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Metabolic syndrome among psychiatric inpatients with schizophrenia in Indonesia

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ABSTRACT

Despite the fact that antipsychotic medication increases the risk of metabolic syndrome (MetS), the rate of MetS among psychiatric patients in Indonesia is rarely reported. This study aimed to investigate the prevalence of MetS among inpatients with schizophrenia in Indonesia. Eighty-six hospitalised psychiatric patients with schizophrenia were randomly recruited, and underwent physical examination including a blood test. MetS was assessed based on the International Diabetes Federation (IDF) criteria for South Asia. Among the sample, only eight patients (9.3%) met the IDF criteria for MetS. Women have a higher rate of MetS than men (23.8% vs 4.6%; $p = 0.02$). Reduced high-density lipoprotein (HDL) cholesterol was the most frequent (81.4%) metabolic abnormality among them, followed by central obesity (29.1%), raised triglycerides (23.3%), raised fasting plasma glucose (12.8%), and raised blood pressure (10.5%). Among the various antipsychotics, no differences in MetS prevalence were observed in this population. The rate of MetS among the psychiatric inpatients in this study is lower compared both to the previously reported rate in the general population and to the findings among psychiatric patients with schizophrenia in developed countries. Several factors related to the reduced rate of MetS in this psychiatric inpatient population will be discussed.

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1. Introduction

Schizophrenia is a severe and chronic mental disorder that requires long-term medical treatment. The introduction of first-generation antipsychotics in the 1950s and second-generation antipsychotics in the 1980s have helped to gradually alleviate the suffering of patients with schizophrenia (Kane, 1999). While second-generation antipsychotics or atypical antipsychotics have been found to be highly effective in particular against positive symptoms in schizophrenia, they have also been found to alter the patient's appetite, weight, serum glucose and their response to insulin (Mathews and Muzina, 2007). These changes are often related to the development of a metabolic syndrome (Mendelson, 2007). Metabolic syndrome constitutes several interrelated abnormalities including obesity, insulin resistance, dyslipidemia,

impaired glucose tolerance and hypertension (Newcomer, 2005; Reaven, 1999). Many studies and meta-analyses have suggested the exacerbating effects of antipsychotics on the development of MetS (Kannabiran and Singh, 2008; McIntyre et al., 2001; Mitchell et al., 2013; Rummel-Kluge et al., 2010). The severity of the effects varied depending on the type of medication (Rummel-Kluge et al., 2010). Nevertheless, increasing rates of cardiovascular disease, physical morbidity and premature mortality as the result of psychiatric medications have become a major concern (De Hert et al., 2011; Saha et al., 2007). The treatment of individuals with schizophrenia, therefore, should also consider the possible metabolic outcomes.

The prevalence of MetS risk factors is high among individuals with schizophrenia. A meta-analysis by Mitchell et al. (2013) suggested an overall MetS rate of 32.5%, with a relatively small difference between the rates among in- and out-patients (30.4% for inpatients vs. 31.8% for outpatients). Mitchell et al. (2013) also found that age and duration of illness had a modest influence on the rate of MetS, while country of origin, definition criteria of MetS and gender had only a minor to no appreciable effect.

The rates of MetS among individuals with schizophrenia have been reported for some Southeast Asian countries, with 46% in Singapore (Lee et al., 2012), 35 to 37% in Thailand (Suttajit and Pilakanta, 2013), and 46.7% in Malaysia (Said et al., 2012). The rate of MetS in the general population of Indonesia was 28.4%, with hypertension being the most common metabolic abnormality in men and central obesity in women (Soewondo et al., 2010). Moreover, the rate of MetS among elderly Indonesians was 18.2% and 6.6% in women and men, respectively (Kamso, 2008). Until the time of this study, no data on the prevalence of MetS and factors associated with MetS among individuals with mental disorders in Indonesia has been available.

In addition, despite the guidelines for monitoring blood profiles during the prescription of the second generation of APs (De Hert et al., 2006; Horn et al., 2012), blood tests are rarely performed in some psychiatric hospitals in Indonesia. This study therefore aimed to investigate the prevalence rate of MetS among inpatients with schizophrenia in a large psychiatric hospital in Indonesia.

2. Methods

2.1. Study design and participants

This cross-sectional study was conducted in Aceh psychiatric hospital in Indonesia. The hospital is the main referral centre and the only psychiatric hospital in Aceh province. During data collection in May 2014, the hospital was treating around 663 psychiatric inpatients. Using the simple random sampling technique, a sample of 86 inpatients was included in the study. The sample size was based on the calculation of a 10% margin of error and a 95% confident interval, which reveals that a minimum of 84 patients should be included in the study. We increased the sample size up to 95 patients to anticipate refusals to participate in the study. Out of 95 randomly selected patients, six refused to participate and three patients were excluded because no blood sample could be taken. The remaining 86 patients underwent the physical examinations and a blood test.

MetS was diagnosed based on the IDF criteria for the South Asian population (Alberti et al., 2006). The criteria must include central obesity (waist circumference $\geq$90 cm for male and $\geq$80 cm for female), plus any two of following factors: raised triglycerides (triglycerides $\geq$150 mg/dL or specific treatment for this lipid abnormality), raised fasting plasma glucose (FPG $\geq$ 100 mg/dL or previously diagnosed with type 2 diabetes), reduced HDL cholesterol (HDL < 40 mg/dL in males, and <50 mg/dL in females, or specific treatment for this lipid abnormality), and raised blood pressure (systolic BP $\geq$ 130 or diastolic BP $\geq$ 85 mmHg or treatment of previously diagnosed hypertension). Those with one or two metabolic abnormalities (MA) were considered to have a pre-metabolic syndrome. Demographic variables of the patients such as age, marital status, education level, previous occupation and the prescribed medications were taken from each patient's chart. Physical examinations such as measuring the waist circumference, weight, height, and blood pressure, were all conducted in the nursing ward by MM. The patients' blood samples were taken by the hospital staff.

2.2. Statistical analyses

Data was analysed using the CDC Epi info 7 software. First descriptive statistics were performed, reporting frequencies, mean, media and range where appropriate. Group comparisons (MetS versus the rest) were performed using the independent sample *t*-test, chi-squared test, Mann Whitney or Fisher Exact tests where appropriate.

2.3. Ethical issues

Permission to conduct the study was obtained from the director of the Aceh psychiatric hospital. Ethical approval was obtained from the ethics committee of the medical faculty—Syiah Kuala University in Banda Aceh (reference number: 196/KE/FK2013). All patients gave their informed consent and participated in the study voluntarily.

3. Results

Of 86 psychiatric inpatients included in this study, all were diagnosed with schizophrenia. The median age was 33, ranging from 20 to 71 years. Sixty-five (75.6%) patients were male and the majority was single (n = 69, 80.2%). The mean age was not significantly different between genders (p = 0.8). The median hospital stay was six months, ranging from two weeks to 61 months. Furthermore, none of the patients had ever attended a university, and 11 (12.8%) of them did not have any formal education at all. 59 patients (68.6%) were active smokers and 22 (25.6%) had a history of substance abuse. 32 patients (37.2%) confirmed that they had been unemployed before being admitted into hospital, while 23 patients (26.7%) worked as farmers and 24 patients (27.9%) owned a private business. Bivariate analysis suggests that MetS was only associated with gender (p = 0.02, fisher exact), but not with age (U = 0.38; p = 0.53), smoking (p = 0.1, fisher exact test), duration of hospital stay (U = 0.2; p = 0.65) or marital status (p = 0.18, fisher exact test). The demographic characteristics of the study respondents and the use of anti-psychotics are summarised in Table 1.

Eight patients (9.3%) met the IDF criteria for MetS, as they had a central obesity plus two other metabolic abnormalities. Reduced HDL cholesterol was the most frequent MA to be found among the patients (n = 70; 81.4%), followed by central obesity (n = 25; 29.1%), raised triglycerides (n = 20; 23.3%), raised fasting plasma glucose (n = 11; 12.8%), and raised blood pressure (n = 9; 10.5%). Furthermore, 46 patients (53.5%) had at least one MA, 28 (32.6%)

Table 1
Demographic and clinical characteristic of patients.

	Number	%/Range (Q1 − Q3)/SD
Median of age (years)	33	28–41 years
Male gender	65	75.6
Civil status		
Single	69	80.2
Married	11	12.8
Widow	6	7
Education		
No formal education	11	12.8
Attended elementary school (6 yrs)	24	27.9
Attended junior high school (9 yrs)	26	30.2
Attended Senior High School (12 yrs)	25	29.1
Previous occupation		
No formal job	32	37.2
Farmer	23	26.7
Homeless and unemployed	6	7
Private business	24	27.9
Government employee	1	1.2
Currently smoking	59	68.6
History of substance abuse	22	25.6
Median duration of hospital stay (month)	6	3–13 months
BMI mean	22.3	±3.7
BMI group		
Underweight	16	18.6
Normal	52	60.5
Overweight	16	18.6
Obese	2	2.3
Metabolic Syndrome	8	9.3