Association between schizophrenia and urinary incontinence: A population-based study

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ABSTRACT

Background: Urinary incontinence (UI) is defined as the involuntary loss of urine and can constitute a hygiene or social problem for affected patients. Whether the UI incidence is higher in patients with schizophrenia than in the general population remains undetermined.

Methods: The patients were selected from the Taiwan National Health Insurance Research Database, using claims data from 2005 to 2011. We compared the risk of UI between schizophrenia and nonschizophrenia groups. Logistic regression models were employed for analyzing the risk of UI after adjustment for sex, age, and comorbidities.

Results: The adjusted odds ratio for UI in the schizophrenia group was 1.78-fold higher than that in the nonschizophrenia group. Furthermore, male patients with schizophrenia were more susceptible to UI than their female counterparts, and a higher risk of UI was observed among younger patients with schizophrenia.

Conclusion: Compared with the general population, the risk of UI was higher among the patients with schizophrenia. Early diagnosis and intervention can increase the quality of life among patients with schizophrenia.

1. Introduction

Urinary incontinence (UI) is defined as the involuntary loss of urine and can constitute a hygiene or social problem for affected patients. UI is common worldwide; the prevalence of UI in female patients ranges from 3% to 17%, whereas that in male patients is lower, at approximately 3–11% (Nitti, 2001). However, the etiologies of UI are complex; structural and functional disorders involving the bladder, urethra, ureters, and surrounding connective tissue can exacerbate the problem. In addition, spinal cord or central nervous system disorders may be the major etiologic factors in some cases. Stress incontinence is the most common type of UI in younger and middle-aged women, and is related to pregnancy and childbirth. The prevalence of UI in men of all ages was lower than that in women in a previous report (Nitti, 2001). The prevalence of UI increases with age, and patients with UI are more likely to report a low quality of life and poor self-efficacy (Broome, 2003).

Schizophrenia is a chronic, severe, and disabling brain disorder. Patients with schizophrenia have more physical-health comorbidities (Smith et al., 2013). However, few studies have investigated the relationship between UI and schizophrenia. Patients with schizophrenia need to receive antipsychotic treatment for long time. Several reports have demonstrated that the use of antipsychotics is correlated with UI (Bhirud and Shah, 2004; Dada et al., 2012; Mendhekar and Lohia, 2009; Rosa et al., 2013; Torre et al., 2005; Tsakiris et al., 2008). In addition, many patients with schizophrenia have brain abnormalities similar to those associated with urge incontinence and detrusor hyperreflexia in neurological patients.(Bonney et al., 1997) Whether the UI incidence is higher in the schizophrenia population than in the general population remains undetermined. Clarifying this relationship is crucial for the prevention and treatment of related diseases in the schizophrenia population. We hypothesized that the incidence of UI is

higher in the schizophrenia population than in the general population. Accordingly, we conducted a population-based case-control study in Taiwan to investigate the prevalence of UI between schizophrenia and general populations.

2. Method

2.1. Data source

This case-control study used the Longitudinal Health Insurance Database (LHID), a subset of the National Health Insurance Research Database, which was established by the Taiwan National Health Insurance Administration, using data obtained from the National Health Insurance (NHI) program, and is maintained by the Taiwan National Health Research Institutes. The NHI program is a compulsory insurance system with coverage of over 99% of the residents of Taiwan. The LHID comprises one million beneficiaries randomly selected from the Registry for Beneficiaries for the year 2000. The information in the LHID includes all medical visits and treatment records for each insurant from 1996 to 2011. Definitions of diseases in the LHID are based on the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM). In accordance with the Personal Information Protection Act, the identifying information of insurant was recorded to prevent researchers from being able to identify specific patients.

2.2. Study patients

We included adult patients newly diagnosed with UI (ICD-9-CM 788.3X) from 2005 to 2011 in a UI group, and the index date was defined as the date of UI diagnosis. Four controls for each case patient were selected from patients without a history of UI before the start of the study period. They were frequency matched with the case group by age (in 5-y bands), sex, and index-year.

2.3. Variables of interest

The variables of interest were comorbidities and prescribed medication. The comorbidities were chronic obstructive pulmonary disease (COPD, ICD-9-CM 491.XX, 492.XX, and 496.XX), congestive heart failure (CHF, ICD-9-CM 428.XX, 398.91, and 402.X1), diabetes mellitus (DM, ICD-9-CM 250.XX), urinary tract infection (UTI, ICD-9-CM 590.0, 590.1, 590.11, 590.8, 590.81, 595.0, 595.2, and 599.XX), benign prostatic hyperplasia (BPH, ICD-9-CM 600.XX) and schizophrenia (ICD-9-CM 295.0X-295.7X and 295.9X). Medication comprised anticholinergic agents and second generation antipsychotics (SGAs). Anticholinergic agents were defined on the basis of the Anatomical Therapeutic Chemical (ATC) classification system, which was established by the World Health Organization Collaborating Centre for Drug Statistics Methodology (http://www.whocc.no/, ATC N04AA01). The SGAs were clozapine (ATC N05AH02), zotepine (ATC N05AX11), olanzapine (ATC N05AH03), quetiapine (ATC N05AH04), risperidone (ATC N05AX08), ziprasidone (ATC N05AE04), aripiprazole (ATC N05AX12), amisulpride (ATC N05AL05), and paliperidone (ATC N05AX13). All comorbidities and medication were defined before the index date.

2.4. Data availability statement

All data and related metadata were deposited in an appropriate public repository. The data on the study population that were obtained from the NHIRD (http://w3.nhri.org.tw/nhird//date_01.html) are maintained in the NHIRD (http://nhird.nhri.org.tw/). The NHRI is a nonprofit foundation established by the government.

Table 1
Demographic characteristics and medicine used between urine incontinence and comparison group.

	Urine incontinence N=5979		Comparison N= 23,916		
	n	%	n	%	p-value
Gender					0.99
Women	3247	54.3	12,988	54.3	
Men	2732	45.7	10,928	45.7	
Age, years					0.99
20–54	1690	28.2	6760	28.2	
55–64	1133	19.0	4532	19.0	
65–74	1556	26.0	6224	26.0	
75+	1600	26.8	6400	26.8	
Mean (SD)	63.8	(15.1)	63.4	(15.2)	0.11
Comorbidity					
Schizophrenia	110	1.84	144	0.60	< 0.0001
COPD	1609	26.9	4509	18.9	< 0.0001
CHF	655	11.0	2002	8.37	< 0.0001
UTIs	3367	56.3	6313	26.4	< 0.0001
BPH	1998	33.4	3768	15.8	< 0.0001
DM	1455	24.3	4247	17.8	< 0.0001
Medicine					
Clozapine	28	0.47	34	0.14	< 0.0001
Zotepine	49	0.82	55	0.23	< 0.0001
Olanzapine	71	1.19	95	0.40	< 0.0001
Quetiapine	227	3.80	395	1.65	< 0.0001
Risperidone	192	3.21	359	1.50	< 0.0001
Ziprasidone	21	0.35	9	0.04	< 0.0001
Aripiprazole	25	0.42	15	0.06	< 0.0001
Amisulpride	37	0.62	32	0.13	< 0.0001
Paliperidone	8	0.13	3	0.01	< 0.0001
Anti-cholinergic agent	343	5.74	663	2.77	< 0.0001

Chi-square test and *t*-test.

2.5. Ethics statement

The NHIRD encrypts patient personal information to protect privacy and provides researchers with anonymous identification numbers associated with relevant claims information, including sex, date of birth, medical services received, and prescriptions. Therefore, patient consent is not required to access the NHIRD. This study was approved to fulfill the condition for exemption by the Institutional Review Board (IRB) of China Medical University (CMUH104-REC2-115). The IRB also specifically waived the consent requirement.

2.6. Statistical analysis

To test for differences between the UI and comparison groups, a chi-square test was used for categorical variables (ie, age group, sex, and comorbidities) and a Student *t*test was used for the continuous variable (ie, mean age). Odds ratios and 95% confidence intervals (CI) for UI and UI-associated risk factors were obtained through logistic regression. A multivariate model was used to adjust for comorbidities and medication, which had a significant difference, as shown inTable 1. Because the interaction tests differed significantly according to sex and schizophrenia diagnosis (P=0.04), and age group and schizophrenia diagnosis (P=0.001), we estimated the age- and sex-specific risk of UI in patients with schizophrenia compared with patients without schizophrenia. We also estimated the association between UI and schizophrenia in various age groups stratified by sex. All statistical analyses were calculated using SAS software Version 9.4 (SAS Institute Inc., Cary, NC, USA). The significance level was set at $P < 0.05$, determined using a 2-tailed test.

3. Results

A total of 29,895 patients were included in this study: 5979 patients