

**COGNITIVE INSIGHT AND VERBAL LEARNING IN  
SCHIZOPHRENIA**

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## LIST OF ABBREVIATIONS

BCIS	Beck Cognitive Insight Scale
BCIS-Composite	Beck Cognitive Insight Scale- Composite
BCIS-SC	Beck Cognitive Insight Scale-Self-Certainty
BCIS-SR	Beck Cognitive Insight Scale-Self-Reflectiveness
BPRS	Brief Psychiatric Rating Scale
CI	Confidence Interval
DSM IV-TR	Diagnostic and Statistical Manual IV- Text Revision
HRPZ II	Hospital Raja Perempuan Zainab II
HUSM	Hospital Universiti Sains Malaysia
IQR	Interquartile Range
ITAQ	Insight and Treatment Attitudes Questionnaire
MLR	Multiple linear regression
MVAVLT	Malay Version Auditory Verbal Learning Test
SD	Standard Deviation
SLR	Simple linear regression
SPSS	Statistical Package for Social Sciences

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## ABSTRAK

**Latar Belakang:** Skizofrenia merupakan penyakit psikiatri berulang. Pemahaman diri (*insight*) dalam skizofrenia masih tidak difahami sepenuhnya. Penilaian pemahaman penyakit dipanggil pemahaman diri klinikal (*clinical insight*) tetapi pesakit dengan pemahaman diri klinikal yang baik masih mengalami penyakit berulang. Satu konsep berbeza iaitu pemahaman diri kognitif (*cognitive insight*) telah diperkenalkan untuk melengkapkan pemahaman diri klinikal. Ia mengukur keupayaan menilai dan mengubah pemikiran tidak normal atau kepercayaan palsu. Tahap psikotik yang tinggi akan menjejaskan pemahaman diri kognitif. Walaupun berbeza pemahaman diri, keduanya tergolong dalam model pemahaman diri neurokognitif. Terdapat hubungan antara pemahaman diri kognitif dengan pembelajaran secara lisan (daya ingatan; satu domain neurokognitif) . Oleh itu, daya ingatan baik berperanan meningkatkan pemahaman diri untuk membolehkan pesakit menerima rawatan psikososial bagi mencegah pengulangan penyakit.

**Objektif:** Untuk mengkaji hubungan antara pemahaman diri kognitif dengan pembelajaran secara lisan, pemahaman diri klinikal dan tahap keterukan psikopatologi serta mengenalpasti faktor-faktor berkaitan pemahaman diri dalam kalangan pesakit skizofrenia di Kota Bharu, Kelantan.

**Metodologi:** Kajian keratan rentas ini melibatkan 108 pesakit luar yang menghidap skizofrenia dari dua buah hospital dan dipilih mengikut persampelan mudah. Mereka mengisi borang BCIS dan ditemuramah oleh penyelidik tunggal untuk menilai

psikopatologi dan pemahaman diri klinikal. Ujian pembelajaran secara lisan dijalankan untuk mengkaji daya ingatan pesakit. Hubungkait antara pemahaman diri kognitif dengan pembelajaran secara lisan, pemahaman diri klinikal serta tahap keterukan psikopatologi ditentukan oleh analisis korelasi. Analisis regresi linear pelbagai (MLR) dilakukan untuk mengenal pasti faktor-faktor berkaitan untuk pemahaman diri kognitif dan klinikal.

**Keputusan:** Majoriti ialah lelaki, tidak berkahwin dan tidak bekerja. Skor purata untuk tiga domain BCIS adalah seperti berikut: BCIS-SR 12.52 (SD=4.62), BCIS-SC 8.93 (SD=3.45) dan BCIS-Composite 3.57 (SD=4.92). Analisis korelasi tidak menunjukkan keputusan yang signifikan. Bagi MLR, BCIS-Composite mempunyai hubungkait yang signifikan dengan jantina perempuan yang mana mereka menunjukkan 1.99 unit lebih tinggi dalam skor komposit BCIS berbanding dengan lelaki. Pemahaman diri klinikal yang lebih baik pula mempunyai hubungkait dengan tahap pendidikan peringkat sekolah rendah ( $p = 0.018$ ), tempoh berpenyakit ( $p < 0.001$ ) dan penguatan kembali dalam pembelajaran secara lisan ( $p = 0.006$ ).

**Kesimpulan:** Kajian awal ini mendapati pemahaman diri kognitif tidak menunjukkan hubungan dengan pembelajaran secara lisan, pemahaman diri klinikal dan tahap keterukan psikopatologi tetapi mempunyai hubungkait signifikan dengan jantina perempuan. Tidak seperti pemahaman diri kognitif, jantina tiada kaitan dengan pemahaman diri klinikal tetapi sebaliknya dikaitkan dengan status pendidikan, tempoh berpenyakit dan daya ingatan. Oleh itu, kedua-dua jenis pemahaman diri (*insight*) didapati disumbangkan oleh faktor-faktor yang berbeza walaupun tergolong dalam

model pemahaman diri neurokognitif. Lebih banyak penyelidikan perlu dijalankan untuk mendalami topik pemahaman diri kognitif .

**Kata kunci:** Pemahaman diri kognitif , pemahaman diri klinikal , pembelajaran secara lisan , psikopatologi , daya ingatan

## ABSTRACT

**Background:** Schizophrenia is a disorder with frequent relapses due to impaired insight which is poorly understood. Clinical insight is the usual insight assessment but patients with good clinical insight could still relapse. A different concept of insight called cognitive insight has been introduced to complement clinical insight. It assesses the ability to reappraise and modify abnormal thoughts or beliefs, and severe psychosis affects cognitive insight. Despite both insights being different, they are part of the neurocognitive model of insight. Relationships between cognitive insight and verbal learning (working memory; a neurocognitive domain), have been shown. Good verbal learning, therefore, plays a role to improve patient's insight and receive better psychosocial intervention to prevent relapse.

**Objectives:** To evaluate the relationship between cognitive insight with verbal learning, clinical insight and severity of psychopathology, as well as determining other associated factors of insight among patients with schizophrenia at Kota Bharu, Kelantan.

**Methodology:** This cross-sectional study recruited 108 outpatients with schizophrenia from two tertiary hospitals using convenience sampling method. Patients self-rate the Beck Cognitive Insight Scale (BCIS) questionnaire and were interviewed by a researcher for clinical insight and severity of psychopathology. Verbal learning tests were conducted to assess working memory. Relationships between cognitive insight with verbal learning, clinical insight and severity of psychopathology were determined

by correlation analyses. Multiple linear regression analyses (MLR) were done to identify other associated factors of insight.

**Results:** Majority were males, single and unemployed. Mean BCIS scores for three domains were: BCIS-SR 12.52 (SD=4.62), BCIS-SC 8.93(SD=3.45) and BCIS-Composite 3.57(SD=4.92). Correlation analyses showed no significant results. In MLR, BCIS-Composite was significantly associated with females, who showed 1.99 units higher in BCIS-Composite than males. Better clinical insight was significantly associated with primary school educational status ( $p=0.018$ ), duration of illness ( $p<0.001$ ) and delayed recall capability in verbal learning ( $p=0.006$ ).

**Conclusion:** This early study revealed no relationship between cognitive insight with verbal learning, clinical insight and severity of psychopathology, but found significant positive association with female gender. Unlike cognitive insight, the gender factor did not predict better clinical insight but was instead associated with the educational status, illness duration and delayed recall of verbal learning. Therefore, both types of insight are independently contributed by different factors despite being in the same spectrum and theoretical model of insight. More research needs to be conducted to tap into the new interest area of cognitive insight.

**Keywords:** Cognitive insight, clinical insight, verbal learning, psychopathology, working memory

## CHAPTER ONE

### INTRODUCTION

Schizophrenia, a stigmatized illness in some parts of the world especially in developing countries, is a chronic psychiatric disorder which usually affects about 1% of the population. It is severe enough to impact on functional areas like independent living, marriage, social and also occupational functioning (Stefanopoulou *et al.*, 2009). The disease itself has been argued to be a spectrum of symptoms displayed against what the normal population considers as inappropriate or abnormal. These symptoms include aberrations in thoughts, perceptions, emotion, behaviour and also cognitive functions. When cognitive functions like memory, attention and judgment are impaired, improvement in illness is impeded and relapses become more frequently common.

As our current trend is moving towards deinstitutionalization while strengthening our delivery of community psychiatry service, frequent relapses and hospitalizations are not helping our aim to achieve a stable group of psychiatric patients to be treated in society. Some patients have been treated to the extent that they are aware of their illness but yet a relapse could still occur despite being deemed to have good insight. Having an insight is commonly defined as possessing the ability to recognize that a mental disorder is present, understand that delusions and hallucinations are signs of mental illness and realize the need for treatment (David, 1990). The term “clinical insight” usually denotes this. Although the blame for relapse is often put on poor medication adherence due to lack of insight and a fair share of observations accounted for this relationship, theories

have also been growing that there are possibly other aspects of insight that clinicians might be unaware of and left untackled. This then leads to the endless cycle of relapses in schizophrenia despite some patients clinically labelled as having good insight.

In 2004, Beck et al. popularized the idea of cognitive insight. This is conceptually different from clinical insight but is said to be occurring in a similar spectrum of insight. Earlier than 2004, Garety et al had found that 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 unshakeable in their beliefs and received the same psychological approach (Garety *et al.*, 2000). This finding was later realized to be linked to “cognitive insight”, a term gaining ground only as recent as 2004.

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 (Beck *et al.*, 2004). Thus, patients with a high level of psychosis are expected to have lower cognitive insight but this relationship has been inconclusive somewhat. Other factors could have played a role in determining good cognitive insight and as to our understanding, the evaluation and correction of these pathological symptoms require good cognition to perform the reappraisal and avoid misinterpretation.

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 (Beck *et al.*, 2004). Assessment on cognitive insight can thus complement clinical insight to make the usual insight evaluation more comprehensive and representative of an individual's mental state. 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. Negative emotions like frustrations, helplessness and anger from the frequent relapses could also be minimized.

To improve insight, patients are usually given health education and counselling. Doing this needs patient's cooperation, understanding as well as intact cognitive ability to remember health-related advice in order to produce a constant positive effect on one's mental health. This is very 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, form an umbrella term widely known as neurocognition. As a result of this understanding, the neurocognitive model of insight has been proposed. 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 (Lysaker and Bell, 1994; Lysaker *et al.*, 2003).

Nevertheless, linking both cognitive insight and neurocognition is still not widely investigated and to our knowledge, only a few studies attempted to examine this relationship but with dissimilar end results. There have been no known published data yet to the author's knowledge regarding cognitive insight assessment in Malaysia. It thus seems essential that as both cognitive insight and neurocognition appear to show

conceptual overlapping, 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. Specific 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.

The long term result of actively investigating the role of cognitive insight and verbal learning will also see more successful implementation of psychological, psychosocial rehabilitation and community psychiatry approach among patients with schizophrenia. In fact, this benefit was mentioned in one study that showed a reduction of positive symptoms of schizophrenia when cognitive insight improved, after a psychological intervention was given in the form of cognitive behavioural therapy (Granholm *et al.*, 2005).

Based on these points, this study thus aims to examine the relationship between cognitive insight and verbal learning, clinical insight and severity of psychopathology as well as determining other contributing factors associated with insight among patients with schizophrenia in Kelantan, Malaysia.

## CHAPTER TWO

### LITERATURE REVIEW

#### *2.1 The concept of insight*

Impaired insight has been accepted as part of schizophrenia. As early as 1973, this has been thought to be a central clinical feature of schizophrenia (Carpenter *et al.*, 1973). Attempts have been made until recently to define the idea of insight clearly but many authors conceptualize insight differently. Nonetheless, insight should be seen as a multidimensional concept which occurs along a continuum instead of a unitary, categorical concept (Amador *et al.*, 1991; Cooke *et al.*, 2005).

The current viewpoint of insight is related to clinical insight. Clinicians use insight as a guide to determine the prognosis and management pathways in schizophrenia. This concept of clinical insight is best described by Anthony David who proposed three features to define insight: that one recognizes the need to be compliant with treatment; that one understands he is mentally ill; and that the mental illness accounts for the pathological beliefs and phenomena he experiences such as delusions and hallucinations (David, 1990).

Poor clinical insight is widely understood to have caused less favourable functional outcomes in patients with schizophrenia. These include slower psychosocial skills improvement, deterioration in cognitive functioning and frequent hospitalizations

leading to an overwhelming burden of care among family members. The accompanying frustration could occur not only among the members of the ill patients but also the treating clinicians. Subsequently, the doctor-patient relationship becomes fraught, non-therapeutic and further worsens the prospect of patient achieving best optimum outcomes.

In at least two articles, it has been shown that poor insight is strongly linked to increased relapse rates in patients with schizophrenia (McEvoy *et al.*, 1989a; Csernansky, 2002). Impaired insight patients, who feel that they are not ill, will have a tendency to be non-adherent to medicine interpreted by themselves as unnecessary in their life.

As a consequence of poor insight, non-compliance becomes frequent and is one factor to be accounted for the relapses (Stefanopoulou *et al.*, 2009). A vicious cycle of poor insight and active psychosis then forms, further exacerbating the patient's weak acceptance of mental illness, need for treatment and follow-up.

Across the world, this link between insight and relapse has been consistent up until today. Locally, a study done in Kelantan also revealed that poor insight and poor compliance were among the factors to predict repeated hospitalizations among patients with schizophrenia (S Draman 2005). It is then thought that improving insight will lead to better compliance, adherence, and a reduced hospitalization.

However, this belief is not exactly accurate, as pointed out by Beck and his colleagues in 2004. They conceptualized a different dimension of insight, termed as "cognitive

insight” (Beck *et al.*, 2004) and this could be one reason to explain why certain patients still enter into a relapse despite exhibiting good clinical insight.

## ***2.2 Cognitive insight***

As mentioned earlier, clinical insight is the awareness of one’s illness and the need to continue treatment. The work of Beck and colleagues had shown that some patients may believe that they have an illness and agree that the psychological explanation for the disorder makes sense but yet fail to produce changes to their belief schema (Beck and Warman, 2004). In psychotherapy or general psychiatric textbooks, clinical insight is also commonly referred to as “intellectual insight”.

Up until recently, most scales that are produced emphasized more on clinical insight while leaving another aspect of insight unmeasured. This aspect, termed as “emotional insight”, has now been regaining more importance and prominence. The observations from daily clinical practice of mental health professionals involved in dealing with mentally ill patients have shown that there is incongruence between patient’s verbal statements (clinical insight) against the true convictions about having mental illness (emotional insight) (Orfei *et al.*, 2010).

Beck and his team explored this feature of emotional insight and appropriately termed it as “cognitive insight” since it involves the cognitive ability of patients to analyse their belief system and make lasting changes by removing dysfunctional beliefs. In other words, it relies on the brain’s metacognitive ability in evaluating and applying

corrective measures to any distorted thinking (Granholm *et al.*, 2005; Ekinici *et al.*, 2012).

It is argued that clinical and cognitive insights both measure different things. Someone who is mentally ill may be able to accept that the unusual experiences are a result of mental illness but not fully appreciating the meaning of it. These patients could have acquired such clinical insight from frequent psychoeducation they received from their health care providers but still holding firm to their false beliefs, signalling the absence of cognitive insight despite the presence of adequate clinical insight.

Poor cognitive insight is then said to be present when these patients lack the ability to modify their dysfunctional beliefs, reappraise and distance themselves away from the false convictions (Beck *et al.*, 2004). It explains why certain patients despite having good clinical insight could still relapse, hospitalize or functionally deteriorate along the years.

### ***2.3 Cognitive insight and psychosis***

In many studies done, it has been found that insight is affected by the severity of psychopathology in patients with psychotic disorders such as schizophrenia. Impairment of insight is connected to the development of psychosis, maintenance of delusions and loss of reality testing. Consequently, the impairment perpetuates schizophrenia thereby leading to intervention resistance and the emergence of challenging behaviours.

One of the core differences between psychotic and non-psychotic individuals is the extent of damaged insight. Non-psychotic individuals with depressive, panic or obsessive-compulsive disorder may misinterpret their surrounding events but generally retain the capacity and ability to reflect, recognize and come to the understanding that their conclusions are incorrect. This is referred to as good cognitive insight. However, patients with schizophrenia have these capacities weakened, causing them to show resistance to corrective feedback and lacking the capability to modify misinterpretations, abnormal perceptions and distorted beliefs. As a result, they exhibited an overall poorer level of cognitive insight (Beck et al., 2004).

Cognitive insight in psychosis can be measured using the Beck Cognitive Insight Scale (BCIS) which has been translated and validated in French, Japanese, Taiwanese, Spanish, Tamil and other languages. The appearance of this scale since 2004, although considered relatively new, has enabled clinicians worldwide to assess cognitive insight in schizophrenia. This questionnaire is a self-report scale of 15 questions, divided into two sections labelled as “self-reflectiveness (BCIS-SR)” and “self-certainty (BCIS-SC)”.

The domain of BCIS-SR is composed of nine items while the remaining six out of the total 15 items demonstrate patient’s BCIS-SC. Patients will self-rate the statements and a composite index is calculated by subtracting the BCIS-SC score from BCIS-SR score. The composite index represents overall cognitive insight. High BCIS-SR and low BCIS-SC are considered normal (Beck *et al.*, 2004; Engh *et al.*, 2007; Ekinci *et al.*, 2012; O’Connor *et al.*, 2013).

Whenever a patient is in a psychotic state, the reverse is usually true. They will be more certain and convinced of themselves being correct but less likely to reappraise or doubt the false beliefs. In BCIS, this is translated as a stronger level of BCIS-SC and a weaker BCIS-SR. For this reason, the composite index thus represents a more balanced and unbiased presentation of a patient's cognitive insight since higher BCIS-SC may reduce BCIS-SR.

This explanation had been proven in a paper by Bora and colleagues in 2007 showing that cognitive insight was impaired in active psychosis. Both overconfidence in judgments and impaired BCIS-SR were initially associated with patients with schizophrenia who were actively psychotic. However, despite a later improvement in BCIS-SR scores when psychosis improved, the BCIS-SC scores had remained relatively unchanged (Bora *et al.*, 2007b). A composite score in that situation would reflect a better picture of cognitive insight rather than only looking at respective sub-domains. Higher cognitive insight signifies the ability of the patient to receive corrective feedbacks to modify presence of abnormal experiences.

In a study by Warman *et al* in 2007, subjects with active delusions were found to exhibit higher BCIS-SC relative to healthy controls and also individuals without active delusions (Warman *et al.*, 2007). However, a detailed look at BCIS-SR values revealed otherwise: that it was found to be higher in people with active delusions rather than those without active delusions. This interesting theoretical contradiction should be treated with caution due to the low sample size (37 patients diagnosed with schizophrenia or schizoaffective). A 2009 study only partially concurred with Warman in relation to the BCIS-SC but not the BCIS-SR. In that later study, delusion was

associated with high BCIS-SC in schizophrenia but the presence of delusion lowered BCIS-SR scores (Engh *et al.*, 2009).

Another paper also agreed with the view that psychosis impaired cognitive insight (Kao *et al.*, 2011). Realising this link, targeting an improvement in delusional beliefs is then understood to allow better cognitive insight and consequently favouring good functional outcome. This statement is supported by one study where increment in cognitive insight scores had been shown to match with psychiatric symptom reduction measured using Global Assessment Functioning scale (O'Connor *et al.*, 2013). A higher level of cognitive insight is also related to improvement in delusional beliefs especially after cognitive behavioural therapy for psychosis was done as a form of psychological intervention (Perivoliotis *et al.*, 2010; Riggs *et al.*, 2012).

#### ***2.4 Cognitive and clinical insight***

Both clinical and cognitive insight measure different aspects but complement each other under the umbrella spectrum of insight (Ekinci *et al.*, 2012). Good cognitive insight may be unnecessary for good clinical insight but is at least partly reliant on the processes involved in clinical insight (Donohoe *et al.*, 2009). Hence, this means that insight measurements should deal with both types of insights and not focus on only one side of it.

The relationship between both types of insight has been investigated with some conflicting observations found. These inconsistencies could be explained by the different rating scales used to assess clinical insight and formation of bias attributed to

various rating methods (self-rated or clinician-rated). Available clinical insight scales include Insight and Treatment Attitudes Questionnaire (ITAQ), Schedule for the Assessment of Insight- Expanded (SAI-E) and G12 Insight item of the Positive and Negative Symptoms Scale (PANSS).

Nevertheless, it is interesting to understand that significant positive association was found between BCIS-SR and clinical insight (Pedrelli et al., 2004), no association between BCIS-SC and clinical insight (Pedrelli et al., 2004; Ekinici et al., 2012), and no association between all domains of cognitive insight (BCIS-SR, BCIS-SC, BCIS-Composite) with clinical insight (Ekinici et al., 2012).

Another study in 2008 also investigated the link between BCIS sub-domains and clinical insight measured using the PANSS insight item in schizophrenia patients. The author of the study published results for French-speaking patients. In it, it was found that the BCIS-Composite scores showed significant, negative correlation with the insight item of PANSS ( $r=-0.42$ ,  $p=0.002$ ). The BCIS-SR negatively correlated with the insight item ( $r=-0.37$ ,  $p=0.007$ ) while BCIS-SC positively correlated with similar insight scores from PANSS ( $r=0.29$ ,  $p=0.004$ ) (Favrod *et al.*, 2008).

In 2011, Engh and his team studied the relationship between verbal learning and cognitive insight while assessing the influence of clinical insight. Their measurement of clinical insight correlated to cognitive insight differently from Favrod et al but concurred partially with Pedrelli et al. BCIS-SR was positively correlated with clinical insight ( $r= 0.36$ ,  $p <0.001$ ) but BCIS-SC was negatively correlated with clinical insight ( $r=-0.32$ ,  $p=0.001$ ) (Engh *et al.*, 2011).

Clearly, the overall findings stated here showed inconsistencies in outcomes and conclusions. Thus, more detailed studies may need to be done in this relatively new field of cognitive insight.

In order to reduce the chances of different outcomes being attributed to the use of dissimilar scales, these various types of scales were also investigated for their correlations with each other. The clinical insight scales, albeit different in insight conceptualization and definition, had been shown to correlate significantly with each other, with the magnitude of the correlation being greater than 0.5 (Cooke, 2006).

However, these clinical insight scales only show low correlation with BCIS. This then suggests that the BCIS indeed measures cognitive insight which is a construct of insight conceptually different from clinical insight (Cooke, 2006). At the moment, there is no published correlation between ITAQ and BCIS.

### ***2.5 Socio-demographic correlates of cognitive insight and clinical insight***

While socio-demographic profiles have been theorized to be potential confounders, past studies so far showed no significant correlation between cognitive insight and socio-demographic factors such as age, gender, educational level and marital status (Beck *et al.*, 2004; Bora *et al.*, 2007a; Uchida *et al.*, 2009; Orfei *et al.*, 2010; Engh *et al.*, 2011).

Similarly, the same demographic profiles are independent of clinical insight from previous studies (McGlashan and Carpenter, 1981; McEvoy *et al.*, 1989c; David *et al.*, 1995; Stefanopoulou *et al.*, 2009).

## ***2.6 Neurocognition, working memory and verbal learning***

Neurocognition is a term used to describe the high mental capability of learning, comprehending and interacting with information processed in the brain. Under neurocognition, the working memory, attention and other related cognitive functions such as language processing, perception and visuospatial ability have been described. These areas of neurocognition are the basis for understanding the effects of schizophrenia. Neurocognition is also used to describe neuropsychology interchangeably.

Previous studies on effects of schizophrenia on neurocognitive function have explained a wide range of disastrous deficits in cognitive functions involving attention, executive function, working memory, learning and memory storage (Heinrichs and Zakzanis, 1998; Hamzah et al., 2012). These deficits in schizophrenia start early and subtly, well before other positive or negative schizophrenia signs appear (Krivoy et al., 2012). The outcome of good functionality following a psychosocial intervention depends on the extent of cognitive deficits in the usual, daily tasks of understanding instructions, remembering, learning new skills and making decisions.

To understand the relationship between working memory and verbal learning, the concept of human working memory needs to be explained. According to Alan Baddeley, he suggested that the human working memory is a system comprising of three components. This system allows the mind to hold transient information and has been regarded as synonymous with short-term memory. It functions so as to enable transiently-stored information to be processed for memory storage, comprehension,

learning new skills, reasoning and applying good judgments on complex issues encountered during our everyday life.

The constituents of this working memory system are a central executive, an articulatory (phonological) loop and a visuospatial scratch pad with interlinks to each of these components (Baddeley, 1996). The articulatory loop is used for verbal learning and is a measurable area of working memory. Other forms of non-articulatory data such as the visuospatial information will activate the visuospatial scratch pad. As for the central executive element, it is understood to be involved in higher mental processes such as formulating judgement, making complex decisions, solving problems, devising future plans and executing those plans effectively. Theoretically, this proves that verbal learning has relationship with working memory by activating the articulatory loop subsystem. A good verbal learning is essential to patients whenever clinicians deliver health education, counselling and other psychological therapies.

### ***2.7 Cognitive insight and verbal learning***

Cognitive insight requires higher cognitive processes to not only reason but also to reappraise the thoughts and belief system. Both cognitive insight and neurocognition, therefore, share some overlap in their functionality. This link is not extensively studied yet although there are a few studies reporting on the effect of neurocognition on cognitive insight.

In one earlier study, the relationships between cognitive insight and cognition functions in 51 patients who developed first-episode psychosis were examined. The cognitive

domains measured in this study were extensive, ranging not only from verbal learning but also to encompass visual memory, speed processing, reasoning and problem-solving as well as social cognition. It was found that there occurred significant associations between both BCIS-SC and BCIS-Composite with verbal learning, suggesting that reappraisal skills of cognitive insight may rely on memories including those of past experiences (Lepage *et al.*, 2008). This thus concurs with the present idea of how the current way of human thinking and the formation of belief schema are both shaped by past memories.

Subsequently, there was another study by Buchy *et al.* in 2009. This study attempted to investigate the brains of participants to find out if there was a neurocognitive model to explain the link between cognitive insight and verbal learning. The authors scanned 61 brains of first-episode psychosis patients and measured hippocampal volumes. The analysis revealed a relationship between BCIS-SC and verbal learning but this was insignificant. In contrast, relationship between BCIS-SR and verbal learning was significantly positive ( $r=0.31$ ,  $p=0.01$ ) and was even stronger as compared to one earlier study by the same team of authors (Buchy *et al.*, 2009). The composite scores of BCIS also correlated with verbal learning in that work. The significant findings were attributed to a larger sample size, thereby increasing the statistical power of the later Buchy study.

In 2010, Orfei and colleagues investigated the neuropsychological correlates in schizophrenia. Similar to previous two studies, they found that impairment in cognitive insight was linked to a poorer working memory and executive performances. More specifically, higher BCIS-SC was associated with deficits in both visual and verbal

memory. They thus concluded the need to improve the metacognitive ability of cognitive insight in patients with schizophrenia to reduce relapse rates from non-adherence to treatment (Orfei *et al.*, 2010).

The later published study with significant results was in 2011 where the team of Engh *et al.* assessed cognitive insight and neuropsychological tests in 102 patients with schizophrenia. Significant negative correlation was found for BCIS-SC and verbal learning, in agreeing with the Lepage study ( $r=-0.28$ ,  $p=0.006$ ). There was, however, no significant association found between BCIS-SR and verbal learning ( $r= -0.06$ ,  $p= 0.58$ ) or even any other domains of neuropsychological tests (Engh *et al.*, 2011). This finding was discordant with the earlier mentioned Buchy study. Despite the sample size in the study seemingly bigger than previous studies, this was not truly reflective of schizophrenia patients as they also included patients with schizoaffective disorder.

Finally, in 2012, Garcia *et al.* found evidence that was in contrast to previous studies and expectations. An assessment of neurocognition and cognitive insight among 75 patients with both schizophrenia and schizoaffective disorder found that verbal learning was not associated with cognitive insight (Garcia *et al.*, 2012). However, the overall findings from a recent meta-analysis implied that there is a small, significant relationship between some parts of cognitive insight and clinical insight with the neurocognitive correlates, including memory component (Nair *et al.*, 2014). The inability to show replicable findings with strong, significant relationship in all these studies indicates that the intricacies of cognitive insight in relation to neurocognition are still prevalent. More research over the coming years might need to be done to unravel the complex relationships.

## ***2.8 The neurocognitive model of insight: Integration of cognitive insight and verbal learning with clinical insight***

Aetiological contributions to insight have been proposed in a few explanatory models. Among these, the neurocognitive model of insight has been investigated and found to show associations between neurocognitive functions and insight (Lysaker and Bell, 1994; Lysaker et al., 2003). This model explains that the lack of awareness of insight (clinical insight) could have been a result of the decline in cognitive functioning, which happens as a consequence of schizophrenia. The patients became unaware of the disorder due to reduced cognitive capability to understand the manifestation of the illness on oneself.

As for cognitive insight, it is also thought to be in the same model since cognitive insight depends on good cognition to re-appraise and modify the belief system. Thus, the model describes and integrates both cognitive insight and clinical insight in relation to the cognitive functioning such as working memory (verbal learning). Relationships between cognitive insight and verbal learning, together with the influence of clinical insight in the neurocognitive aspect, have been the area eagerly researched recently.

As such, this overall literature review has provided some current knowledge about the relationship between cognitive insight with verbal learning, clinical insight, the severity of psychopathology and also other related correlates. Our study would be the first known attempt in Malaysia to investigate the links between these factors in order to set the pathway for more future interest on cognitive insight in schizophrenia.

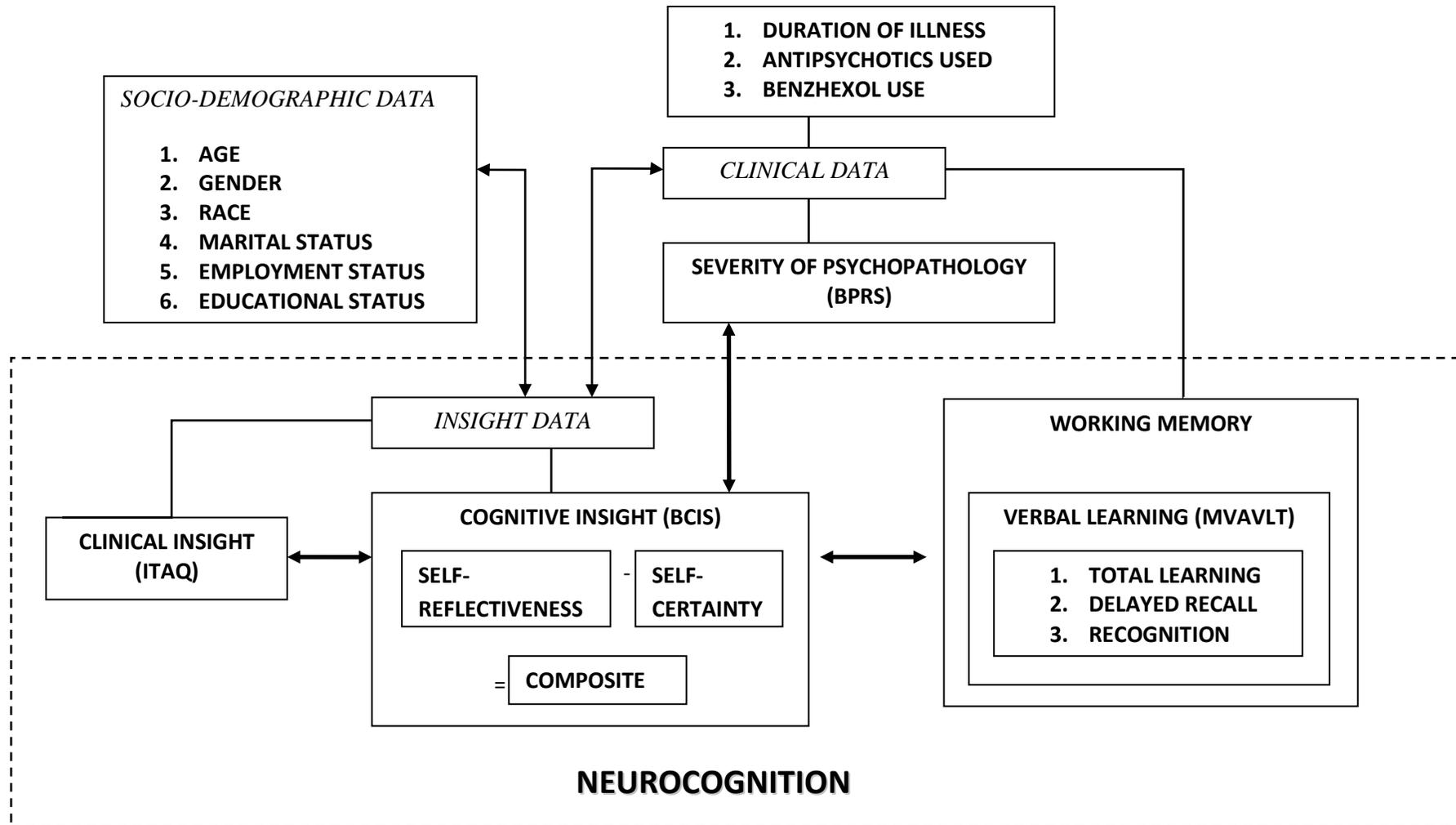


Figure 2.1 Conceptual framework

## **CHAPTER THREE**

### **OBJECTIVES AND RESEARCH HYPOTHESIS**

#### **3.1 General Objective**

To investigate the relationship between cognitive insight with verbal learning, clinical insight and severity of psychopathology, as well as determining other associated factors contributing to insight among patients with schizophrenia at both Hospital Universiti Sains Malaysia (HUSM) and Hospital Raja Perempuan Zainab II (HRPZ II), Kota Bharu, Kelantan.

#### **3.2 Specific Objectives**

1. To determine the relationship between verbal learning and cognitive insight in schizophrenia.
2. To determine the relationship between clinical insight and cognitive insight in schizophrenia.
3. To determine the relationship between severity of psychopathology and cognitive insight in schizophrenia.
4. To determine other associated factors relating to insight in schizophrenia.

### **3.3 Research Questions**

1. What is the relationship between verbal learning and cognitive insight in schizophrenia?
2. Is there any relationship between cognitive and clinical insight in schizophrenia?
3. What is the relationship between severity of psychopathology with cognitive insight in schizophrenia?
4. What are the other associated factors of insight in schizophrenia?

### **3.4 Research Hypothesis**

1. There is a positive relationship between verbal learning and cognitive insight in schizophrenia.
2. There is no relationship between cognitive and clinical insight in schizophrenia.
3. Patients with higher scores in severity of psychopathology have poorer cognitive insight in schizophrenia.
4. There are no other associated factors of insight in schizophrenia.

## **CHAPTER FOUR**

### **METHODOLOGY**

#### **4.1 Study Setting**

The study was conducted at two different hospitals, both of which are situated in Kelantan. These hospitals were:

1. Hospital Universiti Sains Malaysia, Kubang Kerian, Kelantan. (HUSM)
2. Hospital Raja Perempuan Zainab II, Kota Bharu, Kelantan. (HRPZ II)

HUSM is a teaching university hospital while HRPZ II is administered by the Malaysian Ministry of Health. On top of both hospitals being experienced in managing schizophrenia, these hospitals are also located within a short distance of 8km apart and thus the demographic profiles of patients are considered similar.

#### **4.2 Study Design and Study Period**

This was a cross-sectional study conducted for nine months from March 2014 until November 2014.

### **4.3 Study Population and Sample**

#### **4.3.1 Reference population**

All patients diagnosed with schizophrenia in Kelantan.

#### **4.3.2 Source population**

All patients diagnosed with schizophrenia who attended outpatient psychiatric clinic at Hospital Universiti Sains Malaysia and Hospital Raja Perempuan Zainab II from March 2014 until November 2014.

#### **4.3.3 Sampling frame**

All patients diagnosed with schizophrenia attending outpatient psychiatric clinic at Hospital Universiti Sains Malaysia and Hospital Raja Perempuan Zainab II for regular follow-up during the study period and fulfilled inclusion and exclusion criteria.

#### **4.3.4 Study sample**

All patients diagnosed with schizophrenia attending outpatient psychiatric clinic at Hospital Universiti Sains Malaysia and Hospital Raja Perempuan Zainab II for regular follow-up during the study period, fulfilled inclusion and exclusion criteria and willing to participate in the study.

#### **4.3.4.1 Inclusion criteria**

1. All patients with schizophrenia from age 18 to 65 years old.
2. Schizophrenia is diagnosed using DSM-IV-TR criteria.
3. Patients attending outpatient psychiatric clinic for follow-up.
4. Able to read and write in Malay.
5. Patients who consented for the study.

#### **4.3.4.2 Exclusion criteria**

1. Dementia or cognitive deterioration according to DSM IV-TR.
2. Previous history of traumatic head injury.
3. History of admission to psychiatric ward due to relapse of schizophrenia in the past six months.
4. Alcohol or drug dependence.
5. Major medical or neurological illness.
6. Mental retardation and other major axis I diagnosis.
7. Poor command of Malay language.

#### **4.3.5 Sampling method**

This study employed convenience sampling or non-probability sampling method in an effort to optimize limited time and resources available. Eligible, consented patients who attended outpatient psychiatric clinics during the study period were enrolled in the data