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DISSERTATION

Metabolic Syndrome and Skin Diseases among Psychiatric Inpatients in Aceh - Indonesia

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Table of Contents

Abstract

Background

In Indonesia, treatment of people with mental disorders is largely institutionalised in psychiatric hospitals. During hospitalisation, patients receive both psycho- and pharmacotherapies. Treatments with antipsychotics cause numerous adverse effects. Such effects include alterations in weight, blood pressure, plasma glucose, triglycerides, albumin and LDL and HDL cholesterol, all of which are components of metabolic syndrome (MetS). Furthermore, long-term hospitalisation and the use of antipsychotics are also associated with the development of skin diseases in the patients. Nevertheless, despite theses major potential side effects, research on rates of MetS and skin problems among psychiatric inpatients in Indonesia was lacking. Therefore our studies aim at revealing rates of MetS and skin diseases among psychiatric inpatients.

Methods

Cross-sectional studies were conducted at Aceh psychiatric hospital in Indonesia. The first study aimed to estimate rates of overweight and obesity among inpatients. The study applied a random sampling method and included a total of 242 inpatients. The second study aimed to unveil rates of metabolic syndrome among inpatients with schizophrenia. In this study also a random sampling was used and a total of 86 inpatients were included. The third study aimed at unveiling rates of skin disorder among long stay psychiatric patients. This study applied a total population sampling methods and was conducted at the distance wards of the hospital. The distance wards, also called “the filial”, are devoted to the longer stay patients. Metabolic syndrome was assessed based on the International Diabetes Federation (IDF) criteria for South Asian, while diagnosis of skin diseases was evaluated according to ICD-10.

In each study, descriptive statistics were performed, reporting frequencies, mean, media or range when appropriate. Inferential statistics were later performed to test for significant association between dependent and independent variables. *The independent sample t-test, chi-squared test, Mann-Whitney, Fisher Exact, or spearman’s rho correlation coefficient tests* were used when appropriate

Results

The majority of psychiatric inpatients population had a normal body weight. There were more underweight than overweight or obesity observed among patients with shorter hospital stay. The rates of obesity were 5%, 2.3% and 8.6% in the first, second and third study, consequently. Approximately 9.3% of the sample met the IDF criteria for MetS. Women had a higher proportion of Metabolic Syndrome than men (23.8% vs. 4.6%, $p = 0.02$). Reduced HDL cholesterol was the most frequent (81.4%) metabolic abnormality, followed by central obesity (29.1%), raised triglycerides (23.3%), raised fasting plasma glucose (12.8%), and raised blood pressure (10.5%). Furthermore, around 73% of psychiatric inpatients in the long stay wards suffered from a dermatological disease.

Conclusions

The findings suggest that rates of overweight, obesity and rate of metabolic syndrome in this population are relatively lower compared to developed countries as previously reported. The rate of skin diseases among psychiatric patients was high, which is in line with previous reports in other settings. Nevertheless, the high a proportion of patients with underweight call for further studies in the future. In addition, the role of socio-economic condition before hospitalization and the methods of caring, including the adequacy of nutritional intake during hospitalisation, should be further investigated.

Zusammenfassung

Hintergrund

In Indonesien sind Behandlungen von Menschen mit psychischen Störungen weitgehend in psychiatrischen Kliniken institutionalisiert. Während des Krankenhausaufenthaltes erhalten die Patienten Psycho- und Pharmakotherapien. Behandlungen mit antipsychotisch wirkender Medikation (AP) führen zu zahlreichen unerwünschten Wirkungen, zu denen die Veränderung des Gewichts, des Blutdrucks, der Plasmaglucose, der Triglyceride, des Albumin und des LDL- sowie HDL-Cholesterins zählen. Bei allen hier aufgeführten unerwünschten Wirkungen handelt es sich um Komponenten des Metabolischen Syndroms. Die Einnahme von antipsychotisch wirkender Medikation (AP) scheint mit einem langfristigen Krankenhausaufenthalt auch mit der Entwicklung von Hauterkrankungen bei den Krankenhauspatienten in Verbindung zu stehen.

Bei den vorgelegten Studien handelt es sich um die ersten zum Metabolischen Syndrom und Hautproblemen bei stationären psychiatrischen Patienten in Indonesien. Sie wurden durchgeführt, um Daten zum Metabolischen Syndrom und zu Hauterkrankungen bei stationär behandelten psychiatrischen Patienten in Indonesien zu erfassen.

Methoden

Es wurden Querschnittsuntersuchungen in einem psychiatrischen Krankenhaus in Banda Aceh, Indonesien, durchgeführt. Bei der ersten Studie wurde ein einfaches Zufallsstichprobenverfahren angewandt, und insgesamt 242 stationäre Patienten in die Studie eingeschlossen. Ziel dieser Untersuchung war, den Anteil von Übergewichtigkeit und Adipositas bei stationären Patienten zu erfassen. Auch bei den Patienten der folgenden zwei weiteren Studien wurden jeweils Daten zum Gewicht mit erfasst. Auch bei der zweiten Studie wurde ein einfaches Zufallsstichprobenverfahren eingesetzt, die insgesamt 86 stationäre Patienten einschloss. Hier ging es um die Erfassung der Parameter des Metabolischen Syndroms unter stationär psychiatrischen Patienten mit einer Erkrankung aus dem Schizophrenen Formenkreis. In der dritten Studie wurde eine Vollerhebung aller stationär behandelten Pateinten durchgeführt. Hier ging es um die Erfassung von Hauterkrankungen unter den stationär sich in Langzeitbehandlung befindenden psychiatrischen Patienten in eigens dafür vorhandenen Dependancen. Die Beurteilung des Metabolischen Syndroms erfolgte auf der Grundlage der Kriterien der International Diabetes Federation (IDF) für Süd-Asien, während die Diagnose von

Hauterkrankungen nach ICD-10 - Kriterien für Hauterkrankungen bewertet wurde. Bei der Auswertung kamen deskriptive und Inferenzstatistiken zur Anwendung.

Ergebnisse

Die Mehrzahl der stationär behandelten psychiatrischen Patienten hatte ein normales Körpergewicht. Bei Patienten mit kürzerer stationärer Behandlungsdauer konnte häufiger ein Untergewicht als Übergewicht oder Fettleibigkeit registriert werden. Eine Fettleibigkeit lag mit 5% bei Pateinten der ersten Studie, 2,3% bei Pateinten der zweiten und mit 8,6% bei Patienten der letzten Studie vor. Von diesen erfüllten 9,3% die Kriterien eines Metabolischen Syndroms. Frauen hatten einen höheren Anteil an MetS als Männer (23,8% vs. 4,6%, $p = 0,02$). Reduziertes HDL-Cholesterin war die häufigste (81,4%) Stoffwechselveränderung, gefolgt von zentraler Adipositas (29,1%), erhöhten Triglyceride (23,3%), erhöhtem Nüchtern-Blutzucker (12,8%) und Bluthochdruck (10,5%). Darüber hinaus konnte eruiert werden, dass 73% der psychiatrisch stationär behandelten Langzeitpatienten an einer Hautkrankheit litt.

Schlussfolgerungen

Unsere Ergebnisse zeigen auf, dass der Anteil an Übergewicht, Adipositas und Metabolischem Syndrom in der hier untersuchten Population an stationär psychiatrisch behandelten Patienten im Gegensatz zum bislang in der Literatur aus den Entwicklungsländern beschriebenen Anteil niedriger liegt. Demgegenüber konnten wir die Ergebnisse in Bezug auf Hauterkrankungen unter stationär psychiatrisch behandelten Langzeitpatienten mit den Ergebnissen aus der Literatur bestätigen. Künftige Studien könnten z. B. der Frage nachgehen, warum ein hoher Anteil der stationär behandelten Patienten untergewichtig ist.

Introduction

Metabolic Syndrome

Metabolic syndrome (MetS) is gradually being acknowledged as a major cause of morbidity and mortality related to cardiovascular diseases, both among general population and people with a mental disorder (1,2). The increasing rate of MetS among general population is largely due to changes in their lifestyles (3,4); while antipsychotic medication plays a significant role among people with a mental disorder (5,6).

Since the first-generation antipsychotics (FGAs) were introduced in the 1950s and second-generation antipsychotics (SGAs) in the 1980s, they have helped to gradually alleviate the suffering of people with mental disorders (7). Nevertheless, treatment with antipsychotics has been challenging due to their numerous adverse side effects. First-generation antipsychotics may induce, among others, extrapyramidal symptoms (8). On the other hand, SGAs may alter the weight, blood pressure, plasma glucose, triglycerides, LDL and HDL cholesterol (8–11), all of which are components of metabolic syndrome (12,13).

There have been a number of studies concerning the effect of AP treatments on MetS. Patients who started using SGAs had a three times higher incidence rate of MetS and double increase in weight and body mass compared to those who used only FGAs (14). A study in Belgium revealed that MetS prevalence in groups of patients taking antipsychotics was 36% (15), while a study in Germany found a rate of 44.3% at baseline and a rate of 49.6% during the third month after the initiation or switch of antipsychotics (16).

The presence of MetS also varied according to sex, age, ethnicity, settings, smoking behaviour and duration of illness (17). Most studies confirmed a higher rate of MetS in female than in male patients (18,19). Only a few studies revealed a slight predominance of MetS among males, or no significant difference between genders (17,20). Age and duration of illness had a modest contribution to the rate of MetS; the rate increases with age, as it does with the duration of illness (17,21). Furthermore, low rates of MetS were reported in specific ethnic groups (e.g. Asian was lower than white European), although this might be related to the fact that prescription of the second generation antipsychotics was lower in settings in which specific ethnic groups (i.e the Asian) reside (17).

The rates of MetS were also relatively high among people with a mental disorder in developing countries. A study in Palestine confirms a rate of 43.6%, with 55.9% in female and 39% in male patients (22), while other studies show 38.7% in Iranian patients (23) and 43.6% in

Indian patients (24). Furthermore, studies in South East Asian countries revealed a rate of 46.7% in a Malaysian sample (25), around 46% in Singapore (26), and between 35% and 37% in Thailand (27), all of which are higher compared to the rates in general population of the mentioned countries. Finally, a meta-analysis by Mitchell et al. (21) in 2013 summarised an overall MetS rate of 32.5% in psychiatric patients. They also suggested that the difference in MetS rate between in- and out- patients was relatively small (21).

Research on prevalence of MetS among general population in Indonesian is limited. A survey by Soewondo et al. (28) in Jakarta confirmed that the rate was 28.4%, with central obesity being the most common metabolic abnormality among females and hypertension among males. Another study among elderly Indonesians found rates of 18.2% and 6.6% for females and males, respectively (29). Until our study was conducted in 2014, no data on prevalence of MetS and factors associated with MetS among people with a mental disorder has been available. Our studies, therefore, were the first to reveal the rate of MetS and its components among psychiatric inpatients in Indonesia.

Skin Diseases

Long-term hospitalisation and treatment with antipsychotics are associated with the presence of skin diseases. The use of antipsychotics may cause obesity (30). Obese patients are at a higher risk of having cardiovascular disorders (31), as well as of having some types of dermatological disorders (32). In a study conducted to reveal the association between antipsychotic medication and appearance of dermatological symptoms (33), it was found that around 8.4% of hospitalised psychiatric patients had dermatological symptoms. However, all mentioned studies were conducted in industrialised countries, making it difficult to compare them with low-and middle-income countries. Furthermore, psychiatric patients in Indonesia tend to stay longer in hospital compared to psychiatric inpatients in developed countries such as Germany and the USA (34,35), which in turn might significantly contribute to inpatients developing skin problems. Nevertheless, there had been no research had been carried out in Indonesia concerning rate of skin diseases among psychiatric patients. Therefore, one of our studies was also aimed at revealing rates of skin diseases among psychiatric inpatients.

Methodology

Study Design

The reported studies were conducted in cross-sectional design. The first study on BMI of the inpatients used simple random sampling and was conducted from December 2012 to January 2013. The second study on MetS also used simple random sampling and was conducted in May 2014. The third study on skin diseases applied a total sampling method and was conducted in January 2014.

Settings

All studies were conducted in Aceh psychiatric hospital in Indonesia. The hospital is the main referral centre and the only psychiatric hospital in Aceh province. At the end of 2013, the hospital had nearly 360 beds in total, but had around 650 hospitalised patients, which suggests that almost half of the patients had no bed to sleep on. During hospitalisation, most of the patients were locked inside the nursing wards, and were only allowed out of the wards during the ward cleaning session each morning. A typical nursing ward has between 30 and 50 patients. There were eight psychiatrists, one neurologist, four clinical psychologists and a number of nurses that worked at the hospital. Apart from the main hospital building located in the town of Banda Aceh, the hospital also has four distance wards, also called “the filial”. The filial is located in the district of Aceh Besar, which is nearly two hours drive from the main hospital. The filial was devoted to taking care of patients who require long-term treatment, or who have no family or home to return. Aceh psychiatric hospital provides a variety of services, including in- and out-psychiatric care, neurological consultation, psychological consultation, and substance abuse rehabilitation. The hospital is also a learning hospital for the state and private universities in Aceh.

Subjects

Patients who were hospitalised in Aceh psychiatric hospital during data collections were included as study participants. In the first study, the sample included 242 patients, while the second and third study included only 86 and 70 patients, respectively. The first study did not require any blood tests, and the number of people recruited was therefore large, while the third

study on skin diseases was conducted at the distance long-stay ward, which only had around 70 patients. Furthermore, the first two studies related to MetS included patients in the main psychiatric hospital; the study on skin diseases only included all patients at the filial.

Measures

Body Mass Index was categorised according to the Indonesian National Institute of Health Research and Development, which uses the following categories: underweight (BMI < 18.5), normal (18.5 ≥ BMI < 24.9), overweight (25 ≥ BMI < 27), and obese (BMI ≥ 27) (36). MetS was diagnosed based on the IDF criteria for the South Asian population (13). The criteria must include central obesity (waist circumference ≥ 90 cm for male and ≥ 80 cm for female), plus any two of these factors: raised triglycerides (triglycerides ≥ 150 mg/dL or specific treatment for this lipid abnormality), raised fasting plasma glucose (FGP ≥ 100 mg/dL or previously diagnosed with type 2 diabetes), reduced HDL cholesterol (HDL < 40 mg/dL in male, and < 50 mg/dL in female, or specific treatment for this lipid abnormality), and raised blood pressure (systolic BP ≥ 130 or diastolic BP ≥ 85 mmHg or treatment of previously diagnosed hypertension). Subjects with one or two metabolic abnormalities (MA) were considered as having a pre-metabolic syndrome. The diagnosis of skin diseases was evaluated according to ICD-10, while psychiatric diagnoses were accessed according to DSM-IV.

Data Analysis

The analyses of the first study were carried out using SPSS, while CDC Epi info 7 was used in the second study and STATA in the third study. In each study, descriptive statistics were performed, reporting frequencies, mean, media or range where appropriate. Inferential statistics were later performed to test for significant association between dependent and independent variables. *The independent sample t-test, chi-squared test, Mann-Whitney, Fisher Exact, or spearman's rho correlation coefficient tests* were used where appropriate.

Results

Demographic Information

The mean and median age of respondents in all three studies was 33 years. Male patients were predominantly found in this hospital (87% were male in the first study, 75% in the second study); the study on skin diseases was conducted only among male inpatients. Reports on the duration of hospital stay were different between studies; the first study found a hospital stay of approximately eight months, the second study found a median of six months and the study of skin diseases shows a median of one year. A large proportion of patients have never been married; the second study suggests that around 80% of patients were single, while the third study shows around 78% of patients were single. The vast majority of male patients were active smokers (98.6%); however, when both genders were considered, the proportion of active smoking declines to 68.6%, as similarly found in the second study. A history of substance abuse was also frequent among male patients (45.7%). Lastly, before being admitted to hospital, almost half of patients (42.9%) had experienced physical restraint and confinement in their community due to their mental illness.

Medical Diagnoses

The majority of patients in hospital were diagnosed with schizophrenia (92%), including the paranoid type, residual, disorganised and undifferentiated schizophrenia. More than half of patients (55.3%) suffered from residual schizophrenia. Other types of psychiatric diagnoses were depression (0.4%), bipolar disorder (0.8%) and mental and behavioural disorders related to psychoactive substances (4.1%).

Antipsychotic Medication

All hospitalised patients had to take antipsychotics everyday. Each patient took between one and four different drugs. A variety of generic and branded antipsychotics was used. The most commonly prescribed medications were risperidone, clozapine, olanzapine, haloperidol and chlorpromazine. The use of anticholinergic trihexyphenidyl was found in more than half of patients in this hospital.

Body Mass Index

A large proportion of the sample fell in the normal weight category. There were more underweight than overweight or obese patients observed in the first and second study. The rates of obesity were 5%, 2.3% and 8.6% in the first, second and third studies, respectively.

Table 1: key summaries of conducted studies

No	Variables	Study I	Study II	Study III
1	Focus of the study	Body Mass Index	Metabolic Syndrome	Skin Diseases
2	Study design	Cross sectional	Cross sectional	Cross sectional
3	Settings	Main Psychiatric Hospital	Main Psychiatric Hospital	The Hospital filial
4	Sampling methods	Simple random sampling	Simple random sampling	Total sampling
5	Number of sample	242	86	70
6	Time of data collection	Dec 2012 – Jan 2013	May 2014	Jan 2014
7	Statistical packages	SPSS	Epi Info 7	STATA
8	Statistical analysis	Descriptive and Inferential statistics	Descriptive and Inferential statistics	Descriptive and Inferential statistics
9	Mean/median of age	33 year old	33 year old	33 year old
10	Mean/median of hospital stay (month)	15	6	12
11	BMI - percentage			
	- Underweight	17	18.6	2.9
	- Normal	70	60.5	72.9
	- Overweight	8	18.6	15.7
	- Obese	5	2.3	8.6
12	Rate of MetS	NR	9.3%	NR
13	Rate of skin diseases	NR	NR	73%
14	Selected Antipsychotics used – percentage *)			
	- Chlorpromazine	12	13	11
	- Clozapine	56	71	69
	- Haloperidol	17	12	14
	- Risperidone	64	79	79

NR: no report
*): Each patient takes between one and four different drugs

Metabolic Syndrome

From a total of 86 psychiatric inpatients that underwent the examination and had their blood tested, only eight met the MetS conditions according to IDF criteria for South Asian Population. Reduced HDL cholesterol was the most frequent metabolic abnormality (MA) (81.4%), followed by central obesity (29.1%), raised triglycerides (23.3%), raised fasting plasma glucose (12.8%) and raised blood pressure (10.5%). Furthermore, more than half (53.3%) had at least one MA and 32.6% had two MAs; which suggest that around 86% of the sample fulfilled the criteria for pre-metabolic syndrome. Lastly, two patients within the sample did not show any of the metabolic abnormalities.

The presence of MetS was significantly associated with gender (female = 23.8% and male = 4.6%; $p = 0.02$). Female patients had a larger waist size ($U = 2.8$, $p = 0.006$), higher HDL median latency ($U=16.9$, $p = 0.001$), and higher median latency of Triglycerides ($U = 7.5$, $p = 0.001$) than male patients. The ratio of triglycerides to HDL was also significantly associated with the presence of MetS. Conversely, the value of fasting plasma glucose and blood pressure did not differ significantly between genders.

Skin Diseases

From a total of 70 psychiatric inpatients examined for skin diseases, fifty-one of them (72.9%) had at least one skin disease. Certain infectious and parasitic diseases were found in 26 patients, while diseases of skin and subcutaneous tissue were found in 44 patients.

Table 2: diagnoses of skin diseases

ICD 10 Code	Diagnosis	Number	Total
B35-B49	***Mycoses***	**26**	
A00-B99	**Chapter I, certain infectious and parasitic diseases**		**26**
K00-K14	Diseases of oral cavity, salivary glands and jaws	1	
	• K12 stomatitis and related lesions (=1)		
K00-K93	**Chapter XI, Diseases of the digestive system**		**1**
L00-L08	Infection of the skin and subcutaneous tissue	8	
	• L02 Cutaneous abscess, furuncle and carbuncle (=8)		
L20-L30	**Dermatitis and Eczema**	9	
	• L21 Seborrhoeic dermatitis (=1)		
	• L27.2 Dermatitis due to ingested food (=3)		
	• L30.9 Dermatitis, unspecified (=5)		
L55-L59	**Radiation-related disorders of the skin and subcutaneous tissue**	3	
	• L55 Sunburn (=3)		
L60-L75	**Disorders of skin appendages**	5	
	• L65.2 Alopecia Mucinosa (=1)		
	• L70.0 Acne Vulgaris (=3)		
	• L73.0 Acne Keloid (=1)		
L80-L99	**Other disorders of the skin and subcutaneous tissue**	19	
	• L81.1 Chloasma (Melasma) (=2)		
	• L85.3 Xerosis cutis (Dry skin dermatitis) (=15)		
	• L90.5 Scar condition and fibrosis of skin (=2)		
L00-L99	**Chapter XII Diseases of the skin and subcutaneous tissue**		**44**
T63.4	Venom of other arthropods (Insect bite)	1	
S00-T98	**Chapter XIX, Injury, poisoning and certain other consequences of external causes**		**1**
	No skin diseases	**19**	**19**
	Total number of diagnosis		**72**

Discussion

Demographic Condition

All three studies found a relatively similar mean or median of age of the patients. However duration of hospital stay varied across patients; the study conducted in 2012 to 2013 reported a longer duration of hospital stay than studies conducted in 2014. This can be explained though the new programme called "patient-dropping" that has been introduced in 2013. In this programme, patients who had been hospitalised for a considerable amount of time and did not longer show any criteria for hospitalisation, were sent home. This programme significantly shortened duration of hospital stays from an average of 15 months (2012) to only six months (2014).

Drug Use

Considering periods of data collection, the studies suggest that the use of typical antipsychotics has been reduced, while the use of atypical antipsychotics has increased as the time passed. In 2012, haloperidol was used by around 17% of the patients and reduced to 13% in 2014. However, use of clozapine increased from around 56% in 2012 to around 70% in 2014. Use of risperidone was also increased from 64% in 2012 to 79% in 2014. The increasing prescription of atypical antipsychotics to patients requires specific attention from psychiatrists, especially regarding its potential adverse effects. The risk of adverse effects should be monitored regularly, as it is universally recommended (37,38). Also, the risk of developing induced symptoms of Parkinsonism must be monitored due to continued use of typical antipsychotics.

Metabolic Syndrome

In contrast to the majority of previous reports (10,39–41), psychiatric patients taking antipsychotics in Indonesia did not show a significant weight gain. Our result on a low rate of overweight and obesity could be interpreted that using antipsychotics is not the sole factor that responsible for weight gain among psychiatric patients. Thus patients' inadequate nutritional intake could be another possible factor to explain this finding (42). Our result a large proportion of underweight patients was in line with previous reports from Japan (43,44). This finding is relevant for the hospital management as it implies the need in improving physical condition of patients.

The fact that patients in the filial had better access to food compared to their counterparts in the main psychiatric hospital is another interesting finding. The small number of patients and better "filial" setting, with regular food and snacks, might explain why their physical condition was considerably better. Despite the lack of documentation on patients' condition before and during hospitalisation at the filial, the nurses at the filial noted a number of patients gain weight since being moved from main hospital to the filial. This information, however, requires further investigation.

Finally, despite the fact that all participants were taking antipsychotics, only 9.3% of them suffered from metabolic syndrome. This rate was significantly lower than rates previously reported in neighbouring countries (25–27). Several factors are proposed to explain this low rate of MetS. First, conventional ways of patients' care through locking them inside the nursing wards prevented patients from obtaining other sources of foods beyond hospital supply. On the other hand, psychiatric patients in developed countries have access to much more food which could increase their risk of having a MetS.

Secondly, poor socio-economic conditions of the patients before hospitalisation could be interpret that much food has not been affordable for them. Unlike patients in developed countries, psychiatric patients in Indonesia hardly received any financial support from the government. This condition might lower their risk of developing MetS.

Skin Diseases

The finding that 73% of psychiatric inpatients in our study had a skin problem was significantly high and relatively similar to findings in the previous studies in the Netherlands (77%) (45), Egypt (71.5%) (46) and in Taiwan (61.4 of fungal infection and 46.9% of dermatitis) (47). The association between the presence of dermatological diseases and BMI or obesity that has been reported in the previous studies (32,45), has not been replicated in our study. Therefore our results differ from previous studies.

The presence of skin diseases among patients in the current study was also not associated with age and duration of hospital stay. Factors such as a patient's personal hygiene, cleanliness of the nursing ward, limited number of nursing wards and severity of mental disorder might play more influential roles than investigated. It has been previously mentioned that psychiatric patients in hospital were locked inside the nursing wards. On the nursing ward it is usually dirty and smelly and it is usually has poor sanitation, which might also be due to limited health funds allocated to the mental health sector (48). The limited number of nursing staff might higher rate

of skin problems among patients. There are usually only one or two nurses on duty per shift, while looking after up to 20 patients at once. This makes fully care taking of patients' personal hygiene very difficult. Moreover, each patient must wear a hospital uniform that is not regularly changed.

Lastly, treatments of psychiatric patients in hospital should not merely be focused on improving their mental condition, but also on their physical condition, including skin problems. Treatment with antipsychotics should include regular monitoring of their blood profile. Regular weighing is a simple method to monitor the adverse effect of medications.

Further epidemiological studies on MetS and other medical problems among psychiatric patients should be conducted in other parts of Indonesia. Findings from these studies would not only provide basic information of medical problems among psychiatric patients, but also expected to act as triggering factors for the improvement of mental health services in the country.

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Declaration of any eventual publications

Marthoenis took part in the following publications to the extend stated below:

Publication 1:
Marthoenis M, Aichberger MC, Puteh I, Schouler-Ocak M. Low Rate of Obesity among Psychiatric Inpatients in Indonesia. International Journal of Psychiatry in Medicine, 48(3) 175-183, 2014.
Contribution in detail: Marthoenis contributed in designing the study, collecting and analysing the data, writing the manuscript and was the corresponding author of the article.

Publication 2:
Marthoenis M, Aichberger MC, Puteh I, Syahrial S, Schouler-Ocak M. Metabolic syndrome among psychiatric inpatients with schizophrenia in Indonesia. Asian Journal of Psychiatry. Vol 15, June, Pages 10-14, 2015.
Contribution in detail: Marthoenis contributed in designing the study, collecting and analysing the data, writing the manuscript and was the corresponding author of the article.

Publication 3:
Marthoenis M, Aichberger MC, Fathiariani L, Schouler-Ocak M. Skin diseases among long stay psychiatric patients in Indonesia. ASEAN Journal of Psychiatry, Vol. 16 (2), July - December 2015.
Contribution in detail: Marthoenis contributed in designing the study, analysing the data, writing the manuscript and was the corresponding author of the article.

Marthoenis PD Dr. Meryam Schouler-Ocak

Publication I

Marthoenis M, Aichberger MC, Puteh I, Schouler-Ocak M. Low Rate of Obesity among Psychiatric Inpatients in Indonesia. International Journal of Psychiatry in Medicine, 48(3) 175-183, 2014. http://dx.doi.org/10.2190/PM.48.3.c

Publication II

Marthoenis M, Aichberger MC, Puteh I, Syahrial S, Schouler-Ocak M. Metabolic syndrome among psychiatric inpatients with schizophrenia in Indonesia. Asian Journal of Psychiatry. Vol 15, June, Pages 10-14, 2015. http://dx.doi.org/10.1016/j.ajp.2015.04.004

Publication III

Marthoenis M, Aichberger MC, Fathiariani L, Schouler-Ocak M. Skin diseases among long stay psychiatric patients in Indonesia. ASEAN Journal of Psychiatry, Vol. 16 (2), July - December 2015.

Curriculum Vitae

My curriculum vitae does not appear in the electronic version of my paper for reasons of data protection.

Complete list of Publications in Chronological Order

1. **Marthoenis M**, Yessi S, Aichberger MC, Schouler-Ocak M. Mental Health in Aceh – Indonesia: A decade after the devastating tsunami 2004. Asian Joural of Psychiatry. Vol 19, February, Pages 59-65, 2016

2. **Marthoenis M**, Aichberger MC, Fathiariani L, Schouler-Ocak M. Skin diseases among long stay psychiatric patients in Indonesia. ASEAN Journal of Psychiatry, Vol. 16 (2), July - December 2015

3. **Marthoenis M,** Aichberger MC, Puteh I, Syahrial S, Schouler-Ocak M. Metabolic syndrome among psychiatric inpatients with schizophrenia in Indonesia. Asian Journal of Psychiatry. Vol 15, June, Pages 10-14, 2015

4. **Marthoenis M**, Aichberger MC, Puteh I, Schouler-Ocak M. Low Rate of Obesity among Psychiatric Inpatients in Indonesia. International Journal of Psychiatry in Medicine, 48(3) 175-183, 2014.

5. Puteh I, **Marthoenis M**, Minas H. Aceh Free Pasung: Releasing the mentally ill from physical restraint. IJMHS, May 14;5:10, 2011

Affidavit

I, Marthoenis, certify under penalty of perjury by my own signature that I have submitted the thesis on the topic “Metabolic syndrome and skin problems among psychiatric inpatients in Aceh – Indonesia”. I wrote this thesis independently and without assistance from third parties, I used no other aids than the listed sources and resources.

All points based literally or in spirit on publications or presentations of other authors are, as such, in proper citations (see "uniform requirements for manuscripts (URM)" the ICMJE www.icmje.org) indicated. The sections on methodology (in particular field work and statistical processing) and results (in particular graphics and tables) correspond to the URM (see above) are my own work. My contributions in the selected publications for this dissertation correspond to those that are specified in the following joint declaration with the responsible person and supervisor. All publications resulting from this thesis and of which I am author correspond to the URM (see above) and I am sole responsible.

The importance of this affidavit and the criminal consequences of a false affidavit (section 156,161 of the Criminal Code) are known to me and I understand the rights and responsibilities stated therein.

Date: _____ Signature

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