# Prevalence and 1-Year Incidence of Metabolic Syndrome in Thai Schizophrenic Patients

# (ความชุกและอุบัติการณ์ใน 1 ปีของ กลุ่มอาการเมตาโบลิคในผู้ป่วยจิตเภทชาวไทย)

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ABSTRACT

**Objective:** This prospective study estimated point prevalence and 1-year incidence rates of metabolic syndrome in Thai schizophrenic patients.

**Method:** All schizophrenic patients visited our psychiatric clinic were screened. Each subject was assessed at baseline, 6 months, and 12 months to determine the presence of metabolic syndrome.

**Results:** Of the 101 schizophrenic patients who visited the clinic, 57 were included in the study. Eight of the 57 subjects (14.0%) had metabolic syndrome at baseline. These subjects were older and had later onsets of schizophrenia than those without metabolic syndrome. Of 45 subjects who participated in the incidence evaluation, 6 and 2 patients (17.8%) developed metabolic syndrome at 6 and 12 months, respectively. The demographic data and characteristics of those developing and not developing metabolic syndrome were not different.

**Conclusions:** Thai schizophrenic patients are likely to have and develop metabolic syndrome. These findings support the importance of assessing and monitoring metabolic syndrome in schizophrenic patients.

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**บทคัดย่อ**

**วัตถุประสงค์:** การศึกษาวิจัยแบบไปข้างหน้าเพื่อประมาณค่าความชุกที่จุดของเวลาและอุบัติการณ์ที่ 1 ปีของกลุ่มอาการเมตาโบลิคในผู้ป่วยจิตเภทชาวไทย

**วิธีการ:** ผู้วิจัยคัดกรองผู้ป่วยจิตเภททุกรายที่มารับการรักษาที่คลินิกจิตเวช ผู้ป่วยแต่ละรายจะถูกประเมินเมื่อแรกเริ่ม, 6 เดือน และ 12 เดือนเพื่อดูว่ามีกลุ่มอาการเมตาโบลิคหรือไม่

**ผลการศึกษาวิจัย:** จากผู้ป่วยจิตเภท 101 คนมารับการรักษาที่คลินิก, ผู้ป่วย 57 รายเข้าร่วมการศึกษาวิจัย ในอาสาสมัคร 57 ราย มี 8 ราย (ร้อยละ 14.0) มีกลุ่มอาการเมตาโบลิกเมื่อแรกเริ่มวิจัย ผู้ป่วยเหล่านี้มีอายุมากกว่าและมีการเริ่มป่วยช้ากว่าผู้ที่ไม่มีกลุ่มอาการเมตาโบลิก จากอาสาสมัครจำนวน 45 รายที่เข้าร่วมในการประเมินอุบัติการณ์ ผู้ป่วย 6 และ 2 คน (ร้อยละ 17.8) มีกลุ่มอาการเมตาโบลิกเกิดขึ้นเมื่อติดตามไป 6 และ 12 เดือน ตามลำดับ ข้อมูลส่วนตัวและลักษณะต่างๆ ของอาสาสมัครที่มีกลุ่มอาการเมตาโบลิกเกิดขึ้นไม่แตกต่างจากผู้ที่ไม่เกิดกลุ่มอาการ

**สรุป:** ผู้ป่วยจิตเภทชาวไทยมีแนวน้าที่จะป่วยและเกิดกลุ่มอาการเมตาโบลิก ผลการศึกษานี้สนับสนุนความสำคัญของการประเมินและติดตามกลุ่มอาการเมตาโบลิกในผู้ป่วยจิตเภท

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## INTRODUCTION

Recent studies have shown that metabolic syndrome in schizophrenic patients may be more common than in the general population (1). Possibly due to several factors (e.g., lifestyle influences, genetic factors), the differential prevalence of metabolic syndrome across ethnic groups has been found in the general population (2) and schizophrenic patients (3). So far, most studies of metabolic syndrome in schizophrenic patients have been carried out in non-Asian individuals. To our knowledge, there has been no prevalence or incidence study of metabolic syndrome in Asian schizophrenic patients. We, therefore, proposed an evaluation of point prevalence and 1-year incidence rates of metabolic syndrome in Thai schizophrenic patients.

## METHOD

We carried out this prospective study at a psychiatric clinic in Chiang Mai University Hospital. The study was approved by the Ethics Committee for Research, Faculty of Medicine, Chiang Mai University, under condition that both the subjects and their 1st degree relatives had given written informed consent prior to the study participation.

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We screened all DSM-IV schizophrenic patients who visited the psychiatric clinic between February 2003 and May 2004 for their eligibility to participate in the study. The inclusion criteria were patients aged 18 years old or more who had taken antipsychotics for at least 3 months. The exclusion criteria were i) being on medications for obesity, dyslipidemia, hypertension and diabetes mellitus, ii) hospitalization due to physical illnesses during 1 month prior to the visit, iii) pregnancy, and iv) regular treatment of renal hemeodialysis.

To assess the blood levels of triglycerides, low HDL cholesterol and glucose, each subject had to fast himself/herself after midnight and have a blood test between 8 am and10 am on the assessment day. Body weight was digitally measured with the subject wearing light cloth and no shoes. Sitting blood pressure was digitally measured twice, and the mean reading was used. Waist circumference was taken at the midpoint of the vertical, drawn from the lowest rib to the iliac crest.

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All subjects without metabolic syndrome at baseline participated in the incidence evaluation. They also received metabolic reassessment at 6 (range 5-7) and 12 (range 11-13) months after baseline assessment. Those who missed the 6-month assessment were still allowed to have a 12-month evaluation.

The criteria proposed by the National Cholesterol Education Program Adult Treatment Panel III were applied for diagnosing metabolic syndrome (4). Participants with metabolic syndrome were those having 3 conditions or more of the following: i) waist circumference >102 cm for men or >88 cm for women, ii) triglyceride level ≥150 mg/dL, iii) high-density lipoprotein (HDL) cholesterol level <40 mg/dL for men or <50mg/dL for women, iv) blood pressure ≥130/≥85 mm Hg, and v) fasting glucose level ≥110 mg/dL.

Other than the calculation of prevalence and incidence rates, significant differences in proportions were determined by using Fisher's exact tests, and mean differences were assessed by using the Student-t tests. The p-values were 2-tailed, and the term statistically significant implies a p-value of <.05.

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RESULTS

One-hundred one schizophrenic patients visited the clinic. Twenty-five (24.8%) were excluded due to no consent given, 13 (11.6%) for the visits of patients' family members only, and 6 (5.9%) because medication for metabolic disturbances had been taken. The 44 excluded patients had a mean ± SD age of 46.2 ± 11.6 years old, and 21 of them (47.7%) were male. While the excluded patients were significantly older than subjects in the prevalence ($t=2.30$, $p=.02$) and incidence evaluations ($t=4.57$, $p<.001$), the proportion of males to females in the excluded group was not significantly different from those of the other two groups. Table 1 shows other demographic data and characteristics of subjects in prevalence and incidence evaluations.

Eight of 57 subjects (14.0%) included in the prevalence evaluation had metabolic syndrome. In comparison to subjects without metabolic syndrome, those with it had older age (51.0 ± 12.4 years vs 35.5 ± 11.4 years; $p=.001$), later onsets of schizophrenia (41.9 ±12.6 years vs 26.4 ± 10.4 years; $p<.001$), higher triglyceride levels (350.2 ± 234.2

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mg/dL vs 127.6 ± 69.6 mg/dL; p<.001), lower HDL cholesterol levels (39.8 ± 6.4 mg/dL vs 55.0 ± 12.4 mg/dL; p=.003), and higher diastolic blood pressure (82.1 ± 5.8 mmHg vs 74.7 ± 9.0 mmHg; p=.03) (see Table 2).

After excluding 8 patients with metabolic syndrome at baseline, 49 subjects were included in the incidence evaluation. Forty-one and 45 subjects received metabolic syndrome reassessment at 6 and 12 months, respectively, after the baseline. Of 45, 8 subjects (17.8%) developed metabolic syndrome during a 1-year follow-up period (6 and 2 subjects at 6 and 12 months, respectively). There was not difference between subjects who did and did not develop metabolic syndrome with respect to the proportion of males to females, age, age at schizophrenia onset, number of hospitalizations, proportion of patients taking second-generation antipsychotics, and family history of obesity, dyslipidemia, hypertension, and diabetes mellitus (see Table 3).

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Table 1: Demographic data and characteristics of subjects included in prevalence and incidence evaluations[a]

| | Prevalence study (N=57) | Incidence Study (N=49) |
|---|---|---|
| Male | 24 (42.1) | 20 (40.8) |
| Age, years | 40.5 ± 12.9 | 35.3 ± 11.4 |
| Age at schizophrenia onset, years | 28.5 ± 11.9 | 26.4 ± 10.4 |
| Number of hospitalizations | 1.79 ± 2.2 | 1.8 ± 2.3 |
| Patients taking second-generation antipsychotics[b] | 33 (57.9) | 30 (61.2) |
| Patients who have 1st degree relatives with cluster diseases of metabolic syndrome | | |
| 1. Obesity | 6 (10.5) | 5 (10.2) |
| 2. Dyslipidemia | 5 (8.8) | 5 (10.2) |
| 3. Hypertension | 20 (35.1) | 17 (34.7) |
| 4. Diabetes mellitus | 8 (14.0) | 7 (14.3) |
| Patients with cluster diseases of metabolic syndrome | | |
| 1. Obesity (BMI ≥30 kg/m$^2$) | 4 (7.0) | 4 (8.2) |
| 2. Obesity (waist circumference >102 cm for men or >88 cm for women) | 6 (10.5) | 3 (6.1) |
| 3. High triglyceride level (≥150 mg/dL) | 22 (38.6) | 14 (28.6) |
| 4. Low HDL cholesterol level (<40 mg/dL for men or <50mg/dL for women) | 16 (28.1) | 9 (18.4) |
| 5. High blood pressure (≥130/≥85 mm Hg) | 17 (29.8) | 13 (26.5) |
| 6. High fasting blood glucose level (≥110 mg/dL) | 11 (19.3) | 7 (14.3) |

[a]Data shown as mean ± SD and N (%)

[b]The rest were taking first-generation antipsychotics

Abbreviation: BMI = body mass index, HDL = high-density lipoprotein.

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Table 2: Comparison characteristics and metabolic variables between patients having and not having metabolic syndromes in the prevalence evaluation[a]

| | Patients with metabolic syndrome (n=8) | Patients without metabolic syndrome (n=49) | Significant difference (df=55 for all) |
|---|---|---|---|
| Male | 4 (50) | 20 (40.8) | Fisher's exact test, p=.71 |
| Age, years | 51.0 ± 12.4 | 35.3 ± 11.4 | t=-3.57, p=.001 |
| Age at schizophrenia onset, years | 41.9 ± 12.6 | 26.4 ± 10.4 | t=-3.80 p=.000 |
| Number of hospitalizations | 1.8 ± 2.1 | 1.8 ± 2.3 | t=.05, p=.96 |
| Body mass index | 25.1 ± 2.4 | 23.9 ± 4.2 | t=-.80, p=.43 |
| Waist circumference | 34.9 ± 3.2 | 32.2 ± 3.9 | t=-1.83, p=.07 |
| Triglyceride level | 350.2 ± 234.2 | 127.6 ± 69.6 | t=-5.48, p=.000 |
| HDL cholesterol level | 39.8 ± 6.4 | 55.0 ± 12.4 | t=3.15, p=.003 |
| Systolic blood pressure | 124.9 ±15.4 | 117.2 ± 13.1 | t=-1.50, p=.14 |
| Diastolic blood pressure | 82.1 ± 5.8 | 74.7 ± 9.0 | t=-2.25, p=.03 |
| Fasting blood glucose level | 109.4 ± 26.6 | 95.7 ± 23.8 | t=-1.49, p=.14 |

[a]Data shown as mean ± SD and N (%)

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Table 3: Comparison characteristics of patients developing and not developing metabolic syndrome in incidence evaluation[a]

| | Patients developing metabolic syndrome (N=8) | Patients not developing metabolic syndrome (N=41) | Significant difference |
|---|---|---|---|
| Male | 4 (50) | 16 (39) | Fisher's exact test, p=.70 |
| Age, years | 39.4 ± 7.4 | 34.5 ± 11.9 | t=-1.11, df=47, p=.28 |
| Age at schizophrenia onset, years | 27.4 ± 9.9 | 26.2 ± 10.6 | t=-.30, df = 47, p=.76 |
| Number of hospitalizations | 2.38 ± 1.7 | 1.68 ± 2.4 | t=-.78, df=47, p=-.69 |
| Patients taking atypical antipsychotics[b] | 4 (50) | 26 (63) | Fisher's exact test, p=.69 |
| Patients having 1st degree relatives with metabolic disturbance | | | |
| 1. Obesity | 1 (12.5) | 4 (9.8) | Fisher's exact test, p=1.0 |
| 2. Dyslipidemia | 0 (0) | 5 (12.2) | Fisher's exact test, p=1.0 |
| 3. Hypertension | 4 (50) | 13 (31.7) | Fisher's exact test, p=.42 |
| 4. Diabetes mellitus | 1 (12.5) | 6 (14.6) | Fisher's exact test, p=1.0 |

[a]Data shown as mean ± SD and N (%)

[b]The rest were taking first-generation antipsychotics

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## DISCUSSION

Metabolic syndrome is common in general Thai schizophrenic patients. Its point prevalence and 1-year incidence rates may be approximately 14.0% and 17.8%, respectively. Although patients with metabolic syndrome tended to be older and had later onsets of schizophrenia, we could not find factors possibly relating to the development of metabolic syndrome.

The prevalence rate of metabolic syndrome in Thai schizophrenic patients (14%) is much lower than those in Finns (37%) (5) and Americans with schizophrenia (63%) (3). Because this Thai study excluded subjects with cluster diseases of metabolic syndrome, it may be difficult to compare its prevalence rate with the other two, which included subjects with cluster diseases of metabolic syndrome. However, the study results appear to be in concordance with findings in the general population, as the prevalence rate of metabolic syndrome in Thais (19%-27%) was lower than that of Americans (31%-35%) (6).

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In this study, selection bias, a common problem of epidemiological studies, was minimized by including all patients visiting our clinic. However, due to the exclusion of older patients, the participants in this study might be younger than general Thai schizophrenic patients. Only 4 of 49 subjects were lost to follow-up during the incidence evaluation. The limitations of this study were the small sample size, lack of a control group, and a large proportion of excluded samples.

## CONCLUSIONS

Thai schizophrenic patients are likely to have and develop metabolic syndrome. These findings support the importance of assessing and monitoring metabolic syndrome in schizophrenic patients (7, 8).

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- **Srisurapanont M**, Jarusuraisin N, Jittiwutikan J. Amphetamine withdrawal: I. Reliability, validity and factor structure of a measure. Aus N Z J Psychiatry 1999;33:89-93.
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- **Srisurapanont M**, Pruksachatkunakorn P, Chaowasilp P. Types and schools of psychotherapy. Journal of the Psychiatric Association of Thailand, 1994;39:40-51 (in Thai).
- Prukschatkunakorn P, **Srisurapanont M**. GABA-ergic systems, benzodiazepines and schizophrenia. Journal of the Psychiatric Association of Thailand 1991;36;262-7 (in Thai).

**Books**

- **Srisurapanont M** has a number of books and chapters of books published in Thai.

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Director of Wat Pleng District Hospotal, Rajburi Province, Thailand(1983-1986)

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**AREAS OF SPECIAL INTEREST**

Neurotic disorders, Personality, Hospital accreditation, Medical education

**PUBLICATIONS**

Journals

- **Boonyanaruthee V,** Chan-ob T. What kinds of characteristics are important for studying psychiatry? Asean Journal Psychiatry 1997; 5: 24-9.
- Chan-ob T, **Boonyanaruthee V.**Medical student selection:Which matriculation scores and personality factors are important?J Med Assoc Thai 1999;82:604-10.
- Chan-ob T, **Boonyanaruthee V.** Meditation in association with psychosis. J Med Assoc Thai 1999; 82: 925-30.
- Chan-ob T, **Boonyanaruthee V.** Medical students's attitudes towards behavioral sciences. J Med Assoc Thai 2000 ;83:936-9.
- Chan-ob T, Kuntawongse N, **Boonyanaruthee V.** Quetiapine for Tic disorder : A case report. J Med Assoc Thai 2001; 84 :1624-8.
- Chan-ob T, Kuntawongse N, **Boonyanaruthee V.** Bupropion for Amphetamine withdrawal syndrome. J Med Assoc Thai 2001;84:1763-5.
- Chan-ob T, **Boonyanaruthee V,** Pinyopornpanich M. Intaprasert S, Kuntawongse N. The birth order and personalities of medical students. J Med Assoc Thai 2002;85:97-101.
- **Boonyanaruthee V,** Chan-ob T. The birth order and personalities of medical students. J Med Assoc Thai 2002;85: 261-8.

Books

- **Boonyanaruthee V,** Maneethorn N, Anxiety disorders. In: Srisuraphanont M, Disyavanich C, eds. Text Book of Psychiatry. Chiang Mai: Saengsilp Publishing, 1999
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- **Boonyanaruthee V,** Pinyopornpanich M, Dissociative disorders.. In: Srisuraphanont M, Disyavanich C, eds. Text Book of Psychiatry. Chiang Mai: Saengsilp Publishing, 1999

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- Srisurapanont M, Jarusuraisin N. Amitriptyline vs. lorazepam in the treatment of opiate-withdrawal insomnia: a randomized double-blind study. Acta Psychiatr Scand1998;97:233-5.
- Srisurapanont M, Jarusuraisin N. Opioid antagonists for alcohol dependence. (Cochrane Review). In: The Cochrane Library. Oxford: Update Software

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