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Risk of hypertension in patients with bipolar disorder in Taiwan: A population-based study

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Abstract

Objective: To examine the prevalence, incidence, and risk factors of hypertension in patients with bipolar disorder in Taiwan.
Method: The National Health Research Institute provided a database of 1,000,000 random subjects for study in Taiwan. Study subjects ≥18 years or older had at least one service claim during 2005 for either outpatient or inpatient care, with a primary or secondary diagnosis of hypertension combined with antihypertensive drug treatment were identified. We also compared the incidence of hypertension in patients with bipolar disorder and the general population from 2006 through 2010.
Results: The 1-year prevalence of hypertension in patients with bipolar disorder was higher than the general population (18.13% vs. 13.22%, odds ratio, 1.43; 95% confidence interval, 1.25–1.64) in Taiwan. Compared with the general population, patients with bipolar disorder had a higher prevalence of hypertension among 18- to 39-year-olds and 40- to 59-year-olds, in both sexes, and in the group with lower socioeconomic status. The average annual incidence of hypertension in patients with bipolar disorder from 2006 to 2010 was higher than the general population (2.83% vs. 1.99%, risk ratio, 1.40; 95% confidence interval, 1.20–1.62). Patients with bipolar disorder had a higher incidence of hypertension among 18- to 39-year-olds and 40- to 59-year-olds and in both sexes compared with the general population.
Conclusions: Patients with bipolar disorder had a higher prevalence and a higher incidence of hypertension than those in the general population. Prevention, early detection, and comprehensive treatment of hypertension are important issues for patients with bipolar disorder.

1. Introduction

Hypertension is one of the most common physical diseases and carries a huge economic burden and public health challenge throughout the world [1]. The prevalence rates of hypertension range from 29.8% to 60.2% in men and from 23.8% to 50.3% in women in Western societies [2]. Bipolar disorder with recurrent manic–depressive episodes also has a great economic cost, estimated as $45 billion in the United States [3]. Patients with bipolar disorder with comorbid medical conditions usually include hypertension, diabetes, cardiovascular disease, chronic obstructive pulmonary disease, and obesity [4,5]. Several studies have reported that hypertension is more prevalent among patients with bipolar disorder than in the general population [6–8]. Hypertension is a leading risk factor for cardiovascular mortality and morbidity, and bipolar patients have a higher mortality rate due to cardiovascular diseases than in the general population [9]. Generally, the prevalence rates of hypertension in patients with bipolar disorder have ranged from 35.0% to 39.0%, depending on sampling, methods of identification, and the clinical and demographic characteristics of patients [10]. The duration of mental illness, manic–depressive episodes, comorbidity with substance use, psychotropic drug exposure, activity level, and lifestyle all contribute to the increased risk of these medical problems in people with bipolar disorder [11].

The prevalence rates of hypertension are 27.1% in men and 20.2% in women in Taiwan [12]. One study of outpatient individuals with bipolar disorder in Taiwan showed a higher prevalence of metabolic disturbances, including hypertension (18.6%), hyperglycemia (13.7%), hypertriglyceridemia

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(36.8%), low high-density lipoprotein cholesterol (53.0%), and large waist circumference (61.0%) [13]. Patients with bipolar disorder share some common risk factors with the general population for developing hypertension, including age, obesity, smoking, alcohol use, family history, poor dietary habits, and unhealthy lifestyle.

Taiwan implemented a National Health Insurance (NHI) program since March 1995, offering a comprehensive, unified, and universal health insurance program to all residents. There is no comprehensive study of hypertension in patients with bipolar disorder in Taiwan. We used health care data files to analyze hypertension in patients with bipolar disorder.

First, we compared the prevalence of hypertension between patients with bipolar disorder and the general population in 2005. Second, we detected the factors associated with hypertension in patients with bipolar disorder. Third, we compared the incidence of hypertension in patients with bipolar disorder and the general population from 2006 to 2010. Fourth, we investigated the risk factors for hypertension in patients with bipolar disorder during this period.

2. Methods

2.1. Sample

As many as 98% of the people in Taiwan have joined the NHI program in 2005. The Bureau of NHI (BNHI) has contracted with 92% of medical institutions in Taiwan. The National Health Research Institutes provided a database of 1,000,000 random subjects, about 4.5% of the total population (22.6 million), including data related to outpatient care, inpatient care, and prescription drugs for health service studies. The Longitudinal Health Insurance Database 2005 contains the original claim data of 1,000,000 beneficiaries randomly sampled from the NHI Research Database in 2005. Subjects <18 years of age in 2005 were excluded from the current study, leaving 766,427 subjects. There were no statistically significant differences in age, sex, or average insured payroll-related amount between the sample group and all enrollees. This study was approved by the Institutional Review Board of Jianan Mental Hospital.

2.2. Definition of bipolar disorder

The NHI used the diagnostic coding from the International Classification of Disease, 9th Revision, Clinical Modification (ICD-9-CM) diagnostic criteria. Study subjects who had at least one service claim during 2005 for either outpatient or inpatient care with a primary diagnosis of bipolar disorder (ICD-9-CM: 296.0, 296.1, 296.4, 296.5, 296.6, 296.7, 296.8) were identified [14,15].

2.3. Definition of hypertension

Generally, the typical criterion used by physicians in Taiwan to diagnose hypertension is systolic pressure ≥140 mm Hg or diastolic pressure ≥90 mm Hg, which is the same criterion used in the United States and by the World Health Organization. For the accuracy of diagnosis, we identified study subjects who had a primary or secondary diagnosis of hypertension (ICD-9-CM: 401–405) combined with antihypertensive drug treatment in 2005 and those who received a diagnosis of hypertension during 2006 to 2010 and had either outpatient or inpatient care [16].

2.4. Definition of diabetes

We considered study subjects who had at least one prescription (oral hypoglycemic agents or insulin) for the treatment of diabetes during 2005 for either outpatient or inpatient care as having a diagnosis of diabetes.

2.5. Definition of hyperlipidemia

We considered study subjects who had a primary diagnosis of hyperlipidemia (ICD-9-CM: 272) identified during 2005 for either outpatient or inpatient care as having a diagnosis of hyperlipidemia.

2.6. Prevalence of hypertension

To investigate the prevalence of hypertension in the general population, the denominator was the total number of study subjects in 2005 and the numerator was the number of cases of hypertension in 2005. To investigate the prevalence of hypertension in patients with bipolar disorder, the denominator was the number of total bipolar disorder subjects in 2005 and the numerator was the number of cases of hypertension among these patients in 2005.

2.7. Incidence of hypertension

We found new cases of hypertension from 2006 to 2010. Subjects with newly diagnosed hypertension and no hypertension diagnosis before 2006, formed the group for incident hypertension, and we calculated the incidence from 2006 to 2010. The numerator was the number of incident cases of hypertension and the denominator was the number of person-years contributed by the study subjects.

2.8. Measures

We obtained demographic factors, including age, sex, antipsychotic use, mood stabilizer use, antidepressant use, insurance amount, region, and urbanicity from the individuals' files. Age was classified into one of three categories: 18–39 years, 40–59 years, and 60 or more years. Antipsychotic use was grouped as no antipsychotic use, first-generation antipsychotic use, and second-generation antipsychotic use (clozapine, olanzapine, quetiapine, risperidone, ziprasidone, amisulpride, zotepine, and aripiprazole). Mood stabilizer use was divided into no mood stabilizer use, lithium use, and other mood stabilizer use (carbamazepine, valproate, gabapentin, topiramate, and lamotrigine). Antidepressant use was defined as absent, or present (including tricyclics, monoamine oxidase inhibitors,