Cognitive Insight in Schizophrenia: Its Relationship with Verbal Learning and Clinical Insight

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ABSTRACT

Background: **Cognitive insight is a relatively new concept. While cognition, clinical and cognitive insight are interrelated, the relationship is rather complex and the research so far is inconclusive.**

Objectives: **This study aimed to examine cognitive insight and its relationships with verbal learning, clinical insight, and severity of psychopathology among schizophrenia outpatient in Kelantan, Malaysia.**

Methods: **A total of 108 stable outpatient schizophrenia patients were recruited. Cognitive insight, psychopathology, verbal learning, and clinical insight were assessed using the Beck Cognitive Insight Scale (BCIS), Brief Psychiatric Rating Scale (BPRS), Auditory Verbal Learning Test (AVLT), and Insight and Treatment Attitudes Questionnaire (ITAQ), respectively.**

Results: **In multiple linear regression final model for BCIS-Composite, only female gender emerged as a significant associated factor. The final equation for BCIS-Composite was 2.746 + 1.99*(Gender) with 4% of the variation explained by gender (R^2 = 0.04). None of the other socio-demographic and clinical characteristics including psychopathology, clinical insight and verbal learning were significantly associated with the self-reflection, self-certainty and composite-index of cognitive insight**

Conclusions: **Cognitive insight was not significantly associated with verbal learning, clinical insight, and severity of psychopathology. The only significant factor was female gender which was positively correlated with composite-index of cognitive insight.**

KEY WORDS

cognitive insight, schizophrenia, verbal learning

INTRODUCTION

Cognitive insight is conceptually different from clinical insight but occurring in a similar spectrum of insight[1]. Patients with schizophrenia who agreed that they could be wrong in their beliefs, showed better improvement in treatment outcome when psychological approach such as cognitive behavioural therapy (CBT) was given, as opposed to the other group of patients who were unshakable in their beliefs and received the same psychological approach[2]. This finding was later realized to be linked to "cognitive insight", a term gaining ground only as recent as 2004. High self-certainty reflects greater certainty about being right and more resistant to correction (poor insight), while high self-reflection indicates the expression of introspection and the willingness to acknowledge fallibility (good insight)[3].

Cognitive insight measures the ability of patient's higher mental functioning to assess and re-evaluate their distorted thoughts and beliefs, their openness to criticism, and how firmly they believe in their delusions[3]. In contrast to clinical insight, no significant change was observed in cognitive insight after treatment of acute psychosis suggesting cognitive insight contributes to clinical insight but is not treatment-dependent[4]. Schizophrenia patients with depression had significantly higher score for self-reflection and self-certainty subscales as well as the mean composite index score[5]. Factors such as negative sympoms[6] and depression[7] may also play a role in determining good cognitive insight.

A good clinical insight may also not necessarily be translated into good cognitive insight. Some patients may agree that they are mentally ill and the unusual experiences are due to mental disorder but without themselves being convinced of this[3]. It was found that self-reflection of cognitive insight, but not self-certainty, predicted severity of symptoms at 4-years after first episode psychosis (FEP)[8]. Cognitive insight, particularly the level of self-reflectiveness, is negatively associated with the level of subjective quality of life in outpatients with schizophrenia[9]. A reduction of positive symptoms was demonstrated as cognitive insight improved with CBT[10,11]. A more comprehensive assessment of patient mental state, therefore, requires evaluation of both cognitive and clinical insight. This is a good step to bring the patient to a more serious level of recovery by ensuring successful adherence to treatment and continuous engagement in a therapeutic doctor-patient partnership[12].

In individuals with an FEP, cognitive insight may rely on memory whereby current experiences are appraised based on previous ones[13]. Excessively high self-certainty might be linked with weaknesses in cognitive flexibility or set-shifting ability in people with at risk mental states (ARMS)[14]. Social cognitive abilities, particularly, theory of mind (ToM) is associated with clinical, but not cognitive insight, suggesting ToM impairment as contributing factors to poor insight in schizophrenia[15,16]. The close relationship between insight and cognition leads some authors to describe insight as being part of a neurocognitive model related to frontal lobe function[17,18]. Recently, there has been a lot of interest in the study of neural correlates of cognitive insight. Higher self-certainty was associated with thinner cortex in left posterior cingulate/precuneus[19] as well as hippocampal presubiculum atrophy, which is involved in episodic memory and cognitive control and is supposed to be under-

Table 1. Socio-demographic, clinical and insight characteristics of subjects (n = 108)

Variables	n (%)
Sex	
Male	63 (58.3)
Female	45 (41.7)
Race	
Malay	105 (97.2)
Chinese	1 (0.9)
Indian	-
Others	2 (1.9)
Marital Status	
Never married	74 (68.5)
Married	21 (19.4)
Divorced/separated	13 (12.0)
Employment Status	
Unemployed	59 (54.6)
Employed	49 (45.4)
Educational Status	
Primary	4 (3.7)
Secondary	73 (67.6)
Tertiary	31 (28.7)
Treatment Received	
Atypical antipsychotics	67 (62.0)
Typical antipsychotics	24 (22.2)
Both atypical and typical	17 (15.7)
Benzhexol Use	
Yes	14 (13.0)
No	94 (87.0)

	Mean(SD)	Median(IQR)
Age (yrs.)	33.67(10.11)	
Duration of Illness (yrs.)	10.96 (7.71)	
BPRS		23 (5)*
Verbal Learning		
Total learning	34.19 (10.61)	
Delayed recall		7.0 (4)*
Recognition		14.0 (3)*
Insight data		
BCIS-SR	12.52 (4.62)	
BCIS-SC	8.93 (3.45)	
BCIS-Composite	3.57 (4.92)	
ITAQ	13.52 (4.16)	

*Skewed distribution

Table 2. Correlation coefficients of BCIS with verbal learning, clinical insight and severity of psychopathology

Variables	BCIS-SR		BCIS-SC		BCIS-Composite	
	r	p-value	r	p-value	r	p-value
Total learning	0.13	0.19	0.09	0.36	0.06	0.56
Delayed recall	0.06*	0.54	0.10*	0.30	-0.01*	0.93
Recognition	0.06*	0.53	0.09*	0.39	0.03*	0.77
ITAQ	0.06	0.53	0.02	0.83	0.04	0.68
BPRS	0.05*	0.60	-0.12*	0.20	0.15*	0.13

r Pearson correlation coefficient, * Spearman correlation coefficient

Table 3. Associated factors of BCIS-SR by simple linear regression (n = 108)

Variables	BCIS-SR		
	ba (95%CI)	tb stat	p-value
Age	-0.00 (-0.09,0.09)	-0.003	0.998
Gender	1.47 (-0.30,3.25)	1.648	0.102*
Race			
Malay	2.93 (-2.42,8.29)	1.086	0.280
Chinese	-1.53 (-10.77,7.70)	-0.329	0.743
(Others)			
Marital Status			
Never married	-0.62 (-2.52,1.29)	-0.643	0.522
Married	0.78 (-1.46,3.01)	0.689	0.493
(Divorced/Separated)			
Employment	-0.87 (-2.64,0.90)	-0.980	0.329
Educational Status			
Primary	-2.88 (-7.53,1.78)	-1.225	0.223*
Secondary	-0.33 (-2.22,1.56)	-0.348	0.728
(Tertiary)			
Antipsychotics			
Atypical	-0.23 (-2.05,1.60)	-0.245	0.807
Typical	-0.51 (-2.63,1.62)	-0.472	0.638
(Both)			
Benzhexol Use	1.66 (-0.95,4.28)	1.260	0.210*
Duration of illness	0.02 (-0.10,0.13)	0.296	0.768
BPRS	0.05 (-0.22,0.32)	0.369	0.713
Verbal Learning			
Total learning	0.06 (-0.03,0.14)	1.316	0.191*
Delayed recall	0.20 (-0.12,0.51)	1.244	0.216*
Recognition	0.26 (-0.13,0.66)	1.315	0.191*
ITAQ	0.07 (-0.15,0.28)	0.627	0.532

a crude regression coefficient, b t statistic, *p < 0.25, included in the MLR

pinned by difficulty in integrating new memories and thus in generating new hypotheses about the self[20]. Self-reflectiveness was positively correlated to activation in bilateral ventrolateral prefrontal cortex (VLPFC) in FES, but not in controls[21]. In addition, reduced posterior (occipito-temporo-insulo-parietal) and increased anterior (orbitofrontal) cerebral metabolism may sustain low cognitive insight in psychosis[22].

In order to improve insight, patients are given health education and counselling. Patient's cooperation, understanding as well as intact cognitive ability to remember health-related advice are essential in order to produce a constant positive effect on one's mental health. This is dependent on patient's ability to listen, comprehend and retain information, hence collectively called as "verbal learning" and it involves working memory process. Verbal learning, together with other cognitive abilities such as visual working memory and executive function, are part of neurocognition. Nevertheless, linking both cognitive insight and neurocognition is still not widely investigated and there have been no known published data yet to the author's knowledge regarding cognitive insight assessment in Malaysia. More knowledge about cognitive insight can be gained by exploring the relationship between the two domains in our Malaysian setting by using appropriate investigative tools.

Therefore, this study aimed to examine cognitive insight and its relationships with verbal learning, clinical insight, and severity of psychopathology among schizophrenia outpatient in Kelantan, Malaysia. Cognitive remediation therapies could later be formulated, suggested or devised to enhance neurocognitive abilities in order to improve cognitive insight. Better cognitive insight inevitably helps elevate patient's potential functional outcome by achieving greater adherence to medication, therapies and simultaneously reducing relapses that have been linked to treatment non-compliance.

Table 4: Associated factors of BCIS- SC by simple linear regression (n = 108)

Variables	BCIS- SC		
	bᵃ (95%CI)	tᵇ stat	*p*-value
Age	0.06 (-0.01,0.12)	1.695	0.093*
Gender	-0.48 (-1.82,0.85)	-0.717	0.475
Race			
Malay	-0.08 (-4.09,3.94)	-0.038	0.970
Chinese	1.08 (-5.79,7.96)	0.312	0.755
(Others)			
Marital Status			
Never married	-0.06 (-2.04,0.79)	-0.874	0.384
Married	0.45 (-1.22,2.11)	0.532	0.596
(Divorced/Separated)			
Employment	0.40(-0.92,1.72)	0.596	0.553
Educational Status			
Primary	1.38 (-2.11,4.86)	0.783	0.435
Secondary	0.06 (-1.35,1.47)	0.084	0.933
(Tertiary)			
Antipsychotics			
Atypical	-0.91 (-2.25,0.44)	-1.333	0.185*
Typical	0.79 (-0.79,2.37)	0.995	0.322
(Both)			
Benzhexol Use	1.72 (-0.21,3.65)	1.763	0.081*
Duration of illness	0.01 (-0.07,0.10)	0.337	0.737
BPRS	-0.13 (-0.32,0.07)	-1.250	0.214*
Verbal Learning			
Total learning	0.03 (-0.03,0.09)	0.928	0.355
Delayed recall	0.11 (-0.12,0.35)	0.960	0.339
Recognition	0.21 (-0.09,0.50)	1.376	0.172*
ITAQ	0.02 (-0.14,0.18)	0.210	0.834

ᵃ crude regression coefficient, ᵇt statistic, *p < 0.25, included in the MLR

Table 5. Associated factors of BCIS-Composite by simple linear regression (n = 108)

Variables	BCIS- Composite		
	bᵃ (95%CI)	tᵇ stat	*p*-value
Age	-0.06 (-0.15,0.04)	-1.216	0.227*
Gender	1.98 (0.11,3.86)	2.102	0.038*
Race			
Malay	2.99 (-2.72,8.70)	1.038	0.301
Chinese	-2.60 (-12.43,7.24)	-0.524	0.602
(Others)			
Marital Status			
Never married	0.02 (-2.01,2.05)	0.022	0.983
Married	0.29 (-2.09,2.67)	0.243	0.808
(Divorced/Separated)			
Employment	-1.31 (-3.19,0.57)	-1.386	0.169*
Educational Status			
Primary	-4.23 (-9.16,0.70)	-1.702	0.092*
Secondary	-0.33 (-2.35,1.68)	-0.329	0.743
(Tertiary)			
Antipsychotics			
Atypical	0.69 (-1.25,2.63)	0.705	0.482
Typical	-1.33 (-3.58,0.93)	-1.168	0.246*
(Both)			
Benzhexol Use	-0.08 (-2.89,2.73)	-0.056	0.956
Duration of illness	0.00 (-0.12,0.13)	0.050	0.960
BPRS	0.18 (-0.11,0.46)	1.228	0.222*
Verbal Learning			
Total learning	0.03 (-0.06,0.12)	0.586	0.559
Delayed recall	0.09 (-0.25,0.43)	0.512	0.610
Recognition	0.06 (-0.36,0.49)	0.295	0.768
ITAQ	0.05 (-0.18,0.28)	0.413	0.680

ᵃ crude regression coefficient, ᵇt statistic, *p < 0.25, included in the MLR

METHODS

Study setting and subjects

The ethical approval was granted by the Human Research Ethics Committee (USM/JEPeM/282.3(8) and Medical Research Ethics Committee (NMMR-13-1184-18386). This was a cross-sectional study conducted from March 2014 until November 2014. Patients age 18 to 65 diagnosed with DSM-IV-TR schizophrenia attending outpatient psychiatric clinic at Hospital Universiti Sains Malaysia (USM) and Hospital Raja Perempuan Zainab II (HRPZ-II) for regular follow-up during the study period were invited to participate in the study. Those with cognitive disorders, history of traumatic head injury, relapse of shizophrenia within the preceding 6 months, current or past alcohol or drug dependence, major medical or neurological illness, mental retardation, and poor command of Malay language were excluded from the study.

The participant was explained about the reasons and aims of the study by the researcher. Informed consent was obtained. The subject was then asked to fill in the self-rated questionnaire of BCIS. After this was completed, the information on socio-demographic and clinical data was obtained from both interview and clinical records. These were entered into the socio-demographic and clinical data form by the researcher. Following this, the verbal learning test was then administered using the Malay AVLT. Finally, the data collection was completed by using the BPRS to assess severity of psychopathology and the ITAQ to assess clinical insight during the interview.

Measurements

a) The Beck Cognitive Insight Scale (BCIS)

The BCIS is a 15-item self-rated scale, which includes two sub-scales, self-reflection and self-certainty. Each item is rated on a Likert scale as "do not agree", "agree slightly", "agree a lot" and "agree completely" with each of these ratings given a score of 0,1,2 and 3 respectively. Nine items assess self-reflection (items 1,3,4,5,6,8,12,14 and 15 with a maximum score 27) while another six assess self-certainty (items 2,7,9,10,11 and 13 with a maximum score 18). The self-reflection assesses openness to feedback, criticism and willingness to consider alternative explanations to unusual experiences. The self-certainty assess the extent of being overconfident with one's belief, where higher scores mean a lesser chance for delusion to be modified.[3] High self-reflection and low self-certainty are considered normal[23,24]. To balance the two domains, a composite index is calculated to represent overall cognitive insight. This is obtained by subtracting self-certainty scores from self-reflectiveness scores. A low composite score reflects poor cognitive insight. As of date, there is no common acceptable cut-off point to determine normal or abnormal scores of cognitive insight. This study utilized the validated Malay BCIS. Its Cronbach alpha value for overall, self-certainty and self-reflectiveness stood at 0.705, 0.609 and 0.699, respectively[25]. This was comparable to the original English version where the value stood at 0.61 for self-certainty and 0.67 for self-reflectiveness in patients with schizophrenia[3].

b) The Brief Psychiatric Rating Scale (BPRS)

The BPRS is a clinician-rated tool published in 1962[26]. It is used to assess severity of psychopathology covering symptoms of depression, anxiety and psychosis. This scale is well established and has been wide-

ly used until now. According to Centre of Mental Health Services Research (CMHSR), BPRS is stated to have high inter-rater reliability (0.62 to 0.87) as well as both discriminant and concurrent validity in many studies[27]. Currently, the 18-item BPRS is the most widely used, which cover areas of somatic concern, anxiety, emotional withdrawal, conceptual disorganization, guilt feelings, tension, mannerisms and posturing, grandiosity, depressive mood, hostility, suspiciousness, hallucinatory behaviours, motor retardation, uncooperativeness, unusual thought content, blunted affect, excitement, and disorientation. Items are scored by the researcher during the interview with the patient and are based on a 7-point Likert scale with higher scores denoting greater severity. Total scores range from a minimum of 18 points to a maximum of 126 points.

c) The Auditory Verbal Learning Test (AVLT)

The original Rey AVLT was validated into Malay language for local use in 2008. The Malay version of AVLT has a good factor validity (factor analysis of 0.66-0.98), test-retest reliability (0.24 to 0.84) and is sensitive in discriminating between normal and schizophrenia subjects. The scale measures the patient's ability to encode, consolidate, store and retrieve verbal information as a test for verbal learning and memory. Each of List A and List B contains 15 nouns of Malay words obtained from five different categories (animals, tools, body parts, household items and vehicles)[28]. First, the participants in this study were required to listen to the items read out from List A and to repeat them. A total of five acquisition trials were given (A1, A2, A3, A4 and A5). The total acquisition trial is denoted as total learning (A1 + A2 + A3 + A4 + A5). Then, a new list (List B) was read out and participants were again required to remember the items in List B (B1, interference trial). The purpose of B1 is to interfere with the participant's memory storage ability. Immediately after B1, List A must be repeated (A6, post interference, immediate recall memory). A gap of 20 minutes was given after A6 whereby at the end of this 20-minute gap, the participant was asked to recall List A again (A7, delayed memory recall). The final stage of the test involved recognising and identifying 15 List A words that were read out from a different list consisting of 30 words which were semantically or phonetically related. The researcher used a recorded audio as used in a previous study[29] to standardize the auditory input to minimise errors of the auditory verbal learning data for the study.

d) The Insight and Treatment Attitudes Questionnaire (ITAQ)

The ITAQ was developed as a tool to measure clinical insight. Each of the 11 item on the scale is scored as 0 (no insight), 1 (partial insight) and 2 (good insight). Adding up the scores gives a total sum where higher values denote better insight. Scores range from a minimum of zero (worst) to a maximum of 22 (best). Different areas of insight, ranging from accepting the presence of mental disorder (first five items) to the patient's perspective towards medication, hospitalization and follow-up (last six items) are assessed. Studies have shown that the ITAQ had strong, significant correlation with both insight item of PANSS (r = 0.9)[30,31] and with open interview (r = 0.85) when assessing insight commonly done during mental state examination[32]. The ITAQ had been used in past studies in Malaysia to assess insight in schizophrenia[33,34].

e) Socio-demographic and clinical data

Socio-demographic and clinical data were obtained during the interview to answer the objectives. In order to determine the associated factors relating to cognitive insight, verbal learning, clinical insight and severity of psychopathology in schizophrenia, variables such as patients' age, gender, race, marital status, employment status, educational level, duration of illness, types of antipsychotics received and the use of benzhexol were included for analysis.

Statistical analysis

Descriptive statistics for socio-demographic, clinical data, severity of psychopathology, verbal learning and both cognitive and clinical insight scores were performed using Statistical Package for Social Sciences (SPSS) version 21. Mean (SD) was used for normally distributed continuous variables while median (IQR) was used to describe continuous variables of skewed distribution. Bivariate correlation analyses were performed for cognitive insight and verbal learning, clinical insight and severity of psychopathology to assess the correlation coefficients of the numerical variables. Simple and multiple linear regression (MLR) analysis methods were employed to identify associated factors of cognitive and clinical insight.

RESULTS

A total of 108 patients successfully completed the questionnaire and participated in the study. The self-rated questionnaires were checked by the researcher for any missing data before patients left the clinic. The mean age of patients included in this study was 33.7 years old. There were 63 males (58.3%) and 45 females (41.7%). The majority were Malays at 105 (97.2%). One Chinese and another two Malaysian of Siamese descent (others) patients made up the rest of the racial composition. Most of them were never married (n = 74; 68.5%) and unemployed (n = 59; 54.6%). More than half of 108 patients received education until secondary school level (n = 73; 67.6%). Almost a third (n = 31; 28.7%) received education beyond that. For descriptive clinical data, 62% of patients (n = 67) received atypical antipsychotics. This was then followed by typical antipsychotics at 22.2% while a small minority received both classes of medications (n = 17; 15.7%). The use of benzhexol use was only seen in a fraction of patients (13%). A vast majority of schizophrenia patients were not prescribed benzhexol in their treatment regime (n = 94; 87%). On average, patients showed a mean duration of illness of 10.96 years (SD = 7.71).

The BPRS median score was 23 (IQR = 5). The verbal learning scores showed a mean total learning of 34.19 (SD = 4), median delayed recall of 7 and median recognition score of 14 (IQR = 3). The BCIS-SR, BCIS-SC, and composite means were 12.52 (SD = 4.62), 8.93 (SD = 3.45) and 3.57 (SD = 4.92). Finally, mean ITAQ scores among 108 patients were 13.52 (SD = 4.16). All measures of insight (BCIS-SR, BCIS-SC, BCIS-Composite and ITAQ) followed normal distribution. The results for correlation analyses for variables of interest are shown in table 2. From here, it can be seen that the cognitive insight in this present study showed poor and non-significant relationships with scores of verbal learning, clinical insight and severity of psychopathology.

Bivariate correlations were done for cognitive insight (BCIS-SR, BCIS-SC and BCIS-Composite) and numerical variables of verbal learning (total learning, delayed recall and recognition), clinical insight (ITAQ) and severity of psychopathology (BPRS) scores. To determine the associated factors of cognitive insight, two-step analyses were done to obtain the final model with significant factors. There was no significant final model to describe associated factors for BCIS-SR and BCIS-SC among patient with schizophrenia in this study. In MLR final model for BCIS-Composite, only gender emerged as a significant associated factor. The final equation for BCIS-Composite was 2.746 + 1.99*(Gender) with 4% of the variation explained by gender (R^2 = 0.04).

DISCUSSION

The present socio-demographic findings were consistent with an earlier study conducted in Kelantan, in which patients with schizophrenia had a mean age of 34 years, single (64.9%), unemployed (51.8%), educated until secondary school level (71.9%) and the majority of them were men (59.6%)[35]. Malays were the majority (97.2%) in this study which was consistent with ethnic composition in Kelantan where Malay made up 93.7%, followed by 3.3% Chinese, 0.2% Indian and 2.8% others.

For clinical data, the BPRS scores were low (median 23) and this reflected patient's relatively stable mental health. Higher scores of BPRS indicate more profound psychopathology. One reason for this low score was that the study sample was chosen from outpatient clinics. Severely ill patients with loss of insight do not commonly visit outpatient clinics and are also unable to be brought to the hospital by relatives due to their aggressive state. Those with severe psychopathology could also have been hospitalized for the relapse or were put under acute home care of community psychiatry services.

Assessment of verbal learning scores using Malay AVLT showed fairly consistent results as compared with an earlier study. The mean total learning score was 34.19 while the median score for delayed recall was 7. These results were not much different from a previous study conducted among similar patient characteristics in Kelantan, which found the mean total learning scores to be 35.6. Mean for delayed recall score

was calculated to be 7.4 (SD = 2.71) while recognition was 12.6 (SD = 2.60). All scores in the verbal learning parameters were globally lower than normal controls in that study[35]. In the present study, there were no significant associations between cognitive insight and all three verbal learning parameters. in keeping with the study by Garcia in 2012 who found that verbal learning was not associated with cognitive insight[36]. A meta-analysis found no significant associations between the self-reflectiveness and neurocognition. By contrast there were small but significant negative correlations between the self-certainty and memory (r = -0.23), IQ (r = -0.19) and total cognition (r = -0.14)[37].

For cognitive insight, the mean measurement values in this study were 12.52 (SD = 4.62), 8.93 (SD = 3.45) and 3.57 (SD = 4.92) for BCIS-SR, BCIS-SC, BCIS-Composite, respectively. The scores are arbitrary where high self-reflection and low self-certainty are accepted as normal[3,23,38]. The BCIS scores in this study, nonetheless, revealed some parallel comparison to earlier studies done elsewhere. The original Beck and colleague's results based on a sample of 32 schizophrenia patients showed that the mean scores were 12.97 (SD = 5.00), 7.94 (SD = 3.78) and 5.03 (SD = 5.76) for BCIS-SR, BCIS-SC and BCIS-Composite respectively[3]. Collectively, the range of mean values from other studies were: [BCIS-SR: mean 12.42-16.91; BCIS-SC: mean 8.2-11.65; BCIS-Composite: mean 0.77-7.0][38-41]. Hence, the local BCIS results did not differ markedly from other worldwide studies but it is still too early to draw any firm conclusion because of the different methodologies, inclusion criteria and diagnostic classifications employed.

The study also showed that the correlation coefficients were poor between the two insight scales. The most acceptable reason for this finding is that the two insight scales measure different constructs. There is a shortage of published literature in assessing the correlation coefficients between BCIS and ITAQ. However, BCIS has been shown to have a low correlation with other questionnaires measuring clinical insight while ITAQ, on the other hand, has good correlations with other scales of clinical insight[42]. The poor, non-significant correlations between BCIS and ITAQ in the present study thus affirmed the BCIS as a tool to measure cognitive insight, and not clinical insight.

The BCIS scores among all three domains (BCIS-SR, BCIS-SC and BCIS-Composite) in our study did not show any significant associations with socio-demographic factors except for gender in the final model for BCIS-Composite. The absence of other significant socio-demographic variables was in line with previous studies showing non-significant relationship with the socio-demographic factors[3,39,43,44]. While age and educational status affect cognitive functions, these factors appeared to have no significant effect on cognitive insight, despite the theory of cognitive insight being a part of the neurocognitive model. Nevertheless, it is still a matter of interest to note that the female gender in this study was found to show higher composite scores of BCIS over males. On the basis of theoretical and cultural aspect, we thus suggested a few reasons for this positive association found in our present study.

Firstly, the relationship between cognitive insight and neurocognition in patients with schizophrenia is sexually dimorphic. Sex moderates the association between executive function and cognitive insight in schizophrenia. Poor executive function was significantly correlated with impaired cognitive insight for males with schizophrenia, but not for females[46]. It is well known that females have later age of onset and better overall prognosis of schizophrenia than males. Consequently, females at comparative age may have better cognitive function, thereby allowing them better cognitive flexibility to reflect upon their thoughts and ultimately showing better composite scores of cognitive insight than their opposite gender.

Secondly, gender bias may play a part in this finding. The male gender has been given a societal role and expectation on how a man is supposed to think, act and feel. This assumed gender role has made males to be less likely to show their emotions and to think more decisively. This could then be translated to males being more confident in their thinking and that could have affected the composite scores of BCIS by producing greater self-confidence (BCIS-SC) and less flexibility or reflectiveness (measured by BCIS-SR), ultimately leading to lower BCIS-Composite scores than females. Additionally, better cognitive insight has been shown to be associated with depressive symptoms in schizophrenia where composite index and self-reflection of BCIS is positively correlated with depression scores[7].

The third reason is related to the effects of antipsychotic medications on the cognitive ability to reappraise thoughts or beliefs. Although our study did not investigate the dose of antipsychotics used or attempt to control this factor, it has to be recognized that high dose of antipsychotics tend to show greater side effects, including cognitive blunting and sedation. Since females with schizophrenia tend to exhibit better prognosis and functional outcome, they could be associated with the use of lower doses of antipsychotics as compared to males. As a result, lesser side effects occur and this would give rise to better cognitive function to self-evaluate their own thoughts in BCIS.

Therefore, as this was a pioneering study on cognitive insight in Kelantan, the absence of significant variables other than gender to predict the BCIS scores does not exclude the presence of other hidden covariates that could influence the effect of gender on composite scores. The current finding could also be too early to be concluded upon, as the predictability power was weak. The R^2 value for this association was 0.04. In other words, it means that only 4% of the variance in the final model of BCIS-Composite is explained by gender difference. More studies need to be conducted to explore other variables that could be associated with cognitive insight.

CONCLUSIONS

Cognitive insight was not significantly associated with verbal learning, clinical insight, and severity of psychopathology. The only significant factor was female sex which was positively correlated with composite-index of cognitive insight.

REFERENCES

1) Van Camp LSC, Sabbe BGC, Oldenburg JFE. Cognitive insight: A systematic review. Clin Psychol Rev 2017; 55: 12-24.

2) Garety PA, Fowler D, Kuipers E. Cognitive-behavioral therapy for medication-resistant symptoms. Schizophr Bull 2000; 26(1): 73-86.

3) Beck AT, Baruch E, Balter JM, et al. A new instrument for measuring insight: the Beck Cognitive Insight Scale. Schizophr Res 2004; 68(2-3): 319-329.

4) Poyraz BÇ, Arikan MK, Poyraz CA, et al. Clinical and cognitive insight in patients with acute-phase psychosis: Association with treatment and neuropsychological functioning. Nord J Psychiatry 2016; 70(7): 528-35.

5) Grover S, Sahoo S, Nehra R, et al. Relationship of depression with cognitive insight and socio-occupational outcome in patients with schizophrenia. Int J Soc Psychiatry 2017; 63(3): 181-194.

6) Othman Z, Huri SZ. Insight in offenders with schizophrenia: relationship to psychopathology and cognitive function. Int Med J 2017; 24(1): 18-20.

7) Palmer EC, Gilleen J, David AS. The relationship between cognitive insight and depression in psychosis and schizophrenia: a review and meta-analysis. Schizophr Res 2015; 166(1-3): 261-8.

8) O'Connor JA, Ellett L, Ajnakina O, et al. Can cognitive insight predict symptom remission in a first episode psychosis cohort? BMC Psychiatry 2017; 17(1): 54.

9) Kim JH, Lee S, Han AY, et al. Relationship between cognitive insight and subjective quality of life in outpatients with schizophrenia.Neuropsychiatr Dis Treat 2015; 11: 2041-8.

10) Granholm E, McQuaid JR, McClure FS, et al. A randomized, controlled trial of cognitive behavioral social skills training for middle-aged and older outpatients with chronic schizophrenia. Am J Psychiatry 2005; 162(3): 520-9.

11) Granholm E, McQuaid JR, McClure FS, et al. Randomized controlled trial of cognitive behavioral social skills training for older people with schizophrenia: 12-month follow-up. J Clin Psychiatry 2007 May; 68(5): 730-7.

12) Benoit A, Bowie CR, Lepage M. Is cognitive insight relevant to functional capacity in schizophrenia? Schizophr Res 2017 Jun; 184: 150-151.

13) Buchy L, Czechowska Y, Chochol C, et al. Toward a model of cognitive insight in first-episode psychosis: verbal memory and hippocampal structure. Schizophr Bull 2010; 36(5): 1040-9.

14) Ohmuro N, Katsura M, Obara C, et al. The relationship between cognitive insight and cognitive performance among individuals with at-risk mental state for developing psychosis. Schizophr Res 2017: S0920-9964(17)30217-7.

15) Zhang Q, Li X, Parker GJ, et al. Theory of mind correlates with clinical insight but not cognitive insight in patients with schizophrenia. Psychiatry Res. 2016; 237: 188-95

16) Bora E. Relationship between insight and theory of mind in schizophrenia: A meta-analysis. Schizophr Res 2017: S0920-9964(17)30167-6.

17) Lysaker PH, Bryson GJ, Lancaster RS, et al. Insight in schizophrenia: associations with executive function and coping style. Schizophr Res 2003; 59(1): 41-7.

18) Choudhury S, Khess CR, Bhattacharyya R, et al. Insight in schizophrenia and its association with executive functions. Indian J Psychol Med 2009; 31(2): 71-6.

19) Buchy L, Makowski C, Malla A, et al. A longitudinal study of cognitive insight and cortical thickness in first-episode psychosis. Schizophr Res 2017: S0920-9964(17)30387-0.

20) Orfei MD, Piras F, Banaj N, et al. Unrealistic self-overconfidence in schizophrenia is associated with left presubiculum atrophy and impaired episodic memory. Cortex 2017;86:132-139.

21) Buchy L, Hawco C, Joober R, et al. Cognitive insight in first-episode schizophrenia:

further evidence for a role of the ventrolateral prefrontal cortex. Schizophr Res 2015; 166(1-3): 65-8.

22) Caletti E, Marotta G, Del Vecchio G, *et al*. The metabolic basis of cognitive insight in psychosis: A positron emission tomography study. PLoS One 2017; 12(4): e0175803.

23) Ekinci O, Ugurlu GK, Albayrak Y, *et al*. The relationship between cognitive insight, clinical insight, and depression in patients with schizophrenia. Compr Psychiatry 2012; 53(2): 195-200.

24) O'Connor JA, Wiffen B, Diforti M, *et al*. Neuropsychological, clinical and cognitive insight predictors of outcome in a first episode psychosis study. Schizophr Res 2013; 149(1-3): 70-6.

25) Othman Z, Lua CT. Validation of Malay Beck Cognitive Insight Scale (BCIS). Int Med J 2017; 24(4): 314-6.

26) Overall JE, Gorham DR. The Brief Psychiatric Rating Scale. Psychol Rep 1962; 10: 799-812.

27) Hedlund JL, Vieweg BW. The brief psychiatric rating scale: A comprehensive overview. Journal of Operational Psychiatry 1980; 11: 49-65.

28) Jamaluddin R, Othman Z, Musa KI, *et al*. Validation of the Malay Version of Auditory Verbal Learning Test (MVAVLT) among schizophrenia patients in Hospital Universiti Sains Malaysia (HUSM). Malaysia. ASEAN J Psychiatry 2009; 10(1): 54-74.

29) Munjir N, Othman Z, Zakaria R, *et al*. Equivalence and practice effect of alternate forms for Malay version of Auditory Verbal Learning Test (MAVLT). EXCLI J 2015; 14: 801-8.

30) Sanz M, Constable G, Lopez-Ibor, *et al*. A comparative study of insight scales and their relationship to psychopathological and clinical variables. Psychol Med 1998; 28: 437-46.

31) Lincoln TM, L lmann E, Rief W. Correlates and long-term consequences of poor insight in patients with schizophrenia. A systematic review. Schizophr Bull 2007; 33(6): 1324-42.

32) McEvoy JP, Apperson LJ, Appelbaum PS, *et al*. Insight in schizophrenia. Its relationship to acute psychopathology. J Nerv Ment Dis 1989; 177(1): 43-7.

33) Mohd Nasir AK, Chin CN. Insight In Schizophrenics After Repeated Admissions: A Study Using Insight And Treatment Attitude Questionnaire. Malay J Psychiatry 1997; 5(1).

34) Huri SZ, Othman Z, Yasin MAM, *et al*. Offenders with Schizophrenia: Relationship to Psychopathology Malay J Psychiatry 2013; 21(1):

35) Othman Z, Jamaluddin R, Alwi MNM *et al*. Demographic and clinical factors associated with verbal memory performance in patients with schizophrenia in Hospital Universiti Sains Malaysia (HUSM), Malaysia. ASEAN J Psychiatry 2011; 12(2): 146-56.

36) Garcia CP, Sacks SA, Weisman de Mamani AG. Neurocognition and cognitive biases in schizophrenia. J Nerv Ment Dis 2012; 200(8): 724-7.

37) Nair A, Palmer EC, Aleman A, *et al*. Relationship between cognition, clinical and cognitive insight in psychotic disorders: a review and meta-analysis. Schizophr Res 2014; 152(1): 191-200.

38) Engh JA, Friis S, Birkenaes AB, *et al*. Measuring cognitive insight in schizophrenia and bipolar disorder: a comparative study. BMC Psychiatry 2007; 7: 71.

39) Bora E, Erkan A, Kayahan B, *et al*. Cognitive insight and acute psychosis in schizophrenia. Psychiatry Clin Neurosci 2007; 61(6): 634-9.

40) Favrod J, Zimmermann G, Raffard S, *et al*. The Beck cognitive insight scale in outpatients with psychotic disorders: further evidence from a French-speaking sample. Can J Psychiatry 2008; 53(11): 783-7.

41) Merlin TJ, Rajkumar AP, Reema S, *et al*. Construct validity and factor structure of Tamil version of Beck Cognitive Insight Scale to assess cognitive insight of patients with schizophrenia. Acta Neuropsychiatr 2012; 24(1): 43-9.

42) Cooke MA. Insight in schizophrenia: relationship to cognitive function, coping style and brain structures (doctoral thesis, King's College London). 2006

43) Uchida T, Matsumoto K, Kikuchi A, *et al*. Psychometric properties of the Japanese version of the Beck Cognitive Insight Scale: relation of cognitive insight to clinical insight. Psychiatry Clin Neurosci 2009; 63(3): 291-7.

44) Orfei MD, Spoletini I, Banfi G, *et al*. Neuropsychological correlates of cognitive insight in schizophrenia. Psychiatry Res 2010; 178(1): 51-6.

45) Engh JA, Sundet K, Simonsen C, *et al*. Verbal learning contributes to cognitive insight in schizophrenia independently of affective and psychotic symptoms. Prog Neuropsychopharmacol Biol Psychiatry 2011; 35(4): 1059-63.

46) Kao YC, Liu YP, Lien YJ, *et al*. The influence of sex on cognitive insight and neurocognitive functioning in schizophrenia. Prog Neuropsychopharmacol Biol Psychiatry 2013; 44: 193-200.