PREVALENCE OF SEVERE MENTAL ILLNESS DUAL DIAGNOSIS AMONG INPATIENTS IN A PSYCHIATRIC HOSPITAL

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ABSTRACT

PREVALENCE OF PSYCHIATRIC DUAL DIAGNOSIS AMONG INPATIENTS IN A PSYCHIATRIC HOSPITAL

The high prevalence of co-morbidity or dual diagnosis in severe mental illness is an area of growing concern. The negative implications of either alcohol or non-alcohol substance use among patients with severe mental illness is an important area of focus. The aim of this study is to determine the prevalence of alcohol or non-alcohol substance use dual among patients with severe mental illness that is admitted to Hospital Mesra Bukit Padang. This study will also be looking at their demographic characteristics. In addition, this research attempts to study the possible association of clinical factors and outcomes from alcohol or non-alcohol substance use disorder dual diagnosis. This is a cross-sectional study conducted in the inpatient ward of Hospital Mesra Bukit Padang. Patients who meet the inclusion and exclusion criteria are invited to participate in this study. Sociodemographic and clinical data were obtained from patients who consented based on questionnaire designed by the research team. Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM 5) was used to establish diagnosis of severe mental illness. Mini-International Neuropsychiatric Interview (M.I.N.I) was used to exclude other psychiatric disorders and to screen for alcohol or non-alcohol substance use disorder co-morbidity. Outcomes and severity of different domains among severe mental illness patients was assessed with Addiction Severity Index (ASI).The association of demographic, clinical factors and outcomes of patients with dual diagnosis was examined. A total of 152 patients participated in this study. More than half, 51.3% (n=78) of patients with severe mental illness had comorbid alcohol use disorder and**,** 29.6%(n= 45) with non-alcohol substance use disorder, predominantly amphetamine type stimulants. Majority of patients were male (61.2%), Kadazan (42.1%), single (52.6%), below tertiary

level of education (52.6%) and unemployed (75%). Both univariate and multivariate analysis showed that gender, race and alcohol use disorder were associated factors between severe mental illness with co-morbid non-alcohol substance use disorder. Among patients with severe mental illness and alcohol use disorder, univariate analysis similarly showed that gender, race and non-alcohol substance use disorder were associated factors and when analyzed with multivariate analysis were still significantly associated. Associated clinical factors and outcomes via multivariate analysis also showed more number of hospitalizations among patients with severe mental illness and substance use disorder with severe addiction severity index scores based on legal, family and psychiatric status. Among patients with severe mental illness and alcohol use disorder, similarly had more number of hospitalizations and severe addiction severity index scores in domains of family and psychiatric status. Suicidality was higher among patients with severe mental illness with alcohol use disorder with equal odds among races. The prevalence of severe mental illness dual diagnosis was high in this study with poorer outcomes, higher rates of admissions and risk of suicidality. This highlights the importance of provisions for a more holistic treatment approach among patients with dual diagnosis.

Keywords: severe mental illness, dual diagnosis, non-alcohol substance use disorder, alcohol use disorder

ABSTRAK

KELAZIMAN PENGUNAAN DADAH ATAU ALKOHOL DI KALANGAN PESAKIT PSIKIATRI YANG MENERIMA RAWATAN PESAKIT DALAM DI HOSPITAL PSIKIATRI

Kelaziman dwi-diagnosa yang tinggi di kalangan pesakit mental teruk dengan masalah penyalahgunaan alkohol atau dadah merupakan suatu aspek yang semakin membimbangkan. Kesan akibat negatif penyalahgunaan alkohol ataupun dadah di kalangan pesakit mental teruk menjadi satu fokus penting. Tujuan kajian ini adalah untuk mengenal pasti kelaziman dwi-diagnosa di kalangan pesakit dalam yang menerima rawatan di Hospital Mesra Bukit Padang. Kajian ini juga akan mengenal pasti maklumat demographik.Turut dikaji hubungan antara faktor-faktor klinikal dan kesan akibat daripada penyalahgunaan dadah atau alkohol di kalangan pesakit mental teruk.Kajian ini merupakan kajian keratan rentas yang dijalankan dengan pesakit dalam di Hospital Mesra Bukit Padang. Pesakit yang memenuhi kriteria kemasukan dan tidak mempunyai kriteria sebaliknya dijemput untuk kajian ini. Data demographik dan data klinikal yang disediakan oleh kumpulan penyelidik diperoleh dari pesakit yang telah memberi kebenaran untuk mengambil bahagian dalam kajian ini. 'Diagnostic and Statistical Manual of Mental Disorders', edisi ke-lima (DSM 5) digunakan untuk mengukuhkan diagnosis pesakit mental teruk.'Mini-International Neuropsychiatric Interview' (M.I.N.I) juga digunakan untuk mengecualikan diagnosis pesakit mental yang lain dan juga untuk mengenalpasti masalah penyalahgunaan alkohol atau dadah. 'Addiction Severity Index'(ASI) pula digunakan untuk mengenalpasti tahap keterukan kesan akibat dwi-diagnosa dengan penyalahgunaan alkohol atau dadah berdasarkan bahagian seperti di ASI. Hubungan antara data demographic, faktor-faktor klinikal dan kesan akibat antara pesakit dwi-diagnosa turut dikenalpasti.Seramai 152 pesakit telah berjaya diikutsertakan

dalam kajian ini. Lebih dari separuh (51.3%) daripada pesakit mental teruk mengalami dwi-diagnosa penyalahgunaan alkohol dan 29.6% dengan penyalahgunaan dadah, dengan majori dadah jenis 'amphetamine type stimulant'. Majoriti subjek adalah lelaki (61.2%), berbangsa Kadazan (42.1%), belum berkahwin (52.6%), mempunyai tahap pendidikan menengah(52.6%) dan tidak bekerja (75%). Kedua analisis "univariate" dan "multivariate" menunjukkan ada hubungan antara faktor jantina, bangsa dan penyalahgunaan alkohol antara pesakit dwi-diagnosa dengan penyalahgunaan dadah. Pesakit dwi-diagnosis penyalahguaan alkohol pula menunjukkan faktor-faktor seperti jantina,bangsa dan penyalahgunaan dadah adalah berkait dan serupanya juga melalui analisa "multivariate". Faktor kekerapan kemasukan hospital pula lebih tinggi dikalangan pesakit dwi-diagnosis dengan penyalahgunaan dadah dan alkohol. Pemarkahan "Addiction Severity Index" dalam bahagian status undang-undang ,shubungan keluarga dan psikiatri adalah lebih tinggi di kalangan pesakit dwi-diagnosis penyalahgunaan dadah manakala pesakit dengan penyalahgunaan alcohol melalui analisa "multivariate" turut menunjukkan tahap lebih serius dalam bahagian status hubungan keluarga dan psikiatri. Kecenderungan membunuh diri juga lebih tinggi di kalangan pesakit dwi-diagnosa penyalahgunaan alkohol berbanding penyalahgunaan dadah, manakala faktor bangsa , kecenderungannya adalah sama.Dwi-diagnosis samada dengan alkohol ataupun dadah di kalangan pesakit mental teruk mengalami kesan akibat teruk dengan kekerapan kemasukkan hospital lebih tinggi dan kecenderungan untuk membunuh diri yang lebih tinggi.

Kata kunci: pesakit mental teruk, dwi-diagnosa, penyalahgunaan alkohol, penyalahgunaan dadah

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LIST OF ABBREVIATIONS

SMI   Severe mental illness

ASI   Addiction Severity Index

MINI   Mini-International Neuropsychiatric Interview

SUD   Substance use disorder

AUD   Alcohol use disorder

DSM   Diagnostic and Statistical Manual of Mental Disorders

ECA   Epidemiological Catchment Area

DALYs   Disability adjusted life years

WHO   World Health Organization

LSD   Lysergic acid diethylamide

GHQ   General Health Questionnaire

HIV   Human Immunodeficiency Virus

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CHAPTER 1: INTRODUCTION

1. Introduction

The high prevalent rates of co-morbidity or dual diagnosis among severe mental illness (SMI) patients has been widely documented and is an area of growing concern among clinicians and researchers (Saddichha et al.,2015;Schulte et al.,2008). The term dual diagnosis and "co-morbidity" are commonly and inter-changeably used when an individual with one or more psychiatric disorder also fulfills the diagnostic criteria for substance use disorder (Wittchen et al., 1996). It first came to use and was coined in the 1980's in America (Drake et al., 1998). Lehman et al., (1998), laid out two distinct sub-types of dual diagnosis. Persons with a primary diagnosis of mental illness with a substance misuse as the first type and persons primarily diagnosed with a substance use disorder with a mental illness as the second. In this study, the former definition was used. However, there are no definitive diagnostic criteria for dual diagnosis either in Diagnostic and Statistical Manual of Mental Disorders (DSM)-IV or DSM 5 (American Psychiatric Association, 2013).

Gafoor et al., (1998), emphasized and highlighted that the term dual diagnosis is not a diagnosis on its own, rather it simply describes that an individual has both a mental illness and substance use disorder. Dual diagnosis presentation in a patient also meant that it is a more complex collection of both behavioral problems and ever changing needs among dual diagnosis patients (Steel et al., 1997; Gournay et al., 1997).Severe mental illness (SMI) has been described in various terms and definitions across different practices. Schinnar et al., (1990), defined SMI as a term fulfilling three main criteria's which are; the presence of mental, behavioral or emotional disorder, duration of illness by current or recent diagnosis lasting at least a year that resulted in significant impairment in major areas of functioning. Schizophrenia spectrum disorders such as schizophrenia,

schizoaffective disorder, bipolar disorder and major depressive disorder together represents as having a SMI diagnosis (Stanley et al., 2001).

Several epidemiological studies reveal a prevalence between 25% to 50% of both alcohol and non-alcohol substance use disorders (SUD) among several mental disorders such as schizophrenia, depression or bipolar disorder (Regier et.,1990; Kessler et a., 1996; Teeson et al., 2000). It is not surprising as the lifetime prevalence of substance use disorder alone, which included alcohol and illicit drugs (excluding nicotine), was 15%, which was 5 times more than those without a psychiatric disorder. This rate has been reported to be higher compared to the general population (Robert et al., 2007). Similarly, persons with alcohol use disorder (AUD) or other substance use disorders were also 5 times more frequently affected by a mental disorder (Kessler et al., 2005).

Among each psychiatric disorders, patients with bipolar disorder had the highest prevalence of SUD of 57% based on reports by Epidemiologic Catchment Area (ECA) study, followed by 47% of patients with schizophrenia and 27% of major depressive disorder (Regier et al.,1990). Substance use disorders specific to inpatients with psychiatric illness reported a much higher prevalence rate of 75%. Among admitted psychiatric inpatients, nearly 50% received a diagnosis of either drug or alcohol use disorder, with alcohol being the most common (Weich et al., 2009).

Substance use has been identified as a predisposing factor for psychiatric illness apart from being an implication of psychiatric illness itself. Substances are often used to either alleviate symptoms of mental illness or side effects by self- medicating (Muesser K.T et al., 1998). In another study, environmental factors such as living in an environment with high drug availability or its use for recreational purposes are all contributing factors for the continued use of drugs (Buckley et al., 2006).

Alcohol and illicit drug use has been a global public health concern. 4% of disability adjusted life years (DALYs) was mainly attributed to alcohol and 0.8% to illicit

drugs use (Rehm.J et al., 2009). In year 2000 alone, there were an estimate of 2 billion alcohol users followed by 185 million drug users which contributed to major health issues (WHO,2010).The World Health Organization (WHO) reports that yearly, nearly 2.5 million people die from the detrimental effects of alcohol use and related disorders (WHO, 2014).

Understanding the needs and implications of patients with dual diagnosis is a major health concern. Studies of more localized settings may need to be conducted to understand dual diagnosis in detail. The researcher conducted this study to determine firstly the prevalence of dual diagnosis among inpatients with SMI, associated socio-demographic factors and clinical outcomes between dual diagnosis versus single diagnosis patients. The study was conducted in Hospital Mesra Bukit Padang, which is the sole mental institution in the state of Sabah.

CHAPTER 2: LITERATURE REVIEW

2.1 Overview of substance use disorder

Diagnostic and Statistical Manual of Mental Disorders (DSM) by American Psychiatric Association has been used as the diagnostic gold-standard for mental illness including substance use disorders (SUD) (Robinson et al.,2016). In their latest 5th edition of DSM (DSM 5) (American Psychiatric Association, 2013), both categories of substance dependence and substance abuse as in previous publication of DSM 4th edition (DSM-IV) (American Psychiatric Association ,1994) were combined. An umbrella term of SUD replaced categories of substance dependence and abuse. It was then divided on a severity continuum from mild to severe.

DSM 5 identifies substance-related disorders on the use of 10 separate classes of drugs. They are alcohol, caffeine, cannabis, hallucinogens (phencyclidine, LSD), inhalants, opioids, sedatives, hypnotics or anxiolytics, stimulants (including amphetamine-type stimulants, cocaine and others) and tobacco. Despite the large terminology of substance use disorder, there are subcategories that are required to be addressed specifically, for example, alcohol use disorder or stimulant use disorders. Apart from the general term of SUD, terms such as licit (example alcohol and nicotine) and illicit drugs, such as heroin, cocaine or stimulants are also interchangeably used in clinical practice. Illicit drugs refers to illegal drugs that are used, possessed or distributed against the law, including misused drugs prescribed for medical purposes (UNODC, 2011) .Therefore, throughout this literature review, terms such as alcohol use disorder (AUD) non-alcohol SUD (focusing on illicit drugs) will be used. DSM-IV required the fulfillments of three or more symptoms for substance dependence in a 12-month period, whereas in DSM5, fulfillment of only 2 out of 11 criteria are needed. Additionally, DSM 5 eliminated the criterion of legal problems with that of cravings

and compulsion to use. Essentially, despite these categories being combined, the general principle remains the same. Both editions of DSM explain substance use disorder as having a problematic pattern of substance use leading to various impairments, consequences and distress.

A person is classified as having alcohol or substance use disorder when he or she fulfills two or more of the following total eleven criteria's; tolerance, withdrawal symptoms, cravings, persistent desire or unsuccessful efforts to cut down on alcohol or drugs, excessive time spent to obtain substance or recovering from its effects, intake of larger amount of alcohol or drug use over time, neglect of responsibilities or socio-occupational dysfunction, use of drug or being intoxicated in situations that puts oneself or others in danger and persistent use of substance despite knowing its harmful effects on physical or psychological health (American Psychiatric Association,2013).

2.2 Substance Use in Malaysia

Substance use in Malaysia began during the British colonial government at the 19th century (Arokiasamy et al., 1992). Malaysia is situated close to the golden triangle which was one of the earliest opium producing regions in Asia. The Ministry of Home Affairs is largely responsible for all the drug related offences in Malaysia. Despite having severe punishments and penalties for drug users in Malaysia as well as various drug detection programs, illicit drug use has reached epidemic states in Malaysia (Singh et al., 2013).

Based on statistical reports by National Anti-Drug Agency (NADA), there were nearly 10,152 opioid users alone with a total of 25,922 illicit drug users overall by the end of year 2017 (NADA, 2017).Despite heroin being the most common and main drug of abuse, amphetamine-type stimulants (ATS) has been the rising epidemic since 2000. The commonly available methamphetamine are mostly available in the form of tablet,

also called "pil kuda" or "wy". In its crystallized form, it is available as "syabu" or "ice" (Mazlan et al., 2006). Between the years 2008 to 2011, statistics have revealed the highest rates of admissions to drug rehabilitation centres in Malaysia.

2.3 Alcohol and Substance use in Sabah

In a multi-racial and multi-cultural country like Malaysia, alcohol and alcohol-related problems do not affect the majority of the population, as the Muslims are forbidden from drinking. In Peninsular Malaysia, there are three main ethnic groups with over 80 ethnic groups in East Malaysia, on the island of Borneo. Although the largest Malay ethnic group in Malaysia, summing up to 50% of the population in Malaysia do not drink, many other ethnic groups consume alcohol on much higher rates. This is a concern looking at the considerable harm it may cause. WHO in 2009, placed alcohol as the third leading cause of death and disease in the world, which contributed to 4.6% of disability adjusted life years.

Three states in Malaysia with the highest rates of alcohol consumption are Kuala Lumpur, Sabah and Sarawak. Sabah is one of the two states on the island of Borneo. It is also the state with the highest poverty rate in Malaysia. When compared to Peninsular Malaysia, there are ten times more people below the official poverty line (Hatta & Ali, 2013). Like Peninsular Malaysia, Sabah also has the largest proportion of alcohol consumption from unrecorded sources like homemade beverages, such as rice wine (tapai) and distilled rice wine (montoku). This is largely associated with cultural practices whereby homemade alcohol beverages are easily obtained during festivals. These beverages have varying alcohol content and are most commonly consumed by the Bumiputras of Sabah and Sarawak. Odds of risky alcohol intake were 2.7 among the Bumiputras in Sabah and Sarawak (Mutalip et al., 2014).

Sabah and Wilayah Persekutuan Labuan are among the two states with the highest prevalence of mental health problems such as emotional distress, anxiety, insomnia and depression when screened with general health questionnaire (GHQ), which sums up to 43% followed by Wilayah Persekutuan Kuala Lumpur, 39.8% (National Health and Morbidity Survey 2015). To date, there is no data in Sabah on the association between the vast prevalence of both substance use disorder among patients with psychiatric disorders and vice versa.

2.4 Severe Mental illness and Substance Use Disorder Dual Diagnosis

The importance of understanding the complexity of SMI dual diagnosis among patients with mental illness is undeniable. Dual diagnosis often represents as two or more independent conditions that run its own distinct clinical cause. These conditions are often interrelated, for example, the primary disorder may influence the progress of the second disorder and vise verse (Schuckit. M et al., 2006).

Patients suffering from any mental illness have a 50% risk of developing any substance use disorder at some point in their lives, with half having a current substance use disorder (Robert et al., 2007). Ringen et al., (2007), specified that patients with SMI such as schizophrenia and bipolar disorder have higher rates of substance use disorder dual diagnosis.

Lifetime data on national comorbidity study found 57% of patients with schizophrenia spectrum disorders had a comorbid AUD with a slightly higher rate among patients with bipolar disorder, 59% as compared to other psychiatric disorders (Camtois et al., 2005). Rates of non-alcohol SUD was still higher among schizophrenia spectrum disorder patients, 45% with 38% among those with bipolar disorder and only 10% in other psychiatric disorders (Camtois et al., 2005). These increased risk of SUD is a worrisome issue. 36% of patients with SMI, particularly schizophrenia had reportedly stopped

medications due to active consumption of alcohol (Velligan et al., 2017). Non-compliance may contribute to further increase rates of hospital admissions among patients with dual diagnosis compared with single diagnosis patients (Ayano et al., 2017).

In a meta-analysis study, 46% of patients with schizophrenia alone had four times greater risk of being diagnosed with any substance use disorder. Alcohol is among the most common substance identified, contributing 21% of the comorbidity (Mieutten et al., 2009). This study is similar with the previous study done by Regier et al., (1990), that also reported patients with schizophrenia having nearly five times more rates of SUD as compared to the general population. Alcohol use was three times greater while other illicit drugs use were six times more in rates of co-occurrence. As evident by Epidemiological Catchment Area (ECA) studies, yet again alcohol was identified as the most common substance used with rates of 34% and other drug use, 28% among patients with schizophrenia spectrum disorder.

A meta-analysis study by Muesser K.T et al., (1990), revealed a varying proportion of alcohol and illicit drug use (with exclusion of tobacco and caffeine) comorbidity among patients with schizophrenia. These studies reported a range of alcohol and illicit drug use comorbidities between 10% to as high as 70%. In another study, among patients with schizophrenia alone, over 45% had a current alcohol and non-alcohol SUD (excluding nicotine) while up to 68% have a lifetime disorder (Margolese et al., 2004). Definitively, this vast range has several attributable factors, firstly is the method and approach used for diagnosing schizophrenia, the target population of inpatient or outpatients, as well as the means of defining substance use disorder itself (Dixon et al., 1999). The high prevalence of comorbidities with alcohol or non-alcohol substance use among patients with SMI is particularly high among patients with schizophrenia. The bulk of existing literature research focused on this disorder predominantly.

Dual diagnosis patients face more challenges in terms of diagnosing and clinical management as compared with single diagnosis patients. Substance use have reportedly increased the severity of symptoms, especially positive symptoms among patients with schizophrenia (Gregg et al., 2007). In addition, the prolonged and heavy alcohol consumption are more often associated with paranoia, disorganized and incoherent speech, depression as well as suicidal behavior (Margolese et al., 2004).

Apart from psychiatric symptoms, there have been observed association between increased medication side effects with substance use (Potvin et al., 2006). Several studies observed greater rates of akathisia, more episodes of extrapyramidal symptoms among alcohol users and also dysphoria related to medication as a result of concurrent alcohol use (Dixon et al., 1992; Duke et al., 1994, Awad et al., 2005).

Prior to the first psychiatric contact, nearly 80% of patients with schizophrenia have a history of substance use and up to 70% with a history of alcohol use. Among these groups, they had a significantly lower age of onset of schizophrenia by 2 years than those without a substance use (Buhler.B et al., 2002). Majority of patients with an affective disorder, either major depressive disorder or bipolar disorder with alcohol or non-alcohol substance use disorders, have a younger age of onset of illness with earlier hospitalizations (Minnai et al., 2005). Patients with bipolar disorder are ten times more likely to be diagnosed with AUD compared to general population and eight times the risk for other non-alcohol substance use disorders. These comorbidities not only have implications on recovery period but also adds on to the persistence of symptoms such as anxiety, depression, irritability and above all, disruption of circadian sleep rhythm pattern as a consequence of the directs effect of alcohol or other substances (Salloum et al., 2000).

Why does comorbidities exist among SMI patients? Several factors such as environmental, genetic factors, family and social relationships with early life trauma have been identified as among the vulnerable factors for substance or alcohol use disorder

(Singh et al., 2016). A hypothesis exists that the irregularities in development of hippocampus and frontal cortex further reduces the inhibitory control of drug seeking behavior in patients with SMI as schizophrenia. This in return increases addictive behavior and vulnerability to rewarding effects of drug use (Winklbaur et al., 2006). These vulnerabilities potentially increases the likelihood of negative implications from alcohol or substance use compared to general population. Labelled as "supersensitive" to effects of certain substances, dual diagnosis patients with schizophrenia are more likely to experience greater negative consequences from even low levels of use compared to those without schizophrenia (Muesser K.T et al., 1998). The psycho-biological vulnerability of the disorder itself increases the sensitivity of the effects of drugs and alcohol which potentially leads to the negative consequences despite only low amounts of substance used (Muesser K.T et al., 1998). Although it is still not clear which genes are involved in contributing to dual diagnosis in schizophrenia, the role of genetics can be determined via the presence of family history between relatives or family members with substance use disorder (Noordsy et al., 1994).

Understanding the temporal relationship between alcohol and non-alcohol SUD with SMI is particularly difficult to establish. Different substance posit different effects among patients with SMI. For example, among patients with schizophrenia, there is some evidence that patients with psychotic symptoms are more likely to use alcohol as compared to those without psychotic symptoms (Olfson et al., 2002). Alcohol, being the most commonly reported substance among patients with schizophrenia, further lead to the understanding of its role in the existence with comorbidity. It has been reported that alcohol use may worsen symptoms of psychosis and eventually trigger relapse, however, studies show it does not actually cause schizophrenia (Hambrech et al., 1996). Among those with methamphetamine use disorder, it was reported that nearly 20% have had a psychiatric admissions with 40% of it prior to the onset of amphetamine use (Baker et al.,

2005). This means a pre-existing psychotic symptom among patients with SMI could produce a brief increase in psychosis when using stimulants and was reported most common between 50% to 70% of patients with schizophrenia (Curran et al., 2004). The type of substance use varies, depending on its availability rather than the subjective effect experienced from the use of substance (Muesser K.T et al., 1992). In contrast with study by Nesvag et al., (2015), it was found that the preferred choice of drugs among SMI like schizophrenia are stimulants whereas among bipolar disorder patients, sedatives and alcohol are preferred.

Bidirectional models have been proposed as a link between symptoms of psychosis in SMI with alcohol or SUD. Both may trigger and also maintain each disorder at the same time. Among vulnerable individuals with SMI, substance use can trigger or precipitate the onset of schizophrenia and causes symptoms to persist with the continued use of substance. Factors such as motivation, desire and belief contributes to the continued use of substance (Muesser K.T et al., 1998).The common hypothesis of self-medication has been numerously documented and studied. Most patients use drugs after the first onset of psychosis to self-medicate themselves, with the aim to either improve negative symptoms, depression, anxiety or simply the side effects of medications itself (DeQuardo.J et al., 1994; Dixon. L et al., 1990).

Premorbid functioning or adjustment is an aspect that is frequently assessed among all patients with a psychiatric disorder, more so among dual diagnosis patients. Interesting, one study by Ringen et al., (2008), among dual diagnosis patients revealed that better premorbid function meant higher possibilities of exposed opportunities for patients to gain excess for any substances. Often, patients tend to use substances to cope with their symptoms of mental illness. Therefore, there has been higher rates of substance use among first episode of psychosis especially among patients with schizophrenia (Sevy et al., 2001).

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Despite the known hypothesis of self-medication, some studies have focused on the onset of schizophrenia caused by the use of substance (Kerner et al., 2015;Linszen et al., 1994; Kovasznay et al., 1993). Drugs such as hallucinogens (LSD), stimulants (amphetamine) or cannabis are proposed as the substances that could precipitate schizophrenia due to its psychotomimetic properties (Blanchard et al., 2000). Kovasznay et al., (1993), found that nearly 90% of patients had reported substance abuse that preceded the onset of first psychotic episode. An explanation for this could be due to the fact that the average age onset of alcohol and drug use in the general population generally occurred at a younger age than the average onset for schizophrenia. Alcohol use was most prevalent in early adolescent with 60% between the ages of fourteen and nineteen and 40% between ages twenty to twenty four (Grant et al., 1997). It is undoubted of the negative impact that psychiatric dual diagnosis, in particular schizophrenia and substance use disorders impose. Hence, there is a need to be able to identify these patients who are at risk of using alcohol or other drugs as well as the likelihood of associated problems that comes with it.

Substance use disorders among patients with mood disorders, such as bipolar disorder and depression are also highly prevalent (Minnai et al., 2005; Salloum et al., 2000). Nearly half of participants involving bipolar disorder had either an alcohol or other substance diagnosis (Salloum et al., 2000). To be exact, the highest rates were among bipolar 1 patients, 61% followed by 48% among bipolar II patients (Salloum et al., 2000).Major depressive disorder has a lifetime prevalence rate higher among women, 21% followed by 13% among men (Kessler et al., 1994). A common challenge faced in dually diagnosed depressed patients is the rampant incidents of the usage of drugs or alcohol to self-medicate. In the United States, 20% of male and 10% of female with depression were concurrently diagnosed with alcohol use disorder (Worthinton .J et al., 1996). The causes to this has been widely and extensively studied. One study proposed

that alcohol use was the result of or consequences from primary disorder like depression which was used to self-medicate (Kessler& Price, 1993). The indirect effects from the primary disorder of substance use disorder itself could precipitate the onset of depressive disorder as a result of socio-occupational dysfunction leading to yet again the use of drugs or alcohol (Swendsen J et al., 2000).

It is undeniable the implications and impact of any substance use disorders among patients with mental illness. Dual diagnosis is still a great concern and impose various challenges in the approach and treatment as it affects the course and prognosis of the illness. Patients with comorbidities often have more suffering which lead to disabilities and hence requiring higher cost of care. This in turn eventually leads to the cause of poor medication and treatment compliance (Van et al., 1998; Keck et al., 1998).

3.0.Sequalae of Severe mental illness dual diagnosis

3.1Employment status

It is undeniable that SMI dual diagnosis is often associated with numerous implications (Potvin et al., 2005). The impact of psychiatric dual diagnosis has been linked with a range of negative outcomes such as the increment of hospital admissions, homelessness, criminality, unemployment, violence and suicidal behavior (Schmidt et al., 2011;Blanchard et al., 2000).

Employment is commonly used a sign of individual growth and stability in the process of recovery. It is also used a valuable outcome predictor. Among unemployed psychiatric patients, these individuals report that most fear the possibility of social rejection and fear of the possibility of failure. Some lacked in interest for employment and found that the need for constant and regular follow-ups for treatment to be the reasons of perceived employment difficulties (Laudet. A et al., 2002).

Employment rates among patients with a mental illness varies across countries. In London, United Kingdom, only 13 % of patients with schizophrenia were employed, with 12% in France. The rates of employment were higher in Germany by 30%. Comparisons were also made with the general population which showed an even wider gap of difference in employment rates with 70% in UK and 62% both in France and Germany (Marwaha .S et al., 2007). Less than 15% of patients with mental illness were recruited for competitive employment (Drake et al., 1999).

The evidence are strong for employment difficulties among patients with dual diagnosis (Robert et al., 2007). Several studies demonstrate that having a substance use disorder increases the likelihood of quitting or being fired and hence, reducing the chances for being employed (Becker, Drake et al., 1998; Robert et al., 2007). Study by Swarz et al., (2000), which followed up patients who were terminated from a job, showed that patients with a dual diagnosis were least likely to be employed again. We will need to understand that employment is not only the direct consequences of severe mental illness but also, unemployment may predispose a patient to having a psychiatric illness including substance use disorder (Lee J et al, 2015).

3.2 Medical conditions

The commonly prevalent co-occurring medical conditions among psychiatric inpatients was found to be infectious disease, endocrine and metabolic disorders (Frasch et al., 2012). In comparison with the general population, patients with SMI had higher rates of poor physical health condition (Jones et al., 2004). It is without a doubt that the concurrent substance use disorder and mental illness impacted the overall general health and well-being.

The concurrent use of alcohol or illicit drugs predisposes patients with SMI to develop multiple types of medical illness which includes cancer (lungs, liver,

oesophagus), cardiovascular disease, liver cirrhosis and human immunodeficiency virus (HIV). Also included are the intentional and unintentional injuries such as homicide and suicide (Jane et al., 2006). Jones et al., (2004), in his study encountered among 147 patients with SMI and medical comorbidities, rates of mortality were higher among SMI patients who also had a concurrent alcohol or illicit drug use disorder.

Bipolar disorder with alcohol or non-alcohol SUD are pertinent associations with medical illness. The high rates of dually diagnosed bipolar disorder patients also meant high rates of co-occurring medical illness (Beyer et al., 2004; Krishnan et al., 2005). Infectious diseases such as human immunodeficiency virus (HIV), hepatitis B virus and hepatitis C virus impose serious threat to the health and well-being of patients with mental illness. Dually diagnosed person are at high risk to develop HIV and hepatitis C virus (HCV), estimated between 3% to 8% (McKinnon et al., 2000). As we are not aware yet, patients with dual diagnosis have a complex presentation and when there is co-infections such as HIV, increases treatment challenge. This puts them at risk of increased morbidity and mortality due to diseases such as liver failure (Greub et al., 2000; Graham et al., 2001). There are several reasons for the risk of contacting HIV, hepatitis B or hepatitis C infections such as injecting or exchange of needles, multiple sexual partners, infrequent condom use as well as engaging in sex while using psychoactive substances (Goldberg et al., 2005; Essock et al. ,2003). In a large study, it was reported that more than 20% of patients with severe mental illness reported a lifetime intravenous drug use, with 14% of shared needles used (Osher et al., 2003).

Dual diagnosis patients combined with low levels of education, income, poor psychosocial supports and insight leads to poor treatment compliance and eventually leads to difficulties to engage with services and are unable to be treated successfully (Rosenberg .S et al., 2005). Apart from infectious diseases mentioned above, patients with mental illness and substance use disorders have high risk for cardiovascular diseases,

diabetes mellitus, hypertension, obesity and dyslipidemia (Kilbourne Amy et al., 2007). Dual diagnosis especially one with AUD increases the likelihood of several other medical conditions such as liver and central nervous system disease which could then precipitate diabetes mellitus, gastrointestinal disorders and cardiac diseases (Dickey,B et al., 2000).

3.3. Severe mental illness and Suicidality

Suicide has been among the leading cause of death worldwide, with suicide attempts being five to twenty times more common than completed suicide (Harris et al., 1997). Suicide is also the most important psychiatric implication being linked commonly to the use of drugs or alcohol.

A patient with a previous or prior suicide attempt has a 7% to 13% risk of completed suicide in the future and is a single most important predictor for future suicide attempts (Dag et al., 2008). Suicide rates have increased tremendously to about 60% worldwide and is now among the third leading cause of death (WHO, 2000). Suicide alone contributed 1.8% of the total global burden of disease in 1998 (WHO, 2000). The latest reports by WHO in 2018 now show that suicide is the second leading cause of death among persons aged 15 to 29 years old. WHO aims to reduce this suicide rates by 10% by the year 2020 (WHO, 2018). The rates of suicide are higher among patients with substance use disorder, with rates of completed suicide two to three times higher compared to those without a substance use disorder. Psychiatric disorders mainly depression and substance use disorder have been reported to have a higher risk of suicide. Women who also use drugs are seven times more at risk for a completed suicide than women who do not abuse drugs (Maloney et al., 2007; Darke et al., 2004).

3.3.1 Schizophrenia and Suicidality

Nearly 40% of premature mortality among patients with schizophrenia are related to suicide (Bushe et al., 2000) with a lifetime risk of suicide of 5% (Palmer et al., 2005). Surprisingly, most of the important risk factors of suicide among patients with schizophrenia are similar with that of the general population. Having a co-morbid alcohol or SUD, mood disorder and history of suicide attempts are among the risks factors (Hawton et al., 2005).

The risk of suicide is particularly high among psychiatric patients after an inpatient care and discharge. Patients who were discharged has a 12 fold increase in relative risk of suicide and an alarming 30 fold increase in death due to suicide alone (Tiihonen et al., 2006). Knowing that patients with mental illness are at an heightened risk of suicide and an even higher risk when comorbidity exist, it is crucial not only to identity all risk factors but also to prevent them (Kamali et al., 2000).

Therefore, it is important to properly identify suicide risk for each patient being treated at any psychiatric facility. Hor et al., (2006), in a systemic review found several factors associated with risk of suicide among schizophrenia patients. It was identified that young males with a higher level of education, illness related factors such as having depression, substance use disorders, previous history of suicide attempts , active hallucinations and delusions with good insight into illness, family history of suicide, physical illness and unemployment being all strongly related to the risk of later suicide.

3.3.2 Mood disorders and suicidality

Substance use disorder among patients with mood or affective disorders, particularly major depressive disorder is a risk factor on its own for suicide (Conner et al., 2003; Kessler et al., 1999). Lifetime risk of suicide for mood disorders is estimated between 6% to 15% (Isometsa et al., 2014).

Depression was strongly associated with suicide and are at heightened risk for suicidal behavior. Coexisting comorbidities, such as substance use like alcohol and drugs, anxiety disorder and presence of a personality disorder places patients with depression at higher risk for suicide (Hawton et al., 2013). The presence of any SUD approximately six months prior to episodes of depression was a good predictor of suicide (Dumais, A et al., 2005). Nearly 25% of both inpatients and outpatients with major depressive disorders had at least one lifetime of suicide attempt prior to the use of alcohol or illicit drugs (Aharonovich et al., 2002). Risk of suicide was still high among patients with depression when assessed during the first few weeks following discharge from an inpatient psychiatric care (Olfson et al., 2016).

Alcohol was the most frequently used substance followed by marijuana and cocaine and nearly 70% of them experienced depressive symptoms prior to the onset of substance use disorder (Ortiz et al., 2014). This findings also strengthened previous study by Marmorstein et al., (2011), that suggested depression as a risk factor for substance use. In contrast, symptom of depression such as, loss of interest in pleasurable activities or anhedonia often leads a patient to have lack of energy or motivation which in return lacks the desire to obtain substances. However, the opposite is possible too, whereby patients with depression tend to use illicit drugs in order to feel something as they lack the capacity to derive pleasure from daily activities (Kaleschstein et al., 2002).

Looking at bipolar disorders alone, the lifetime of attempted suicide ranges from 25% to 50%. (Dalton et al., 2003; Lopez et al., 2001). Among this group, 56% of them

have a concurrent diagnosis of either alcohol or other drug use disorder (Regier et al., 1990), putting them at twice more risk of suicide attempts and suicide (Tondo et al., 1999). It is also crucial to determine the severity of symptoms itself as it is a contributing factor that could lead to a substance misuse or suicidal behavior (Dalton et al., 2003).

It is therefore particularly important to identify patients at risk of suicide in order to prevent suicide. Psychiatric inpatients, in particular have higher suicide risk especially if suicidal ideations or thoughts of self-harm preceded reasons for admission (Powell. J et al., 2000).Therefore, it is important to identify and treat comorbidities especially when the risk of suicide is high.

4.0 Family relationships and psychiatric dual diagnosis

Family relationship is an aspect that plays a vital role in the wellbeing of patients with mental illness, more so in those with dual diagnosis (Nov et al., 2007). Family relationships are based on personal ties between persons and are most commonly bonded via blood ties, marriage or adoption. Most often, a strong family relationship, are a group of people bonded by either biological, social or psychological relationship who live together during certain period of their lives. Therefore, evidence shows that a dysfunctional family relationship or ties could have an impact on mental health of each family members (Pradeep et al., 2008).

There have been numerous studies done on families and their involvement among patients with mental illness, however little is known on how substance use disorder directly influences this tie (Lander et al., 2013). The complexity of treatment of patients with dual diagnosis makes it particularly important for family involvement in order to aid a patient's recovery and wellness (Fals et al., 2003). Their support would help patients with SUD to seek and engage in treatment. Lisa et al., (1995), made comparisons between 101 psychiatric inpatients with a dual diagnosis and 78 patients with only a single mental

illness using social and family relationships as the outcome measures. Indeed, those with a dual diagnosis had a significant lower family satisfaction and they reported a greater desire for family intervention.

How does having either a comorbid of alcohol or SUD impact on family relationships? The negative implications of drugs or alcohol misuse among patients directly contributed to family conflicts leading to poor social support and in long term generating high expressed emotion (Barrowclough et al., 2005). Spouses who continue to consume alcohol reported more incidents of arguments and fights with their partners and children (Brookoff et al., 1997). In a more recent study among relatives of patients with alcohol or SUD, spouses reported more problems in relation to physical aggression (Benishek et al., 2011). Rates of domestic violence were significantly increased, 50% among those with partners with SUD, involving drugs or alcohol (Murphy et al., 2001). Hence, it is crucial for clinicians to regularly assess the presence of any interpersonal conflict given that the high prevalence of conflict of 70% (Benishek et al., 2011). Therefore, family involvement and participation in the care of patients are important. Less emphasis has been placed on the importance of family support (Blankertz et al., 1994; Jerrel et al., 1994).

Caregivers or family members of patients with psychiatric dual diagnosis report stress that included feelings of worry, anger, guilt, shame as well as marital dissatisfaction and poor quality of life (Cavaiola et al., 2000; Biegel et al., 1998). There has been several studies done on the impact of family relationships among patients with dual diagnosis but very few directed on the family burden among this group (Brown et al, 1999; Biegel et al., 2007). Stress among caregivers directly influences their involvement with patient's care and affects treatment outcomes of patients. Hence, as much as the well-being of patients with comorbidities are important, emphasis should be targeted among caregivers and family members of patients as well.

A study done by Silver et al., (1999), compared two equal groups of caregivers between persons with dual diagnosis and single diagnosis. Caregivers who cared for the dual diagnosis group experienced more anxiety, stigma, depression and received less social support from other family members. The two largely reported stressors for family members that stood out was mainly the attitude of patients with substance use disorder as well as their motivation for treatment. Patients behavior such as mood swings, impulsiveness, desire to stay in treatment contributed to the stressor in family members (Townsend et al., 2006; Simpson et al., 2000). Patients with low motivation for example, may place a family member at a higher risk of burden.

Apart from the implications of family relationships among SMI dual diagnosis, little is known about the impact of a family history of alcohol or SUD among SMI with dual diagnosis. Just as the relationship between family is important, so does the presence of substance use among members of family and studies suggest that patients with dual diagnosis have high rates of family history with a problematic substance use (Davis et al., 2008; Comptois et al., 2005; Morean et al, 2009). Cantor et al., (2001), found a positive family history of substance abuse apart from other factors such as male gender, which showed poorer outcomes among psychiatric patients in a Swedish sample of 87 patients. 26% of psychiatric inpatients had families with a history of alcohol or SUD whom, were particularly difficult to engage and partake in patients care (Kashner et al., 1991).

In conclusion, psychiatric dual diagnosis has numerous implications that are highly preventable. Firstly, is the increased number of hospitalizations (Kivlahan et al., 1991), poor compliance (Owen et al., 1996), higher rates of violence (Stedman et al., 1998), homelessness (Caton et al., 1994) and increased risk of HIV infections. Hence, if SUD could be successfully eradicated or even reduced, it could dramatically improve the treatment outcomes among this group of patients. It is vital that the treating psychiatrist assesses the level of stress among family members and patient as it is frequently

associated with high relapse rates (Masa et al., 2017; Kavanagh et al., 1992). Family assistance and involvement can drastically reduce the use of substance among people with dual diagnosis (Clark et al., 2001).

Hence, one important clinical implications is the role of clinicians to determine the presence of patient's family history of substance or alcohol use as evidence suggests having a mental illness not only increases risk for substance use but also a family history of substance use may further increase risk for comorbidity (Comtois et al., 2005).

5.0 Association of severe mental illness, dual diagnosis and number of hospitalizations

One of the glaring and recurrent issues among SMI patients is the hospital admission rates. Patients with dual diagnosis had three times more hospitalization rates compared with those of single diagnosis (Prince et al., 2009).A recent study showed, among the rates of hospitalization, nearly half of the admissions were associated with drug abuse. 49% among inpatients and majority of male patients (Wicomb et al., 2018)

The lifetime of hospital admissions increased as well among the groups of psychiatric dual diagnosis. Several potential factors were identified as predictors for the frequent psychiatric admissions. The most common being history of substance use apart from other factors such as non-compliance to treatment, violence, crime, aggression and other demographic and socioeconomic characteristics (Thomas et al., 1995).

Several studies found history of frequent alcohol and drug use among psychiatric patients as being the main attributable factor for admissions (Hauli et al, 2011; Tantirangsee et al., 2015). It is therefore important to understand the relationship between outcomes from hospital admissions and as well as the subsequent psychiatric admissions. Firstly, the readmission are taken as an indicator of the quality of care from the previous

admission. Secondly, the cost that accompanies with frequent readmission needs to beconsidered as well (Byrne, et al., 2010).

A study done on psychiatric readmission rates among dual diagnosis patients identified younger age and male gender from lower income groups as variables associated with readmissions in comparison with single diagnosis patients (Minnai, G. P et al., 2006). One-year study period that was conducted on rates of hospitalization showed an increment of 15% of admission rates among patients with dual diagnosis in the four-year span (George, T. P et al., 2000).

6.0 Relationships of severe mental illness dual diagnosis with legal system

The relationship between SMI and legal problems has long been an area of concern and emphasis. Several studies documented the increased risk of legal problems among patients with SMI to violence, violent offences and crime. Risks are further heightened when co-occurred with alcohol or substance use disorder (Swanson et al. 1990; Hodgins et al., 1999; Putkonen et al., 2004).

Patients with SMI dual diagnosis often have a poorer overall prognosis as compared to single diagnosis, often with multiple negative implications such as suicidality, rehospitalizations, violence, crime or legal problems (Muesser K.T et al., 1996). Among criminal offences, majority of those with SMI had a diagnosis of schizophrenia with a comorbid AUD compared with a single diagnosis, with males more likely to commit violent types of crimes (Rasanan et al., 1998; Rice and Harris et al., 1995). Seena et al., (2009), in a prospective study identified that the presence of alcohol or illicit drugs potentially worsened psychotic symptoms and impulsivity which increased the risk to commit crime and tendencies for violence. In the same study as well, it was identified that the risk of violent crimes are minimal among patients with only SMI such

as schizophrenia, however with alcohol or SUD comorbidity, the risk increases further (Seena et al., 2009).

Admissions to a general psychiatry hospital found that nearly 24% of patients with SMI had criminal records, with nearly 10% committing a crime prior to the first psychiatric admission (Hodgins et al., 2004). Patients with schizophrenia had particularly higher odds of violent behaviors compared to other disorders such as bipolar disorder or depression. They has been studies that documented the strong link between SMI and violence. However, the risk and rates of violence are increased among patients with SMI and substance use disorder (Van et al., 2011). As mentioned, when dual diagnosis is present, it increases the likehood of violent offences among patients with a psychiatric disorder when compared with general population (Soyka et al., 2000).

Aggression, aggressive behavior and violence are commonly associated as the primary reason for hospital admissions (Iozzino et al., 2015). Most often, the concurrent use of alcohol and drug contributed to the development and escalation of aggressive behavior, among other factors (Sharon et al., 2003). Severity and symptoms of the illness itself, overcrowding in the inpatient setting as well as provocations are among the other factors leading to aggression (Angland et al., 2014; Powell et al., 1994). Focusing on psychiatric inpatients alone, a study involving 60 aggressive inpatients revealed at least 70% of them with either a substance or AUD. They were two times more likely to have aggressive tendencies than patients without substance use disorder. Patients with schizophrenia with comorbid alcohol or non-alcohol SUD (not including nicotine) had rates of aggression four times more compared with those without (Serper et al., 2005).

A study by Barlow .K et al., (2000), was consistent with the former study by Swanson et al., (1990), in that, patients diagnosed with schizophrenia possessed two times more risk of aggression while three times more among patients with bipolar disorder. Other diagnostic groups such as major depressive disorder and anxiety disorders reported

only half of such aggressive behaviors. In an Asian based study in Taiwan, patients with schizophrenia and bipolar disorder has more incidents of aggression especially during the acute period of illness (Chou et al., 2002). Mario et al., (2008), delineated the 3 most commonly associated factors of aggression prior to admission was male sex, use of substance as well as the presence of positive symptoms of psychosis. Among aggressive patients, 43% had at least abused one type of substance in the past (Amore et al., 2008).

The mechanism between substance use and aggressive behavior is unclear. However, additional factors such as medication or treatment non-compliance and a comorbid antisocial personality disorder are strong links to aggressive behavior as well (Bartel et al., 1991; Muesser K.T et al., 1999). It is well known that patients who are intoxicated or under the influence of alcohol tend to act aggressively (Hoaken et al., 2003). Alcohol has a rewarding property, which is also relatively comparable with other stimulants such as amphetamine or cocaine (Boileau et al., 2003). Stimulants are known to have psychomotor stimulating effects that could lead to the likelihood of aggression and when impulsivity is present, further confrontational and provocative behaviors lead to aggression (Phil &Peterson, 1995).

Types of crimes often committed among SMI patients varies from non-violent crimes to violent crimes. Buying of drugs are further encouraged with income generating crimes such as theft, burglary and property offences. Male patients with mood disorders and comorbid alcohol or substance use were more likely to be involved in property offences and drug related offences (Swartz et al., 2007). Serious offences such as, arson, homicide and murder mostly involve male schizophrenia patients (Wallace et al., 1998). One of the most appealing factor related to homicide is the psychopathology of mental illness itself, namely schizophrenia. This is because the risk of homicide is four times higher during acute periods of psychosis (Monica & Rui, 2015; Jiri &Roland, 1996).

Some studies found that apart from SMI and comorbid alcohol or SUD, other factors such as antisocial personality disorder also increased the risk of criminal activities, incarcerations and arrest (Tengstrom et al., 2004). Also, patients with SMI with functional impairment were likely to get arrested due to a crime compared with less impaired individuals. Patients with mental illness could also be victims of violent crimes and are more likely to be victims than perpetrators of violent crime (Eisenberg et al., 2005).

Apart from alcohol, there has been a large number of case reports on the relationship between amphetamine and violence (Klee et al., 2001). Similar to the explanation of alcohol and aggression, stimulants have a multifactorial and indirect causal relationship with aggression (Klee et al., 2001; Hoeken et al., 2003). Antisocial personality disorder has been strongly associated with aggressive behavior compared with those without the disorder (Gerard et al., 2002). Frequently, a preexisting impulse control or aggressive tendency are commonly present among patients with stimulant use disorders (Dawe et al., 2009) and when added with the strong stimulant withdrawal effects, together may contribute to the aggressive behavior (Moeller & Steinberg, 1994).

Almost all types of drugs, whether alcohol or stimulants can lead to violent behavior. Allen et al., (1997), found nearly 60% of violent offenders were tested positive for at least one type of substance use .To strengthen this findings, Kuhns et al., (2013), found alcohol use in particular to being strongly associated with crimes such as assault, rape or even murder (Kuhns, J. B et al.,2013).

The role of gender is also often associated with aggression and violence. Physical aggression was more common among the male gender than females (Krakowski, M et al., 2004). Nevertheless, the male gender are often overrepresented among violent patients (Wallace et al., 2006; Swanson et al., 1990). In one study, men were reported to have increased episodes of aggression prior to admissions, however, once an inpatient, women had more episodes of aggression (Binder et al., 1990).

In summary, the vast literature reviews among dual diagnosis SMI patients demonstrates the importance of identifying, screening and treating patients with dual diagnosis. The studies also emphasize on the sequelae of alcohol or other substance use disorders comorbidities that has several negative implications that involved various aspects of patients life.

CHAPTER 3: OBJECTIVES

3.1 General Objective

The aim of this study is to determine the prevalence of dual diagnosis among patients with severe mental illness admitted to Hospital Mesra Bukit Padang. It also aims to investigate the association of severe mental illness dual diagnosis with socio-demographic factors and associated outcome factors among patients with dual diagnosis.

3.2 Specific Objectives

1. to screen for comorbid substance use disorders among patients with severe mental illness

2. to determine the demographic characteristics between those with and without dual diagnosis

3. to examine the association of medical status between dual diagnosis patients and single diagnosis patients

4. to examine the association of employment status among dual diagnosis patients

5. to determine the level of severity of psychiatric status among patients with dual diagnosis

6. to determine the prevalence of legal status among patients with and without dual diagnosis

7. to examine family or social relationships and its relation between dual diagnosis and single diagnosis patients

8. to identify clinical outcomes such as number of hospitalizations between dual diagnosis patients

9. to identify the prevalence of suicidality among patients with dual diagnosis

3.3 Rationale of the Study

Limited data are available in Malaysia particularly in Sabah regarding psychiatric dual diagnosis. If dual diagnosis and its associated factors are identified, treatment and outcome can be potentially improved. As discussed in previous chapters, Sabah is one of the states with the highest rates of people suffering from psychiatric disorders. This study highlights the prevalence of dual diagnosis among psychiatric inpatients, which could help expand and improve treatment in a holistic way in approaching the complex dual diagnosis among mental illness patients.

CHAPTER 4: METHODOLOGY

4.1 Study Setting

Bukit Padang Hospital or Hospital Mesra Bukit Padang is Sabah's sole mental institution in Kota Kinabalu. In 2001, Malaysia passed the Mental Health Act and Sabah then gazetted the act replacing the Lunatics Ordinance ten years later in 2011. Hospital Mesra Bukit Padang started its operation in 1971. At present, there are ten functioning wards which includes two acute wards and two subacute wards. The hospital has total of 302 beds and provides specialist services for both outpatients and inpatients. Admission rates are between 70 to 80 admissions per month with main diagnosis such as schizophrenia and mood disorders. Outpatient setting provides services between 50 to 100 new cases per month with total of nearly 2000 follow up patients in a year. Rehabilitation and occupational therapy are also provided for the inpatients as well as outpatients.

4.2 Study Design and Sampling Method

This is a cross-sectional study. Convenient sampling method was used to recruit patients.

4.2.1 Inclusion Criteria

1) all patients admitted voluntarily and involuntarily to HMBP within 4 months period of data collection fulfilling Diagnostic and Statistical Manual of mental health disorder, 5th Edition (DSM-5) criteria for severe mental illness (schizophrenia spectrum disorder, bipolar disorder and major depressive disorder)

2) age 18 years old and above

3) patients who are able to read and understand Malay or English language adequately

4) patients who are able to give informed consent

4.2.2 Exclusion Criteria

1) Patients who are not able to give informed consent

2) Having an organic mental disorder

3) Diagnosis of substance induced mood or psychotic disorder or substance use

   disorder

4) Severe psychotic symptoms or behavioural disturbances

5) Severe cognitive impairment or Intellectual disability

6) Concurrent severe and unstable medical condition

4.2.3 Data Collection

Data collection was done from August 2018 to December 2018. All patients who are admitted to the inpatient psychiatric ward in Hospital Mesra fulfilling both inclusion and exclusion criteria's were identified and invited to participate in the study. The purpose and the nature of the study was explained verbally to the selected patients, including the benefits of the study. Patient information sheet regarding the research was also given to patients prior to data collection. Emphasis is on the voluntary basis of participation. If patients voluntarily agreed to participate, a written consent was obtained. Prior to obtaining written consent, assessment of fitness to consent is performed by an independent doctor not involved in the study but involved in patient's care and has seen patient on a regular basis. The assessment will be in accordance to the Mental Health Act 2005, section 77 whereby the examining independent doctor shall consider whether or not the person examined understands :

a) the condition for which the treatment/study is proposed

b) the nature and purpose of the treatment

c) the risks involved in participating in the study

d) whether or not his ability to consent is affected by his condition

Then, the fitness to consent form was filled. Once the consent was obtained, the socio-demographic data and clinical information of patients will be obtained using the demographic and clinical data questionnaire. Following this, two clinician-rated questionnaires, namely Mini-International Neuropsychiatric Interview (M.I.N.I) and ASI was administered. Mini International Neuropsychiatric Interview (M.I.N.I) was administered by the interviewer to exclude severe mental illness diagnosis of patients during admission. M.I.N.I was also used to assess and screen for alcohol use disorder and non-alcohol substance use disorder including stimulants, cocaine, opiates, hallucinogens, glue cannabis, sedatives, hypnotics and anxiolytics.

It was then followed by ASI questionnaire to determine the associated outcome factors. The process of interview was done in an interview room in the psychiatric ward in a private and confidential manner and the information kept confidential. In addition, the possible risks or implications to the participants in the study informed by the researcher as certain topics or issues of the past or present may trigger emotional response or discomfort. If the patients were found to have emotional issues, the appropriate measures such as further exploration, allowing time for patient to share and express their thoughts or emotions on the issues was done if the patient was comfortable to continue. The psychiatrist in-charge was also informed for further management in a confidential manner. Once patient had completed the interview, the questionnaires will be returned to the researcher and kept in a file.

Diagram 4. 3: Flow Chart of data collection

Psychiatric in-patients with severe mental illness admitted to Hospital Mesra Bukit Padang

Patients are selected based on convenient sampling

Patients are given explanation about the study and informed consent is obtained from patient.

The selected patients are asked about demographic data

Researcher administers 2 questionnaires, M.I.N.I to exclude diagnosis of severe mental illness and to assess for alcohol and non-alcohol substance use disorder comorbidity and followed by ASI questionnaire to identify domains most severely affected among patients

Alcohol and non-alcohol substance use intake was also double-checked from patients case files and treating clinicians to minimize underreporting from patients

4.4 Sample Size

Sample size was determined by the following formula:

$$n = \frac{t^2 \times p(1-p)}{m^2}$$

$$= \frac{1.962^2 \times 0.104 (1-0.104)}{0.05^2}$$

$$= 3.85 \times 0.104 \times 0.896 / 0.0025$$

$$= 143.5$$

$$\sim 144$$

Description:

n = required sample size

t = confidence interval level at 95% (standard value of 1.96)

p= estimated prevalence of dual diagnosis (the investigator used the expected prevalence of substance and alcohol use disorder among severe mental illness of 10.4% as was found in a study) (Rossi et al., 2004)

m= margin of error at 5% (standard value of 0.05)

4.5 Instruments

4.5.1 Demographic and Clinical Data

The research team developed a demographic questionnaire to collect relevant socio-demographic data and clinical information about the participating patients. The socio-demographic data included age, race, marital status, level of education, employment status, type of employment, family history of drug or psychiatric illness and duration of untreated psychosis.

4.5.2 Mini-International Neuropsychiatric Interview (MINI)

MINI is a short structured diagnostic interview based on the DSM 5 criteria that has good psychometric properties and is reliable for the detection of psychiatric disorders (Sheehan et al., 1998). MINI consists of the following psychiatric diagnoses:

1. Major Depressive Episode

2. Suicidality

3. Suicidal behaviour disorder

4. Manic and Hypomanic episodes

5. Panic Disorder

6. Agoraphobia

7. Social Anxiety disorder

8. Obsessive-Compulsive Disorder

9. Posttraumatic Stress Disorder

10. Alcohol use disorder

11. Substance use disorder (non-alcohol)

12. Psychotic Disorders and mood disorder with psychotic features

13. Anorexia Nervosa

14. Bulimia Nervosa

15. Generalised Anxiety Disorder

16. Antisocial Personality Disorder

M.I.N.I has been validated against Structured Clinical Interview for DSM diagnoses and against Composite International Diagnostic Interview for ICD-10 (CIDI). (Sheehan et al., 1997). M.I.N.I has been compared with Structured Clinical Interview for DSM-5 (SCID-5) and shows acceptable test-retest reliability and interrater reliability with the previous SCID-IV .M.I.N.I for DSM-5 (Sheehan et al.,2015) is a much brief alternative to the SCID-5. It has similar reliability and validity properties with a shorter administration time (median time of 15minutes compared with 35 minutes for SCID) (Sheehan et al., 1997).

For this study, Mini-International Neuropsychiatric Interview (M.I.N.I) version 7.0.2 was used to exclude other psychiatric diagnosis and was used to confirm diagnosis of severe mental illness. MINI was also used assess for alcohol or non-alcohol substance use disorder comorbidity.

4.5.3 Addiction Severity Index (ASI)

Addiction severity index is a semi-structured interviewer rated instrument used in a face-to-face patient interview. ASI-version 5 was created in 1992(Mclellan et al.,1992). ASI assesses impairments in seven main domains or areas of a patients life:

1) Medical

2) Employment/support

3) alcohol/drugs

4) Family/social

5) Psychiatric

6) Legal status

7) Psychiatric status

It has been translated in various languages and is one of the most widely used instruments to assess the severity of problems among persons with substance use disorder in different settings. The ASI has been used extensively for treatment planning and outcome evaluation (Cecile et al., 2013). The ASI questionnaire was not developed for the purpose of diagnosis or diagnosing substance use disorder, rather to assess the levels or severity based on several domains in a patient while being able to identity problem areas for future interventions (Lehman et al., 1996).

The ASI provides overall scores on each domain based on severity rating by two methods, which are composite score(CS) and severity rating (SR). CS, which ranges from 0 (no problem) to 1(extreme severity) is a score calculated objectively through weighted formula in order to provide equal contribution from each of the scored item (McGaham et al.,1986). In addition, SR is relatively a subjective score and additional treatment in that specified area are indicated based on the interviewers assessments.

The subjective items comprises of five point scale of 0 "not at all" to 4 "extremely" in which patients rate their severity of problems. based on two item questions which are "how bothered they are and how important is it to receive treatment or counselling". All seven domains of ASI show good internal consistency with Cronbach's alpha of 0.89 for medical domain, 0.65 for employment, 0.84 for alcohol, 0.69 for drugs, 0.65 for legal status, 0.74 for family or social relationships and 0.84 for psychiatric status (Leonard et al., 2000).

4.6 Statistical Analysis

Statistical Package for Social Sciences (SPSS) was used to analyze data. Descriptive statistics were used to summarize data. Demographic characteristics such as age, race, gender, education level, marital status and employment status were compared between SMI group with and without alcohol or non-alcohol substance use disorder. Median (IQR) was used to represent continuous variables whereby percentage was used to present categorical variables. Univariate logistic regression was done on each variable (demographic and clinical) with the dependent variables (SMI with or without SUD (non-alcohol): SMI with or without or AUD). All variables that were significantly associated with the dependent variables were later analyzed again through multivariate logistic regression. Multivariate analysis were done on the scaled dependent variables (number of hospitalizations, onset of illness, ASI scores) among patients with SMI. ASI scores of medical (MCOMP), employment status (ECOMP), family relationships (FCOMP), legal status (LCOMP) and psychiatric status (PCOMP) components were calculated via Composite score Calculation, Microsoft Office Excel 1997. The mean of continuous variables were compared using generalized linear model (scale) with gamma log link function for onset and number of hospitalization whereby identity link function was used for ASI scores. Univariate logistic regression was used to investigate factors associated with suicidality. Then, dual diagnosis of SMI with AUD was used as the main factor in the multivariate logistic regression after adjusted for confounders. Results were considered significant at p< 0.05.

4.7 Ethical consideration

The study was approved by medical research and ethics committee of Ministry of Health. (Ethics committee reference number NMRR-18-1212-42081(IIR)

Purpose of the study and confidentiality explained to all participants before obtaining consent Written consent was obtained from all participants after explaining the nature and purpose of this study. No recordings were used or taken during the interview process. Confidentiality of all participant are looked after with care during data collection and analysis of data.

CHAPTER 5: RESULTS

5.1 Demographic data

During the four months period, a total of 179 patients admitted to Hospital Mesra Bukit Padang fulfilling the inclusion and exclusion criteria were approached for this study. Out of this, 9 were not fit to give informed consent and 18 did not fulfill the inclusion criteria and hence was excluded.

Patients that participated in the study were of the median age of 38. Majority of the patients in this study were male, 61.2 % and 38.8% female patients. They were predominantly from the Kadazan race (42.1%). The remaining of patients were Bajau (23.7%) followed by 19.1% of races such as Murut, Suluk, Bugis, Brunei, Sungai and Bisayah. The balance comprised of Other races such as Malay, Chinese and Indian (15.1%). 52.6% of the patients were single and 23% were married. 48% had completed primary and secondary education with 47.4% with tertiary level of education. The patients were predominantly unemployed (75%). Among the patients who were employed, 36 (23.7%), 9.9% were self-employed. Table 5.1 shows the demographic data of the patients.

Table 5.1 : Demographic data among patients with SMI (n=152)

Demographic data	n (%)	Median (IQR)
Gender		
Male	93 (61.2)	
Female	59 (38.8)	
Age		38.0 (18.0)
Race		
Kadazan	64 (42.1)	
Bajau	36 (23.7)	
Murut	6 (3.9)	
Suluk	1 (0.7)	
Bugis	4 (2.6)	
Brunei	7 (4.6)	
Iranun	1 (0.7)	
Sungai	7 (4.6)	
Rungus	1 (0.7)	
Bisayah	2 (1.3)	
Others	23 (15.1)	
Marital status		
Single	80 (52.6)	
Married	35 (23.0)	
Divorced	31 (20.4)	
Window	6 (3.9)	
Number of children		0.0 (2.0)
Education level		
No	7 (4.6)	
Primary	31 (20.4)	
Secondary	42 (27.6)	
Tertiary	72 (47.4)	
Employment		
No	114 (75.0)	
Student	2 (1.3)	
Self-employed	15 (9.9)	
Government servant	11 (7.2)	
Private firm	10 (6.6)	

5.2 Clinical descriptive variables

Among the participated patients, the median duration of untreated psychosis was 11 months with a median number of hospitalization of 8. More than half of the participants had no prior family history of mental illness (59.2%). The remaining, 40.8% had a family history of mental illness, out of which majority had schizophrenia (64.5%), major depressive disorder (11.3%), bipolar disorder (6.5%) and substance use disorder (4.8%). The majority of the patients, 92.1% had a past psychiatric illness, with the most common disorder of schizophrenia spectrum disorders, 86.9%. 8.6% of patients had bipolar disorder and 2% with major depressive disorder. 7. 9% of patients had their first psychiatric admission.

Table 5.2: Clinical variables of patients with SMI (n=152)

Clinical	n (%)	Median (IQR)
Duration of untreated psychosis (months)		11.0 (18.0)
Number of hospitalization		8.0 (10.0)
Family history of mental illness		
No	90 (59.2)	
Yes	62 (40.8)	
Detailed illnesses	**(n = 62)**	
Autism	1 (1.6)	
Bipolar	4 (6.5)	
Dementia	2 (3.2)	
Major depression disorder	7 (11.3)	
Schizophrenia	40 (64.5)	
Substance use disorder	3 (4.8)	
Unsure	5 (8.1)	
Past psychiatry illness		
No	12 (7.9)	
Yes	140 (92.1)	
Detailed illnesses	**(n=152)**	
Bipolar	13 (8.6)	
Major depression disorder	3 (2.0)	
Nil	12 (7.9)	
Schizo-affective disorder	7 (4.6)	
Schizophrenia	115 (81)	
Schizophreniform disorder	2 (1.3)	

5.3 Psychiatric disorders (severe mental illness) based on DSM 5

Among all the patients recruited, 83.5 % had a diagnosis of schizophrenia and 4.6% with schizoaffective disorder. 8.5% of patients were diagnosed with bipolar disorder. 3.28 % had major depressive disorder (Table 5.3)

Table 5.3 Psychiatric disorders (severe mental illness) based on DSM 5

Psychiatric diagnosis	Frequency (n)	Percentage (%)
Major depressive disorder		
No	147	96.7
Yes-Current	5	3.28
Yes-Past	0	0
Schizophrenia spectrum disorder	134	88.1
Schizophrenia	127	83.5
Schizoaffective disorder	7	4.6
Bipolar disorder		
No	139	91.4
Bipolar 1-Current	2	1.3
Bipolar 1-Past	2	1.3
Bipolar 1-with psychotic features current	6	3.9
Bipolar 1-with psychotic features past	3	2.0

5.4 Psychiatric comorbidities and suicidality using M.I.N.I

Antisocial personality disorder was a comorbid among 18.4% of patients. 51.3% of patients admitted had co-morbid alcohol use disorder. 44.9% of them had severe levels of alcohol use disorder. 29.6% of patients had a comorbid substance use disorder (non-alcohol, exclude tobacco) with majority, 29.6% with severe level of severity (Table 5.4).

Table 5.4 Psychiatric co-morbidities using M.I.N.I

Psychiatric comorbidities	Frequency (n)	Percentage (%)
Alcohol use disorder (past 12 months)		
No	74	48.7
Yes	78	51.3
Severity of alcohol use	(n=78)	
Mild (2-3 of I2 symptoms)	9	11.5
Moderate (4-5 of I2 symptoms)	34	43.6
Severe ($\geq$ 6 of I2 symptoms)	35	44.9
Substance use disorder (Non-alcohol) (Past 12 months)		
No	107	70.4
Yes	45	29.6
Severity of substance use	(n=45)	
Mild (2-3 of J2 symptoms)	2	4.4
Moderate (4-5 of J2 symptoms)	17	37.8
Severe ($\geq$ 6 of J2 symptoms)	26	57.8
Antisocial personality disorder (Lifetime)		
No	124	81.6
Yes	28	18.4

5.5 Severe mental illness and dual diagnosis

Among patients with schizophrenia spectrum disorder such as schizophrenia and schizoaffective disorder, 21.6 % had both alcohol and non-alcohol substance use disorder with 28.3% with alcohol use disorder and 8.95 % with non-alcohol substance use disorder. 38.5% were diagnosed with comorbid alcohol use disorder among patients with bipolar disorder and 23% with both alcohol and non-alcohol substance use disorder. Among patients with major depressive disorder, 20% had both alcohol and non-alcohol substance use disorder. (Table 5.5).

Table 5.5: Severe mental illness and dual diagnosis (n=152)

Primary psychiatric disorder	Comorbid disorder (alcohol/non-alcohol substance use disorder)	n (%)
Major depression disorder (n=5)	No	2 (40.0)
	Alcohol use disorder	2 (40.0)
	Substance use disorder	0 (0.0)
	Both alcohol/non-alcohol substance use disorder	1 (20.0)
Schizophrenia spectrum disorder (schizophrenia, schizoaffective disorder) (n=134)	No	55 (41.0)
	Alcohol use disorder	38(28.3)
	Substance use disorder	12(8.95)
	Both alcohol/non-alcohol substance use disorder	29 (21.6)
Bipolar 1 (n=13)	No	5 (38.5)
	Alcohol use disorder	5 (38.5)
	Substance use disorder	-
	Both alcohol/non-alcohol substance use disorder	3 (23.0)

5.6 Comparison between severe mental illness patients with and without non-alcohol substance use disorder (SUD): demographic and clinical variables (Univariate)

Univariate analysis revealed demographic factors such as gender (male) and age were significantly associated between severe mental illness patients with co-morbid substance use disorder. (OR=5.132; 95% CI=2.106-12.509; p value <0.001) and (OR=0.958; 95% CI=0.923-0.993; p value=0.019). Among severe mental illness patients, males had five time more odds to have a co-morbid substance use disorder (non-alcohol) as compared to females. Older age patients had less odds to have a co-morbid non-alcohol substance use disorder (Table 5.6.1)

Alcohol use disorder was strongly associated with having severe mental illness and substance use disorder (OR=3.789; 95% CI= 1.765-8.135; p value<0.001). Patients with severe mental illness and co-morbid alcohol use disorder had three times more odds to have a comorbid substance use disorder (Table 5.6.1). After adjusting significant factors in univariate analysis, gender (AOR=3.719; 95% CI=1.459-9.478; p value=0.006), alcohol use disorder (AOR=3.120; 95% CI=1.379-7.059; p value=0.006) and age (AOR=0.957; 95% CI=0.918-0.996; p value=0.032) were all still significantly associated for severe mental illness with comorbid substance use disorder (Table 5.7).

Table 5.6   Comparison between severe mental illness patients with and without non-alcohol substance use disorder (SUD): demographic and clinical variables (univariate) (n=152)

Factors (Categorical)	Without SUD (n=107) n (%)	With SUD (n=45) n (%)	Wald's chi square	Odds ratio (95% CI)	p value
Gender Female(R) Male	52 (88.1) 55 (59.1)	7 (11.9) 38 (40.9)	12.949	5.132 (2.106-12.509)	<0.001***
Race Non-Kadazan (R) Kadazan	64 (72.7) 43 (67.2)	24 (27.3) 21 (32.8)	0.544	1.302 (0.646-2.627)	0.461
Marital Married (R) Non-married	26 (74.3) 81 (69.2)	9 (25.7) 36 (30.8)	0.329	1.284 (0.547-3.015)	0.566
Education Tertiary (R) Non-tertiary	56 (77.8) 51 (63.7)	16 (22.2) 29 (36.3)	3.523	1.990 (0.970-4.083)	0.061
Employment Employed (R) Unemployed	31 (81.6) 76 (66.7)	7 (18.4) 38 (33.3)	2.945	2.214 (0.893-5.490)	0.086
Family history of mental illness No (R) Yes	62 (68.9) 45 (72.6)	28 (31.1) 17 (27.4)	0.240	0.837 (0.409-1.709)	0.624

Table 5.6, continued

			1.000	2.216	0.317
Past psychiatry illness				(0.466-10.549)	
No (R)	10 (83.3)	2 (16.7)			
Yes	97 (69.3)	43 (30.7)			
Alcohol use disorder			11.675	3.789	**0.001
No (R)	62 (83.8)	12 (16.2)		(1.765-8.135)	
Yes	45 (57.7)	33 (42.3)			

*p< 0.05, **p< 0.01, ***p< 0.001

Table 5.6.1: Demographic factors(continuous variables) associated with severe mental illness patients with non-alcohol substance use disorder (SUD) (univariate) (n=152)

Factors (Continuous)	B	Wald's chi square	Odds ratio (95% CI)	p value
Age	-0.043	5.459	0.958 (0.923-0.993)	*0.019
Number of children	-0.168	2.300	0.845 (0.680-1.050)	0.129

*p<0.05, **p< 0.01
(R) = Reference group; B = regression coefficient.

Table 5.7: Demographic and clinical factors associated with severe mental illness patients with non-alcohol SUD (Multivariate) (n=152)

Factors	OR (95% CI)	AOR (95% CI)	p value
Gender Female(R) Male	5.132 (2.106-12.509)	3.719 (1.459-9.478)	**0.006
Alcohol use disorder No (R) Yes	3.789 (1.765-8.135)	3.120 (1.379-7.059)	**0.006
Age	0.958 (0.923-0.993)	0.957 (0.918-0.996)	*0.032

*p<0.05, ** p<0.01

OR = Crude odds ratio; AOR = Adjusted odds ratio; (R) = Reference group.

5.8 Comparison between severe mental illness patients with and without alcohol use disorder (AUD): demographic and clinical variables (univariate)(n=152)

Gender and race was significantly associated among patients with severe mental illness and alcohol use disorder (OR=3.653; 95% CI= 1.832-7.285; p value <0.001) and (OR=2.193; 95% CI= 1.135-4.238; p value = 0.019) through univariate analysis. Kadazan race had two times the odds to have a co-morbid alcohol use disorder. Having comorbid substance use disorder was also significantly associated among patients with severe mental illness and alcohol use disorder through univariate analysis (OR= 3.789; 95% CI=1.765-8.135; p value=0.001) (Table 5.8).

Demographic factors such as age and number of children was not significantly associated among severe mental illness patients with alcohol use disorder (Table 5.8.1).

Table 5.8: **Comparison between severe mental illness patients with and without alcohol use disorder (AUD): demographic and clinical variables (univariate)(n=152)**

Factors (Categorical)	Without AUD (n=74) n (%)	With AUD (n=78) n (%)	Wald's chi square	Odds ratio (95% CI)	p value
Gender			13.538	3.653	<0.001**
Female(R)	40 (67.8)	19 (32.2)		(1.832-7.285)	
Male	34 (36.6)	59 (63.4)			
Race			5.458	2.193	*0.019
Non-Kadazan (R)	50 (56.8)	39 (43.2)		(1.135-4.238)	
Kadazan	24 (37.5)	40 (62.5)			
Marital			0.569	1.339	0.451
Married (R)	19 (54.3)	16 (45.7)		(0.627-2.856)	
Non-married	55 (47.0)	62 (53.0)			
Education			0.095	1.105	0.758
Tertiary (R)	36 (50.0)	36 (50.0)		(0.584-2.090)	
Non-tertiary	38 (47.5)	42 (52.5)			
Employment			0.315	0.810	0.574
Employed (R)	17 (44.7)	21 (55.3)		(0.387-1.692)	
Unemployed	57 (50.0)	57 (50.0)			
Family history of mental illness			0.004	1.020	0.951
				(0.534-1.949)	
No (R)	44 (48.9)	46 (51.1)			
Yes	30 (48.4)	32 (51.6)			

Table 5.8, continued

Past psychiatry illness			1.616	2.242 (0.646-7.790)	0.204
No (R)	8 (66.7)	4 (33.3)			
Yes	66 (47.1)	74 (52.9)			
Substance use disorder			11.675	3.789 (1.765-8.135)	**0.001
No (R)	52 (57.9)	45 (42.1)			
Yes	12 (26.7)	33 (73.3)			

*p< 0.05, **p< 0.01

Table 5.8.1: Demographic factors(continuous variables) associated with severe mental illness patients with alcohol use disorder (AUD) (Univariate) (n=152)

Factors (Continuous)	B	Wald's chi square	Odds ratio (95% CI)	p value
Age	-0.001	0.009	0.999 (0.968-1.030)	0.926
Number of children	0.053	0.342	1.054 (0.883-1.258)	0.559

(R) = Reference group; B = regression coefficient.

5.9 Demographic and clinic factors associated with severe mental illness patients with AUD

After adjusting for multiple factors in univariate analysis through multivariate analysis, gender (OR=3.653;95% CI;1.832-7.285; p value 0.002) , race (OR= 2.193; 95% CI=1.135-4.238; p value= 0.009) and substance use disorder (OR=3.789; 95% CI=1.765-8.135; p value=0.017) were still significantly associated for severe mental illness with alcohol use disorder (Table 5.9).

Table 5.9: Demographic and clinical factors associated with severe mental illness patients with AUD (Multivariate) (n=152)

Factors	OR (95% CI)	AOR (95% CI)	p value
Gender Female(R) Male	3.653 (1.832-7.285)	3.406[a] (1.593-7.281)	*0.002
Race Non-Kadazan (R) Kadazan	2.193 (1.135-4.238)	2.683[b] (1.285-5.604)	*0.009
Substance use disorder(non-alcohol) No (R) Yes	3.789 (1.765-8.135)	2.707[c] (1.191-6.151)	*0.017

OR = Crude odds ratio; AOR = Adjusted odds ratio; (R) = Reference group.

*p< 0.05, **p< 0.001

[a]= Adjusted of race and substance use disorder (non-alcohol)

[b]= Adjusted of gender and substance use disorder (non-alcohol)

[c]= Adjusted of gender and race

5.10 Comparison between severe mental illness patients with/without substance use disorder : Onset of severe mental illness , hospitalization (numbers), ASI scores (Medical, Employment, Legal, Family, and Psychiatric status)

After adjusting all significant factors identified in univariate analysis through multivariate analysis, patients with severe mental illness and substance use disorder had more numbers of hospitalizations compared to those without substance use disorder (Adjusted mean difference= -2.18; 95% CI=-3.37,-1.00); p value=0.001). Patients with severe mental illness and substance use disorder had more severe ASI scores in legal (Adjusted mean difference= -0.094;95% CI= -0.137,-0.051); p value < 0.001), family (Adjusted mean difference = -0.121; 95% CI= -0.189,-0.054); p value <0.001) and psychiatric (Adjusted mean difference= -0.067; 95% CI=-0.105,-0.030); p-value<0.001)status domains after adjusted for all significant factors. (Table 5.10).

Table 5.10: Comparison between severe mental illness patients with/without non-alcohol substance use disorder (SUD): Onset of severe mental illness, hospitalization (numbers), ASI scores (Medical, Employment, Legal, Family, and Psychiatric status) (Multi-variate) (n=152)

Outcomes	Severe mental illness (SMI) patients		Difference of mean	Adjusted difference of mean	95% CI	p value
	Without SUD (n=107) Mean (95% CI)	With SUD (n=45) Mean (95% CI)				
Onset (months)	15.46 (12.91-18.51)	13.71 (10.39-18.10)	1.75	-	-2.97-6.46	0.467
Hospitalization (number)	6.00 (5.18-6.95)	12.69 (10.11-15.93)	-6.69	-2.18[a]	-3.37,-1.00	**0.001
ASI scores						
MCOMP	0.06 (0.04-0.09)	0.06 (0.02-0.10)	-0.0002	-	-0.05-0.05	0.992
ECOMP	0.77 (0.72-0.82)	0.79 (0.71-0.87)	-0.021	0.045[b]	-0.031,0.121	0.248
LCOMP	0.02 (0.00-0.04)	0.15 (0.12-0.19)	-0.131	-0.094[c]	-0.137,-0.051	< 0.001***
FCOMP	0.31 (0.27-0.34)	0.45 (0.40-0.51)	-0.145	-0.121[d]	-0.189,-0.054	< 0.001***
PCOMP	0.42 (0.40-0.44)	0.51 (0.48-0.54)	-0.087	-0.067[e]	-0.105,-0.030	< 0.001***

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

[a] = Adjusted of gender, education level, past psychiatry illness and alcohol use disorder.

[b] = Adjusted of marital status, education level and employment status.

[c] = Adjusted of gender, education, number of hospitalization and alcohol use disorder.

[d] = Adjusted of marital, number of children, number of hospitalization and alcohol use disorder.

[e] = Adjusted of age, past psychiatry illness and alcohol use disorder.

5.11 Comparison between severe mental illness patients with/without alcohol use disorder : Onset of severe mental illness , hospitalization (numbers), ASI scores (Medical, Employment, Legal, Family, and Psychiatric status)

After adjusting all significant factors in univariate analysis through multivariate analysis, patients with severe mental illness and alcohol use disorder had more number of hospitalization compared with those without alcohol use disorder (Adjusted mean difference= -2.36; 95% CI= -3.44,-1.28); p value < 0.001). Patients with severe mental illness with alcohol use disorder had more severe ASI scores in family(FCOMP) (adjusted mean difference= -0.139; 95% CI= -0.200,-0.079); p value < 0.001) and psychiatric (PCOMP) (adjusted mean difference= -0.050; 95% CI= -0.083,-0.016); p value=0.004) (Table 5.11)

Table 5.11: Comparison between severe mental illness patients with/without alcohol use disorder: Onset of severe mental illness , hospitalization (numbers), ASI scores (Medical, Employment, Legal, Family, and Psychiatric status)(Multi-variate) (n=152)

Outcomes	Severe mental illness (SMI) patients		Difference of mean	Adjusted difference of mean	95% CI	p value
	Without AUD (n=74) Mean (95% CI)	With AUD (n=78) Mean (95% CI)				
Onset (months)	14.12 (11.37-17.53)	15.72 (12.73-19.41)	-1.60	-	-6.10-2.91	0.487
Hospitalization (times)	5.09 (4.27-6.08)	10.72 (9.03-12.73)	-5.62	-2.36[a]	-3.44,-1.28	< 0.001***
ASI scores						
MCOMP	0.06 (0.03-0.09)	0.07 (0.04-0.10)	-0.010	-	-0.05-0.03	0.648
ECOMP	0.79 (0.73-0.85)	0.77 (0.71-0.83)	0.023	0.019[b]	-0.050-0.088	0.586
LCOMP	0.03 (0.01-0.06)	0.09 (0.06-0.12)	-0.056	-0.002[c]	-0.041-0.037	0.912
FCOMP	0.27 (0.22-0.31)	0.43 (0.39-0.47)	-0.163	-0.139[d]	-0.200,-0.079	< 0.001***
PCOMP	0.41 (0.39-0.44)	0.48 (0.45-0.50)	-0.063	-0.050[e]	-0.083,-0.016	0.004*

*p<0.05, ***p<0.001

[a] = Adjusted of gender, education level, past psychiatry illness and substance use disorder.

[b] = Adjusted of marital status, education level and employment status.

[c] = Adjusted of gender, education, number of hospitalization and substance use disorder.

[d] = Adjusted of marital, number of children, number of hospitalization and substance use disorder.

[e] = Adjusted of age, past psychiatry illness and substance use disorder.

Table 5.12: Demographic and clinic factors associated with suicidality among severe mental illness patients (univariate-categorical) (n=152)

Race and comorbid alcohol use disorder was significantly associated with suicidality among patients with severe mental illness (OR= 2.143; 95% CI= 1.103-4.164; p value = 0.025) and (OR=4.119; 95% CI= 2.042-8.310; p value < 0.001) through univariate analysis.

Kadazan race have two times the odd to be associated with suicidality among severe mental illness patients. Having comorbid alcohol use disorder was also significantly associated with suicidality among patients with severe mental illness (Table 5.12).

Table 5.12: Demographic and clinical factors associated with suicidality among severe mental illness patients (univariate-categorical) (n=152)

Factors (Categorical)	No (n=92) n (%)	Yes (n=60) n (%)	Wald's chi square	Odds ratio (95% CI)	p value
Gender			0.339	0.821	0.560
Female(R)	34 (57.6)	25 (42.4)		(0.422-	
Male	58 (62.4)	35 (37.6)		1.596)	
Race			5.056	2.143	*0.025
Non-Kadazan (R)	60 (68.2)	28 (31.8)		(1.103-	
Kadazan	32 (50.0)	32 (50.0)		4.164)	
Marital			0.218	0.833	0.641
Married (R)	20 (57.1)	15 (42.9)		(0.387-	
Non-married	72 (61.5)	45 (38.5)		1.793)	
Education			2.302	0.602	0.129
Tertiary (R)	39 (54.2)	33 (45.8)		(0.313-	
Non-tertiary	53 (66.3)	27 (33.8)		1.160)	
Employment			3.604	2.056	0.058
Employed (R)	18 (47.4)	20 (52.6)		(0.977-	
Unemployed	74 (64.9)	40 (35.1)		4.325)	
Family history of mental illness			0.026	0.947	0.873
				(0.488-	
No (R)	54 (60.0)	36 (40.0)		1.838)	
Yes	38 (61.3)	24 (38.7)			
Past psychiatry illness			0.596	0.628	0.440
				(0.193-	
No (R)	6 (50.0)	6 (50.0)		2.047)	
Yes	86 (61.4)	54 (38.6)			
Alcohol use disorder			15.634	4.119	<0.001***
No (R)	57 (77.0)	17 (23.0)		(2.042-	
Yes	35 (44.9)	43 (55.1)		8.310)	

Table 5.12, continued

			0.659	1.340	0.417
Substance use disorder				(0.661-2.716)	
No (R)	67 (62.6)	40 (37.4)			
Yes	25 (55.6)	20 (44.4)			
Antisocial personality disorder			0.691	1.420	0.406
	77(62.1)	47 (37.9)		(0.621-3.245)	
No (R)	15 (53.6)	13 (46.4)			
Yes					

*p < 0.05, ***p< 0.001

Table 5.12.1: Demographic and clinical factors (continuous variables) associated with suicidality among severe mental illness patients (univariate-) (n=152)

Factors (Continuous)	B	Wald's chi square	Odds ratio (95% CI)	p value
Age	-0.022	1.734	0.979 (0.948-1.011)	0.188
Number of children	0.032	0.121	1.032 (0.863-1.234)	0.728
Duration of untreated psychosis	0.002	0.026	1.002 (0.982-1.022)	0.871
Number of hospitalization	0.036	1.909	1.036 (0.985-1.090)	0.167

(R) = Reference group; B = regression coefficient.

5.13 Factors associated for suicidality among severe mental illness patients

After adjusted for multiple factors, only severe mental illness patients with alcohol use disorder had higher odds for suicide (AOR= 3.786; 95% CI=1.859-7.7131;p value < 0.001). Kadazan and non- Kadazan race had equal odds for suicidality, hence this factor was not significantly associated with suicidality

Table 5.13: Factors associated for suicidality among severe mental illness patients (multi-variables) (n=152)

Main factor	Suicidality		OR	AOR	p value
	No	Yes	(95% CI)	(95% CI)	
	n (%)	n (%)			
SMI			4.119	3.786[#]	<0.001***
Without AUD	57 (77.0)	17 (23.0)	(2.042-	(1.859-	
(R)	35 (44.9)	43 (55.1)	8.310)	7.713)	
With AUD					
Race			2.143	1.768[$]	0.111
Non-Kadazan	32 (50.0)	32 (50.0)	(1.103-	(0.877-	
(R)	60 (68.2)	28 (31.8)	4.164)	3.567)	
Kadazan					

*p< 0.05, ***p< 0.001

(R) = Reference group. OR = Odds ratio; AOR = Adjusted odds ratio.

[#] = Adjusted for race; [$] = Adjusted for SMI with/without alcohol use disorder.

CHAPTER 6 : DISCUSSION

6.1 Sampling and methodology

The aim of this study was to determine the prevalence of psychiatric dual diagnosis among inpatients admitted to Hospital Mesra Bukit Padang, focusing on severe mental illness (SMI). Apart from the prevalence of dual diagnosis, the background demographic characteristics were studied. The researcher attempted to identify associated factors between groups of dual diagnosis and single diagnosis patients and the outcomes among those with dual diagnosis.

6.2 Severe mental illness (SMI) and dual diagnosis

In the state of Sabah, which is also the place of research for this study, the use of alcohol or illicit drugs are rampant. There has been a study done on the use of alcohol among the general population, however none that involved psychiatric patients (Shoesmith et al., 2016)

Dual diagnosis is a term that has not been officially recognized in either DSM or International Classification of Disease (ICD) nomenclature. The definition of dual diagnosis as explained earlier in the introduction is synonymous with terms like co-morbidities, which meant, the concurrent presence of a psychiatric disorder and substance use disorder. Emphasis has been given to dual diagnosis due to its high prevalence rates, treatment complexity and prognostic significance (First M. B. et al., 1993). This study focuses on the prevalence of dual diagnosis among inpatients admitted to a psychiatric hospital. SMI patients are groups of patients aged between 18 years old or older who, currently or at any time in the past year have experienced mental, behavioral or emotional disorder with sufficient duration that meets diagnostic criteria of DSM-IV with serious functional impairment (SAMHSA, 2013). Schizophrenia spectrum disorders (example: schizophrenia, schizoaffective disorder),

bipolar disorder and major depressive disorder together represent the preponderance of SMI diagnosis (Stanley et al., 2001). In an inpatient setting, the most frequently admitted groups of patients are mainly those with severe mental illness (SMI).

6.2.1 Prevalence of severe mental illness (SMI)

The most common clinical diagnosis in this study was schizophrenia spectrum disorders (88.1%).This includes disorders such as schizophrenia (83.5%) and schizoaffective disorder (4.6%). A local study done in a general hospital in Kuala Lumpur on admission rates, also found that majority of patients that were admitted were comparable with this study.62% of patients had a diagnosis of schizophrenia, while other disorders such as bipolar disorder were lower (14%), a situation similar in this study (Chin C.N. et al., 1993). Looking into other countries like Saudi Arabia, showed similar prevalence of SMI, in line with this study. Majority had a diagnosis of schizophrenia (55%), followed by bipolar disorder (23%) and 7.2% of major depressive disorder. Outpatients tend to have higher prevalence of major depressive disorders, generalized anxiety disorder and panic disorder (Alosaimi et al., 2017).

Rates of admission are higher for patients with schizophrenia as most often admission to psychiatric wards are by involuntary basis as compared to other mental illness such as depression. Patient are reportedly brought in by family members or enforcement officers as patients are seen to be at high risk of harming themselves or others, agitated or aggressive (Preti et al., 2009). Another study found association of patients with schizophrenia who required admissions had severe symptoms with poor insight which often warranted admission once assessed by psychiatrists (Priebe et al., 2010).

DSM 5 was used to establish the diagnosis of mood disorders such as bipolar 1 disorder and major depressive disorder among patients in this study. The prevalence of

bipolar disorder in this study was low (8.6%), as compared to a range from 25% to 50% in various other studies in Western countries (Cerullo et al., 2007; Lehman et al., 1994). Similarly, Lehman et al., (1994), found higher prevalence of major depressive disorder of 32% compared to this study of 5.2 %. The different cultural backgrounds in Asian populations could explain this difference. Mental illness are often perceived as being associated with supernatural possessions that hindered early treatment initiation (Choudhry et al., 2016). Another possible explanation is the strong stigma that is associated with mental illness whereby treatment is viewed as the last option (Ng et al., 1997).

6.2.2 Prevalence of severe mental illness (SMI) dual diagnosis

Consistent across most studies, dual diagnosis was common among patients with SMI (Dixon et al., 1999; Drake, R.E & Muesser K. T, 2000). In this study, 28.3% and 21.6% of patients with schizophrenia spectrum disorders had co-morbid AUD and both alcohol and non-alcohol SUD respectively. This finding was similar with an Indian study by Aich et al., (2004), that reported prevalence of 22.8% of AUD among patients with schizophrenia. In a Singaporean study by Verma et al., (2002), found rates of non-alcohol SUD of 25% which was similar to rates in our study. Data from Western countries reported higher prevalence of AUD and non-alcohol SUD which ranged between 33% to 70%, which was likely due to the higher prevalence of alcohol or non-alcohol substance use in Western countries (Muesser K. T et al., 1990; Talamo et al., 2006; Fowler et al., 1998).

The prevalence of alcohol and non-alcohol SUD among bipolar disorder patients in this study were 38.5% and 23% respectively, which was higher when compared to Taiwanese study (Lin et al., 1998). This may be explained by the predominance of female patients between the study of Lin et al., (1998), whereas male patients were

predominant in this study. This difference could also be contributed by the lower rates of both alcohol and non-alcohol substance in Taiwan. Higher prevalence of AUD was reported in Western countries between 40% to 50% and a range between 30% to 38% with non-alcohol SUD such as cannabis, cocaine, opioid, amphetamines and hallucinogen among patients with bipolar disorder (Cassidy et al., 2001; Chengappa et al., 2000; Steward et al., 2007).

This study showed that patients with major depressive disorder had a prevalence rate of 40% and 20% of AUD and both AUD and non-alcohol SUD respectively. This finding was supported by a study in the United States by Tate et al., (2008), that reported similar prevalence rates of AUD and non-alcohol SUD. This similarity highlights the possibilities of the usage of alcohol or other substances as means of coping among patients with major depressive disorder (Holahan et al., 2003).

To the best of researchers knowledge, there has not been any local studies examining the prevalence of dual diagnosis, of both alcohol and non-alcohol substance use involving patients with SMI. There is available data on non-psychotic disorders among patients with methamphetamine use disorder as well as psychotic disorders among this same group, however none that solely focused on psychiatric disorders with comorbid substance or alcohol use (A.H Sulaiman et al., 2014; A.H Sulaiman et al., 2013).

6.2.3 Severe mental illness (SMI) dual diagnosis in clinical practice

The most common comorbidity among patients with SMI in this study was AUD (51.3%) followed by 29.6% of non-alcohol SUD. This finding was in keeping with results from several Western studies that reported higher prevalence of comorbid AUD among patients with SMI (Sinclair et al., 2007; Moore et al., 2012; Bonsack et al., 2006). In comparison with another local study done in a mental institution in Perak, cannabis use was identified to be highly prevalent among patients with schizophrenia

followed by alcohol. This is to highlight that patterns of substance use differs between different demographic areas (Rashid et al., 2010).

The study setting of this research took place in Sabah, a state which is rich in various ethnic groups with diverse cultures. The consumption of alcohol is also a large part of culture in Sabah. The famous locally brewed alcohol beverages being largely consumed especially during festive seasons. Despite the strict enforcement laws in Malaysia pertaining to alcohol consumptions and non-alcohol substance use, it is a challenge to monitor the expansion of this locally brewed alcohol beverages (Shoesmith et al., 2016). There are about 10 established National Anti-Drug Agencies centers in different states in Sabah for the purpose of rehabilitation. Despite the availability of these centers, few enter the program on voluntary basis (Mazlan et al., 2006).

The government of Malaysia has realized that relying solely on single treatment modality such as rehabilitation programmes have been ineffective. Focus has shifted to evidence based pharmacological relapse prevention approaches (Rusdi et al., 2008). However, when it comes to enrolment into rehabilitation programs, presence of any mental illness is an exclusion criteria. This is unfortunate, as SMI patients then rely indefinitely to the treatment offered in hospitals. Another challenge faced by SMI patients in Sabah is the lack of availability of anti-craving treatments for AUD or non-alcohol SUD. Most often, the main focus of treatment is directed towards mental illness and less emphasize placed on substance related disorders. Treating co-morbidities is highly justifiable looking into its negative implications and contribution for treatment non-adherence. It is crucial to treat both mental illness and alcohol or non-alcohol SUD concurrently with an integrated treatment approach (Kikkert et al., 2018). Despite psychosocial approaches as motivational interviewing being offered to patients in Hospital Mesra, only few continue to seek treatment. This is likely due to lack of

knowledge regarding short and long term effects of substance use as well as failure to recognize alcohol or non-alcohol SUD as a problem.

Despite these challenges, it is important to identify and to provide a comprehensive aftercare treatment plan for SMI patients with either alcohol or non-alcohol SUD. Collaborative efforts from not only psychologists or psychiatrists but all mental health staffs such as occupational therapists, counsellors and nurses to work as a team to cohesively aid in the recovery of patients with substance related disorders. All mental health staffs should be trained to effectively provide psychosocial treatment to patients with dual diagnosis, be it in inpatient or outpatient settings. It is important to approach patients individually and have patients identify goals to reduce harm from use of substances. Steps to reinforce positive changes and addressing difficulties should be taken actively. At the same time, patients should be provided with psychoeducation regarding the harmful and detrimental effects of either alcohol or non-alcohol substances, focusing more on ATS as it is most prevalent in Sabah. Patients need to be equipped with the knowledge that there are no standard pharmacotherapy treatment for ATS withdrawal currently and only symptomatic treatment (Harada et al., 2018). Therefore, it is the responsibility of treating psychiatrist to prepare patients for potential withdrawal symptoms keeping in mind not to worsen symptoms of underlying SMI.

Findings from this study is useful at many levels, be it at hospital, state or national level. These findings should be brought to the attention of Ministry of Health or Sports and Youth Ministry to assist in policy and advocacy for the benefit of patients care. Healthcare providers should work as a team to organize more community outreach programmes such as mental health awareness campaigns and talks related to addiction, harm reduction and relapse prevention to the various ethnic groups in Sabah. To ensure that efficient knowledge is imparted and shared, these programmes should be conducted in their vernacular languages whenever possible. Routine screenings and regular

psychiatrist visits should be conducted at all rehabilitation centers to ensure no comorbidities goes undetected.

6.3 Demographic characteristics

6.3.1 Association of age with severe mental illness dual diagnosis

Majority of study participants in this study were from the age group of 20 years old to 56 years old. Median age was 38. Based on results of association between age and SMI, with and without non-alcohol SUD as shown in Table 5, younger age patients had more odds to use non-alcohol substances. This finding was consistent with few other studies done, whereby the younger age group correlated with higher vulnerability to use substances (Fahad et al., 2017; Mowbray et al., 1997). Young adults who gradually go through changes in life with more personal, family and other responsibilities begin to have increased awareness of the negative implications of substance use. Therefore, concerns of health related problems as age increases could contribute to the decreased prevalence of non-alcohol SUD among older age group patients (Teeson et al., 2000; Kavanagh et al., 2004)

However, when age was compared among patients with SMI and AUD in this study, it was not significantly associated. This was in keeping with one previous study that yielded similar comorbid AUD across all age groups of patients with SMI. Comparable with reports from Global Burden of disease study in 2010, among patients with mental illness, there was a decline in the average age of initiation of alcohol use from 28years old to 17 years old (WHO, 2010). One factor that was pointed out was the widely accepted norms of alcohol consumption and the increased accessibility of alcohol which could contribute to this decline (Nair et al., 2016; David S. et al., 2015). Similarly, in this study setting which is Sabah, alcohol is widely available and used as

part of customs in many festivals and auspicious events, making the use of alcohol and its consumptions similar across all age groups.

6.3.2. Association of gender with severe mental illness dual diagnosis

Looking at the demographic data from this study, 61.2% of participants were male and from Kadazan ethnic group. This implies that male Kadazan patients with SMI was more likely to have a comorbid alcohol or non-alcohol SUD in a multi-ethnic society like in Sabah. This study replicates previous studies where male gender was significantly associated with AUD and non- alcohol SUD as compared to female gender (Cantwell et al., 1999; Nolen et al., 2004). The prevalence of co-morbid AUD among male patients can be related to the patterns of drinking among males, who are often linked with heavy patterns of drinking. Evidence for this has been reported in studies about gender roles among alcohol use disorder patients (Nolen et al., 2004; Moore et al., 2012).Women who have feminine traits such as nurturance and expressive nature have reported much less and frequent use of alcohol (Ricciardelli et al., 2001; Huselid et al., 1992). Male gender traits as aggressiveness and highly controlled emotions tend to be associated with heavy drinking tendencies (Huselid & Cooper, 1992). Different coping styles between the gender plays a significant role as men tend to use avoidance or deny emotions as means to cope with stressors with the use of alcohol or other substances (Cooper et al., 1992; Frone et al., 1993). As with local studies in Malaysia, it has been postulated that between male and female gender, males were at higher risk to abuse alcohol (Shoesmith et al., 2016; Mutalip et al., 2014; Cheah et al., 2017).

Looking at the results of severity of AUD and non-alcohol SUD as tabulated in table 5.4 above, both these disorders were classified as severe use disorders among SMI patients. 45% of those with AUD were classified as severe use disorder with more than half, 57.8% with severe non-alcohol SUD. These findings are comparable with few

other studies that identified more hazardous patterns of alcohol consumption or use of other substances among psychiatric inpatients (Rush et al., 2008; Hulse et al., 2000).

6.3.3. Association of race with severe mental illness and alcohol or non-alcohol substance use disorder

In this present study, Kadazan ethnic race was the largest (42%) and was significantly associated with both alcohol and non-alcohol SUD among SMI patients. Kadazan race is the largest indigenious group in Sabah and hence was the majority in this study population. Among the Kadazan ethnic group, 32.8% had a diagnosis of non-alcohol SUD and majority, 57.7% with AUD. Opposite to studies mainly conducted in Peninsular Malaysia, majority of the races consist of the three main races, Malay, Chinese and Indian, with Malays being the largest ethnic group. In this study, the three main races comprised of the lowest prevalence, 15%. Kadazans are categorized as Bumiputras of Sabah and Sarawak and are most prevalent in island of Borneo like Sabah. This shows that based on study populations, the prevalence of different races plays a contributing factor to the study or research conducted (Zam Zam et al., 2009).

Locally conducted studies on alcohol consumption has also shown racial differences and among them, Bumiputras of Sabah and Sarawak have been identified as high-risk groups (IPH, 2015). Among the Malay race, alcohol consumption was reported to be uncommon. This could be related to their religious restrictions where alcohol is strictly forbidden (IPH, 2015). As compared to ethnic groups in Sabah like Kadazans, alcohol consumption is socially accepted and commonly consumed for celebrations such as harvest festivals and auspicious events like birth (Mutalip et al., 2014). Therefore, the high levels of alcohol consumption among this group is not surprising (IPH, 2015; IPH, 2011). Similarly, in the United States, different races

contributed to varying rates of comorbidities with the White race more commonly associated with a substance or alcohol use comorbidity (Mericle et al., 2012).

6.3.4. Marital Status, education levels and employment status

52.6% of SMI patients in this study were single (n= 80) which constituted the majority, where as 23 % of them were married (n=35) and 20.4% divorced (n= 31). As shown in table 5.6 and table 5.8 in the previous chapter, univariate analysis between marital status and SMI with and without AUD or non-alcohol SUD did not show a significant association. In other words, all marital status had equal odds for dual diagnosis, either with AUD or with non-alcohol SUD. Findings of this study was similar with one study done in Singapore between SMI and AUD patients (Subramaniam et al., 2017). However, previous studies have shown that being married was reported to be a protective factor for the likelihood of increased alcohol consumption (Kendler et al., 2016; Kretsch et al., 2013). This was because being married was often viewed as having a better social and psychological support as compared to being single or divorced. Better support meant making healthier choices instead of resorting to alcohol or other illicit substances as means of coping or dealing with emotional stress (Kavanagh et al., 2004; Power et al., 1999; Hui Liew et al., 2012). One likely explanation of the insignificant findings between this study and the above mentioned studies was the large majority of single SMI patients in this study as compared to married patients.

Education is another important aspect among patients with SMI. The present studies shows nearly 46.4% of patients as having a tertiary level of education with a nearly equal amount with levels below tertiary levels, 52.6%, which included those with no formal education, primary and secondary education levels. Interestingly, education levels were not significantly associated among those with dual diagnosis SMI after analyzed. This insignificant finding could be as a result of the almost equalized levels of

education among patients who participated in this study. This finding could be as a result of better mental health knowledge among patients or family members with higher education levels and subsequently facilitates them to seek treatment (Li et al., 2018). Families with higher education levels tend to have a higher social expectation and responsibility who are quick to bring patients for psychiatric treatment. These families showed better community level of awareness of mental health services (Reta et al., 2016). In another study, Amithabh et al., (2017), found that among psychiatric inpatients with comorbid AUD, regardless of their educational background, SMI patients were at risk of using alcohol.

In contrary to most studies, education level is taken as a strong and important predictor for substance use, more so among those with SMI. That is to say, those with lower education levels and males had higher rates of alcohol consumptions compared to women (Ringen et al., 2008 ; Bloomfield et al., 2006). Earlier study found lower levels of education among patients who had started to consume alcohol at an earlier age (Crum et al., 1993). This is backed up with a prospective study in 2003 that also found temporal relationship of age onset and education (Greenfield et al., 2003). Earlier age onset of alcohol use interrupted and interfered with the completion of one's education. Also, among the lower educated groups, understanding and knowledge to make healthy choices were impaired (Greenfield et al., 2003).

Having SMI is often related to higher rates of unemployment, often being attributed to the severity and disabling nature of the mental illness itself. The rates of unemployment in this study was high with a majority of 75% being unemployed. Those employed, were mostly self-employed. 50% among those with SMI and AUD were unemployed in this study whereas 33% among SMI patients with non-alcohol SUD were unemployed. Employment status when analyzed further did not show significant association among both alcohol and non-alcohol SUD groups. Often, the co-existence of

other factors such as severity of illness and substance use that could further impair function contributed to the rates of unemployment (Goldberg et al., 2001; Rach et al., 1999) could possibly explain the insignificant finding in this study.

6.4 Severe mental illness dual diagnosis (alcohol /non-alcohol substance use disorder) and significant outcome factors : Number of hospitalizations and suicidality

6.4.1. Number of hospitalizations

Number of hospitalization has been an important outcome for the dual diagnosis of alcohol or non-alcohol SUD among SMI patients in this study. Results found a median of 8 (IQR 10) number of hospitalizations among the admitted patients with higher number of admissions among SMI dual diagnosis. The rising number of psychiatric disorders has witnessed a general rise in admission rates into mental health hospitals across countries worldwide (Priebe et al., 2005). In Malaysia, states like Sabah and Sarawak have seen a higher rise in admission rates into specialized psychiatric hospitals (NMHR 2015). The utmost importance on the frequent admission rates among patients with SMI with alcohol or non- alcohol SUD has been an area of concern. Several studies revealed similar results along this study among admitted psychiatric patients, where medication non-compliance has been linked as a factor associated alongside rates of admission among patients with dual diagnosis (Goodpastor et al., 1991; Igor et al., 2009). This study did not explore on the compliance or number of medications used, however it is an important factor to be explored in future studies. In contrary to one study done in Taiwan, rates of AUD among patients with SMI was much lower and hence did not contribute to the readmission rates (Lin et al., 2010). This differs from findings of our study where the majority of Kadazan ethnic group was predominant and consumed alcohol at higher rates as part of their culture and custom.

Among the three main SMI, patients with schizophrenia have the highest rates of psychiatric hospitalizations, followed by bipolar disorder (Thomas et al., 1994). One possible explanation is the nature of the disorder itself, particularly schizophrenia which is severe and disabling, and when combined with a alcohol or substance use, further increases the potential for re-hospitalizations (Paula et al., 2006; Gooch et al 1996). Alcohol in particular was related to higher frequency of admissions among patients with schizophrenia as compared to patients with a single diagnosis (Drake et al., 1990). In conclusion, 3 main factors were identified as factors that predicted the rates of frequent hospital admissions which are the presence of SMI dual diagnosis, non-compliance to medications as well as lack of family and social support (Cuffel et al., 2002).

In an earlier study by Lin. C. H et al., (2007), major depressive disorder and AUD similarly shown to be associated with a wide range of implications, not only on the course of illness itself but also psychosocial functioning. This potentially resulted in poor compliance, hospitalization and poorer prognosis.

Several other studies support findings from this study of increased hospital admissions particularly in relation to the type of substances used. Amphetamine-type stimulants was the most prevalence type of non-alcohol substance in this study. Evidence shows that the negative symptoms experienced by patients diagnosed with schizophrenia such as psychomotor retardation, anxiety and dysphoria drives them to choose substances as amphetamine which could counteract these symptoms (Dixon et al., 1991; Fowler et al., 1998). A predisposition to substance could potentially alter psychopathology from a negative to a positive symptom leading to the hospital admissions (Dixon et al., 1991; Green et al., 1991) and increase rates of readmission within one year of discharge (Lin.C.H et al., 2010).

Therefore, patients who have SMI with comorbid alcohol or non-alcohol SUD are at increased risk for multiple hospitalization and hence require a much more

comprehensive assistance in order to cope with the demands of living. Early and adequate treatment could potentially reduce rates of hospitalizations. Clinicians need to have a holistic approach for the treatment and the needs of dual diagnosis patients as treatment should focus on both the mental illness and substance use disorders in order to reduce future rates of admissions.

6.4.2. Suicidality

Prevalence of suicidality in this study was high and was significantly associated among SMI dual diagnosis patients. Among patients with SMI and co-morbid non-alcohol SUD in this study, 44.4% had suicidal risk as compared to 37% without SUD. Among those with suicidal risk, 15% had a current suicidal risk.

In this study, alcohol was the most prevalent type of substance used among patients with SMI. Having a co-morbid AUD (55.1%) was particularly associated with higher suicidality as compared with comorbid of non-alcohol SUD. This findings is evident from one previous study that reported alcohol use as the strongest predictor for the increased risk of suicide among patients with schizophrenia compared to other illicit drugs (Mc Lean et al., 2012). A similar study by Uzun et al., (2009), in Turkey, found lower rates of non-alcohol substance use among patients which did not contribute to the risk of suicide.

Why does a comorbid AUD among patients with SMI at increased risk of suicide? Often, symptoms such as hopelessness are highly correlated with rates of suicide and when depressants such as alcohol is used, they are prone to feelings of further hopelessness. Feelings of low mood are heightened during periods of intoxication whereas stimulant –type of drugs produces sensation of hopelessness and low mood during periods of withdrawal (Darke et al., 2008). Not surprisingly, AUD was therefore highly correlated for the increased suicidality among patients with SMI.

In keeping with findings from other studies that the presence of a dual diagnosis increases suicidal risk, nearly 10% of schizophrenia patients throughout the course of illness will commit suicide as compared to other affective disorders (Altamura et al., 2003). Large meta-analysis conducted showed nearly 90% of those who commit suicide have at least one diagnosis of SMI such as schizophrenia (13%) or major depressive disorder (50-80%) (Harris et al., 1997; Gonda et al., 2007). Schizophrenia was shown to have 8.5 times greater the risk of suicidality when associated with comorbid alcohol or non-alcohol SUD and among comorbid AUD alone, risk was six times higher (Harris et al., 1997; Pompili et al., 2007). Apart from the risk of suicidality, dual diagnosis patients tend to have poorer outcomes as the drug or alcohol worsens symptoms and progress (Altamura et al., 2007; Winklbaur et al., 2006).

Apart from schizophrenia, mood disorders such as bipolar disorder with comorbid AUD have increased suicidal risk (Singh et al., 2016). This study showed a predominance of patients with schizophrenia spectrum disorders and therefore suicidality among persons with SMI could be largely contributed among the predominant diagnosis group of schizophrenia. Nevertheless, alcohol is a salient factor for the increased risk of suicide along other confounding factors such as aggression or impulsive traits among patients with bipolar disorder (Elizabeth et al., 2009).

Impulsivity, a prominent manic symptom is often linked to poor planning and hasty decisions, making suicide attempts among bipolar disorder dual diagnosis patients high (Dalton et al., 2003). Greater relapses of depressive symptoms have been reported when alcohol was used in excess, affecting long term course of the disorder (Simnandl et al., 2015). The nature of the disorder and when combined with a comorbid of AUD multiples risk of suicidality (Elizabeth et al.,2009). The important difference with the study by Elizabeth et al., (2009), is the inclusion of only bipolar disorder patients and a

larger sample size as opposed to the type in this study, which combined all SMI patients in a cross-sectional method.

Race was another important factor that the investigator looked into in this study. Based on results shown in table 5.9, in previous chapter, SMI with co-morbid AUD among the Kadazan race was significantly associated with higher risk of suicidality. Several local studies have focused on the association between race and suicidality (Maniam et al., 2014). However, based on a large meta-analysis conducted in Malaysia on rates of suicide, there has not been studies that focused on indigenous people in West Malaysia (Aishvarya et al., 2014). Kadazan, being the majority ethnic group in this study draws attention that more specific focus and screening should be performed in this group of patients.

However, when analyzed further with multivariate analysis, only SMI patients with comorbid AUD showed most significant association (p<0.001) with suicidality. All races had equal risks for suicide among SMI patient with AUD. This finding is in contrast to other studies that suggest risk of suicide differed among different races. However, these studies were mainly conducted in Peninsular Malaysia, with majority of races being Malay, Chinese and Indian. Hence, results varied from this study. In most local studies, Indian race was associated with higher risk of suicide as compared to other races (Maniam et al., 2014; Morris et al., 2001).

Therefore, it is important for a thorough risk assessment especially among patients with a dual diagnosis and of Kadazan ethnic group. Understanding the nature of SMI is important to identify specific patients that have higher risk for alcohol or non-alcohol SUD and risk of suicide. Adequate screening and mental health campaigning, focusing on high risk groups should be routinely performed.

6.5. Severe mental illness dual diagnosis and significant outcomes based on Addiction Severity Index (ASI)

In this study, in-patients with SMI with either alcohol or non-alcohol SUD showed poorer outcomes when assessed across domains involved in ASI questionnaire. The areas or domains included are medical status, employment status, family or social relationships, legal status and psychiatric status. Out of these domains, legal status (LCOMP)($p<0.001$), family or social relationships(FCOMP)($p< 0.001$) and psychiatric status(PCOMP) ($p< 0.001$) were the domains most severely affected among patients with SMI and non-alcohol SUD. Similar domains yielded poorer outcomes among SMI patients with comorbid AUD with the exception of legal status (LCOMP).

6.5.1 Legal status

The problematic area involving legal status was assessed using ASI and was found to be significant in this study among patients with SMI and non-alcohol SUD. The outcomes from previous studies of dual diagnosis patients reported overall poorer outcomes that involved various areas. These includes unemployment, financial problem, marital conflicts, social isolation, interpersonal conflicts, criminality and legal problems among those with a comorbidity of alcohol or non-alcohol substance use disorder (Drake et al., 1998; Laudet et al., 2000).

Results from this study confirm those from previous study that SMI patients with dual diagnosis of non-alcohol SUD faced more legal problems compared with those of single diagnosis (Laudet et al., 2000). Interestingly, when SMI patients with co-morbid AUD was analyzed, LCOMP was found to be not significant. This meant that instead, patients with non-alcohol SUD had higher likelihood for legal problems. This is in contrary to other studies where comorbid of either alcohol or non-alcohol substance use was equally related to legal problems. Alcohol when consumed in excess

increases risk of violence and hence lead to disruptive or violent behavior that could potentiate violent crimes (Lundholm et al., 2013). However, with the current inclusion of more deviant behavior such as aggression and violent behavior, more patients are being admitted to the psychiatric facility or referred to a psychiatrist, than being channeled to the criminal justice system (Link et al., 1992). This could explain the difference in findings in this study. Substance use, commonly illicit drugs are often linked to criminal behaviors via similar factors that could increase risk of violence (Piselli et al., 2009).

Tendency for legal problems among SMI patients with non-alcohol SUD are often associated with poor employment status, educational deficits or lack of adequate family or social support. Together, these factors contributed to the higher tendencies for arrest (Peters et al., 2015; Piselli et al., 2009). Substance use disorder, including alcohol and illicit drug use rather that the mental illness itself, has been a main contributing factor for the risk of offences or incarcerations (Elbogen et al., 2009; Hodgins et al., 2008). That is to say, compared with patients with single diagnosis of mental illness, the presence of any substances, either alcohol or non-alcohol substance increases the likelihood to be arrested (Abram et al., 1991; Tengstorm et al., 2004). Even when compared with different study settings like prisons, the findings were similar to this study. Among male jail detainees who had already committed crimes, 59% of them were found to have a current diagnosis of schizophrenia, 55% with major depressive disorder and remaining 33% with mania. Among them, majority of detainees with schizophrenia were arrested for drug related offences (Abram et al., 1991).

In our study, another important aspect that was looked into was the presence of antisocial personality disorder among SMI patients with dual diagnosis. As mentioned in literature reviews above, comorbid antisocial personality disorder were frequently linked to legal offences. This study however found a small percentage of SMI patients

with antisocial personality disorder, 18.4% (n=28). This finding was comparable to previous studies done that showed prevalence between 20% to 23% among inpatients (Evren et al., 2006; Ross et al., 2003; Muesser et al., 2013). However, when studies involved drug rehabilitation centres or community setting, prevalence of antisocial personality disorder was higher (Samuel et al., 2011; Muesser et al., 2006).

This is because, majority of patients admitted to psychiatric hospitals have either active mood or psychotic symptoms or experience withdrawal symptoms. Although in this study, patients were approached and interviewed once they have been clinically stable, the accurate assessment of personality could be affected by the residual states of recent psychiatric symptoms, leading to the small percentage of antisocial personality disorder in this study (Ross et al., 2003).

Looking at the rates of association between SMI dual diagnosis and legal status, it is important to adequately identify patients at risk to prevent them from involvement with the legal system. It is also important to properly educate the public about the misinformed and misperceived image that mentally ill patients are dangerous.

6.5.2 Family and social relationship

SMI dual diagnosis patients had severe social or family impairment compared to single diagnosis patients in this study. Both SMI with alcohol or non-alcohol SUD patients scored higher in FCOMP in the ASI questionnaire. Social or family relationships was also severely affected in this group of patients (p< 0.001). Questions that were included in ASI were levels of satisfaction of current marital status, problems experienced with family members for the past 30 days and the severity of being affected by family or social problems. A severe family or social impairment among patients with dual diagnosis tend to report a greater level of dissatisfaction with their families or relationships and express importance of treatment or counselling by family therapy

(Dixon et al.,1995). These aspects were assessed under FCOMP and collectively scored higher.

Family relationship is an important aspect of a patient's life, as family, friends and relatives can offer help by providing empathy and support in a non-judgmental manner. This is return could prevent patients with dual diagnosis from relapse into either alcohol or other substance use at some point in their lives (NAMI, 2013; Piselli et al., 2009).   .

Alcohol or non-alcohol SUD in patients have a powerful implication on family relationships and have been identified as a significant family stressor. Combined with early onset of most SMI with later occurrence of alcohol or other SUD, this could have affected the entire family structure (Chiernik et al., 2002; Hall et al., 1992). Families of patients with dual diagnosis of SUD reported feelings of anger, frustration, worry and even shame or guilt. With the prolonged duration of illness, family's financial burden increases (Daley et al., 2013) alongside common marital conflicts and even violence (Cambell.J et al., 2011; O'Farrel et al., 1991).

Looking at the increased number of hospital admissions among patients with dual diagnosis in this study and the presence of past psychiatric history and family history of mental illness, these could collectively affect family relationships (Salyers et al., 2001). Frequent admissions also increases family burden and cost. Added with stigma from public, unemployment and single status further reduces the opportunities to engage in social setting and community (Phelan et al., 2004). At the same time, family and social relationship has a causal relationship whereby a disrupted family environment may also account as a factor leading to hospitalization apart from a comorbidity itself. Among other factors that was studied such as comorbidities or severity of illness, the highest predictor for increased hospital admission was a family

problem and familial stigma towards patient (Loch A. et al., 2012; Alexandre et al., 2014).

It is a heavy challenge for patients with SMI and comorbidity to overcome both symptoms of mental illness, problems of addiction and its implications such as unemployment and the lack of support. The role of family support as part of treatment is of utmost importance. A psychiatric admission to ward is a controlled and artificial setting. Therefore, social skill readaptation should be in cooperated with particularly the involvement of family as well. Psychoeducation is an important element to improve social function among persons with SMI (Magliano et al., 2006).

6.5.3 Psychiatric status

The co-occurrence of SMI with alcohol or non-alcohol SUD has been associated with more severe symptoms and poorer outcomes. In this study, patients were assessed based on experience of psychiatric symptoms in the past 30 days, which includes experiences of hallucinations, anxiety, violent behavior, suicidality and prescribed medications in addition to ratings of troubled psychological or emotional problems. As with this study, patients with either alcohol or non-alcohol SUD had more severe psychiatric status which is comparable with other studies (Morojele et al., 2012; Kessler et al., 1995). A previous study reported higher incidents of tardive dyskinesia and more negative symptoms when assessed among SMI patients with comorbidities (Swafford et al., 2000).

The severity of psychiatric status in this study can be explained by the use of either alcohol or non-alcohol substances among patients with SMI. Alcohol or non-alcohol substances not only impaired adequate control of psychosis via reduced therapeutic efficacy, but also eventually led to relapses as indicated by increased number of hospitalizations (Negrete et al., 2003).

6.5.4 Medical status

As it was mentioned earlier in the literature reviews, SMI dual diagnosis patients are prone to physical or medical illness. Among the common disorders encountered are HIV, hepatitis B, epilepsy, diabetes mellitus, hypertension and chronic obstruction pulmonary disease (COPD) (Barbara et al., 2000). These medical conditions have been studied to be commonly associated with the use of psychotropic medications itself that contributed to weight gain leading to metabolic disorders (Barbara et al., 2000). Apart from that, poor personal hygiene has been seen with more skin infections, respiratory and cardiovascular diseases among smokers and those with sedentary lifestyles. Epilepsy was most common among patients with amphetamine use disorders (Barbara et al., 2000).

However, in this study, dual diagnosis patients did not have a more severe medical status and were similar among patients with and without dual diagnosis. The small number of participants with medical illness that was captured in this study could be related to the study setting that is a mental institution. Commonly, patients with more severe medical conditions were treated at the general psychiatric hospital. Batki et al., (2009), found patients with schizophrenia and comorbid AUD to have higher medical burden largely contributed by the effects of alcohol. Once a substance or alcohol use was reduced or potentially stopped, risk to develop medical illness can be reduced.

CHAPTER 7: LIMITATIONS AND STRENGTHS

7.1 Limitations

This study had a number of limitations that needs to be addressed. Among the limitations are:

1) This study was done in Hospital Mesra Bukit Padang, which is the sole mental institution in the state of Sabah. Thus, data collected may not be generalised to other general psychiatric hospitals in the country and therefore application to general population should be done with caution.

2) The investigators time to approach patients was delayed as time was needed for inpatients to be clinically stable prior to being approached for the study.

3) Majority of the patients admitted during the study time frame were of a particular psychiatric disorder, which was schizophrenia. This might have resulted in bias in this study.

4) The design of this study is that of a cross-sectional one, which limits the ability to determine the temporal relationship and causality between psychiatric disorder and substance or alcohol use disorder.

7.2 Strengths

Although there were limitations, there were also several strengths of the study

1) To the investigators best knowledge, this is the first study to look into the prevalence of dual diagnosis among inpatients in Sabah.

2) This study enabled us to study not only the prevalence of psychiatric dual diagnosis but also associated outcomes among patients with dual diagnosis.

3) MINI was used as the clinician-rated questionnaire as it is based on the gold standard DSM 5 criteria for psychiatric diagnosis. MINI was used to exclude

other SMI diagnosis and to establish alcohol and non-alcohol SUD. MINI, however is not a diagnostic tool but instead a screening tool.

ASI is another clinician rated questionnaire that was used to determine important areas affected among SMI dual diagnosis patient.

4) This study provided as an eye-opener on the various aspects of a patient's life with a comorbid alcohol or non-alcohol SUD .This provides clinicians with a broader perspective of areas to assess in order to provide holistic treatment to patients admitted to a psychiatric ward.

CHAPTER 8: CLINICAL IMPLICATIONS

8.1 Clinical implications

In this study, as a general conclusion, patients with SMI with dual diagnosis showed poorer outcomes in several important domains that were assessed. Therefore, comorbidities among SMI warrants adequate focus as it has several important clinical implications.

1. Prevalence of dual diagnosis of either alcohol or non-alcohol substance use disorder is high and hence requires interventive treatment approach for both the disorders. Inadequate treatment of either one of the disorders may interfere with the recovery process.

2. Thorough assessment and screening for the co-occurrence of alcohol or non-alcohol SUD needs to be routinely performed for patients admitted to psychiatric wards.

3. Looking at the impact and importance of identifying at risk patients for dual diagnosis, psychiatrists need to be trained well to identify dual diagnosis patients.

CHAPTER 9: CONCLUSION AND RECOMMENDATIONS

9.1 Conclusion

This study is one of the first studies to study the prevalence of psychiatric dual diagnosis focusing among inpatients with severe mental illness in Sabah. It is interesting to note that:

1) The prevalence of dual diagnosis among patients with severe mental illness and AUD is 51.3% and with non-alcohol SUD is 29.6%

2) The demographic factors that were associated between SMI and non-alcohol SUD is gender and age.

3) The demographic factors that were associated between SMI and AUD is gender and race.

4) Patients with SMI and comorbid non-alcohol SUD or AUD have more number of hospitalizations and more severe ASI scores in LCOMP,FCOMP and PCOMP

5) Patients with a comorbid AUD have higher odds for suicide

9.2 Recommendations

Given the findings of this study, several recommendations for future studies include:

1. The information obtained from this study shows the high prevalence of dual diagnosis among inpatients in psychiatric hospital. Thus, a more comprehensive treatment with adequate screening needs to be done to reduce the challenges faced by groups of patients with dual diagnosis.

2. A study which is conducted in other psychiatric hospitals in different geographical locations using randomised methods may be able to improve the generalizability of the study to the Malaysian population.

3. Having a comparison with general population without mental illness will enable better comparison rates of comorbidities and outcome severity.

4. Further interventional studies can be done to look into specific causes for the use of substance or alcohol among patients with severe mental illness.

5. Finally, a longitudinal prospective study would be ideal to ascertain the temporal causal or relationship between SMI and alcohol or substance use disorder dual diagnosis.

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