 'moderately ill, and markedly ill' found Pearson's correlation (r) equivalent to 0.85 (p-value = 0.000*) which indicated similar outcome as the CGI-SCH's measurement. In PASS8's 'severe' scale as evaluated in comparison with CGI-SCH's 'severely ill, among the most severely ill' found Pearson's correlation (r) equivalent to 0.74 (p-value = 0.000*). This result indicated similar assessment capabilities between PASS 8 and CGI-SCH.

The evaluation of PASS8 reliability and validity of the cut-off point found sensitivity, specificity and likelihood ratio (LR) as followed: 'Normal to mild' cut-off point at 8 to 16 had the scores of 64%, 64%, and 1.78 (0.38 to 0.85), respectively. 'Moderate' category cut-off point fell between 17 to 30 and had the scores of 37%, 67%, and 1.11 (0.65 to 1.91), respectively. 'Severe' category's cut-off point was at least a score of 31 had the scores of 75%, 93% and 11.25 (2.84 to 244.64), respectively. The distinction separated the group with high severity which contained high sensitivity and specificity. Thus, it was an appropriate method of classification and detection for patients with high severity. If go undetected, the patients may lose the opportunity to receive appropriate treatment.

However, in the cut-off point in the range of 17 to 30, the sensitivity, specificity, and likelihood ratio were not as high. Therefore, the detection of moderate severity group may not be as sensitive to be provided treatments quickly for stopping the progression of symptoms. In the cut-off point in the range of 8 to 16, the sensitivity and specificity were in adequate range. The scores could indicate that from PASS8's assessments reflected normal to mild severity and the patients were not required to receive aggressive treatments immediately.

Limitation

The limitations of the present study involved demographic data that almost two-thirds of the participating patients in this study were male whereas schizophrenia is equally prevalent in men and women across the World and in Thailand[2,23,24].

Furthermore, the primary language used in the assessments was primarily Thai language with northeastern dialect. Although, Thai language, with central dialect, was primarily used in the development of the assessment tools, there may have been some parts affected by the difference in the dialect. This is due to the completeness of psychiatric assessment process required in-person interview of the patient, their relatives, or the caretaker. In addition, the authors have not provided any evidence of content validity by calculating content validation index [CVI].

Moreover, the objective of this tool is to be able to utilize for general practitioners and nurses in community hospital settings. Thus, the context would be different than the setting of this study where schizophrenic diagnosis was given by psychiatrists. However, Prasrimahabhodi Psychiatric Hospital's system has a monthly follow-up plan for patients at their local hospital, and visit Prasrimahabhodi Psychiatric Hospital at least every 6 months. Therefore,

patients from local areas would have the same access as well. The condition of the study specifically excluded schizophrenic patients with comorbidity whereas the patient received treatment from local hospitals and might have had comorbidity which may affect the results of the PASS8's assessments. The registered nurses who participated in the present study were experienced in the field of psychiatry, but nurses in local hospitals may not be. However, the results could still be valid as in some areas the nurses in those communities have experience with psychiatric patients or graduated in similar programs with nurses who were researchers in the present study.

Even though CGI-SCH was not a gold standard for assessment tools, it was acceptable when considered time and experts limitations in this study. The psychiatrists in the present study were previously trained in CGI-SCH assessment. In addition, there are previous studies which found that the correlation between CGI-SCH, PANSS, and GAF were mostly over 0.75 in both positive and negative symptoms category[8] which resonated in the present study. Thus, CGI-SCH used by psychiatrists was the most probable choice as a standard of comparison for the PASS8 assessments that was done by the nurses.

Recommendations

This assessment tool must be used with schizophrenic patients with no comorbidity.

The evaluator of this instrument must have experience in caring for patients with schizophrenia and been trained to use the assessment tool prior to the evaluation.

If used in other health service settings, there should be an evaluation whether the PASS8 is suitable.

Conclusion

PASS8 had acceptable internal consistency and statistic results indicated good correlation with CGI-SCH. It contained high sensitivity and specificity in separating schizophrenic patients with high severity and was adequate for evaluating patients with mild severity. It had low sensitivity in detection that was moderately severe. It was able to be used for evaluation of psychotic symptoms in patients with schizophrenia in short duration by trained primary/secondary health care providers.

What is already known on this topic?

Symptoms' severity assessment is necessity in treatment plan in according to health care services.

What this study adds?

This study added validity and reliability of a schizophrenic severity assessment scale to be used in primary and secondary care.

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Potential conflicts of interest

None.

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