



Prescription patterns of Chinese herbal products for patients with sleep disorder and major depressive disorder in Taiwan



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Benzodiazepine (PubChem CID: 134664)

Zolpidem (PubChem CID: 5732)

Imipramine (PubChem CID: 3696)

Clomipramine (PubChem CID: 2801)

Doxepin (PubChem CID: 667477)

Maprotiline (PubChem CID: 4011)

Escitalopram (PubChem CID: 146571)

Fluoxetine (PubChem CID: 62857)

Paroxetine (PubChem CID: 43815)

Sertraline (PubChem CID: 68617)

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Ziziphi spinosae semen

Jia-Wei-Xiao-Yao-San

National Health Insurance Research Database (NHIRD)

ABSTRACT

Ethnopharmacological relevance: Chinese herbal products (CHPs) are commonly prescribed for sleep disorder and major depressive disorder (MDD). The aim of this study was to investigate the prescription patterns of CHPs and Western medicine for patients with these disorders in Taiwan, and analyze the frequency of using single herbs (SHs) and herbal formulas (HFs).

Materials and methods: In this retrospective population-based study secondary data analysis was performed using data from Taiwan's Longitudinal Health Insurance Database (LHID) between January 2007 and December 2011. In total, 1000,000 beneficiaries from the LHID were randomly selected from the 2010 registry for beneficiaries of the National Health Insurance Research Database. Patients with sleep disorder and MDD according to the International Classification of Diseases, Ninth Revision, Clinical Modification codes 307.40 and 311, respectively.

Results: Among a total of 11,030 patients with sleep disorder, 9619 used Western medicine, 1334 used CHPs, and 77 used both. Among a total of 11,571 patients with MDD, 11,389 used Western medicine, 131 used CHPs, and 51 used both. Regardless of disorder type, women were predominant. The majority of the patients were aged 22–44 years, had a monthly income of NT\$17,281–NT\$22,800, and lived in an area with Level 1 and Level 2 urbanization. Of the patients with sleep disorder, 1411 had used CHPs and visited a clinic 5298 times on average. Of the patients with MDD, 182 had used CHPs and visited a clinic 755 times on average. The three most commonly used SHs and HFs were Ziziphi Spinosae Semen, Polygoni Multiflori Caulis, and Polygalae Radix, and Jia-Wei-Xiao-Yao-San, Suan-Zao-Ren-Tang, and Chai-Hu-Chia-Lung-Ku-Mu-Li-Tang, respectively.

Conclusion: Chinese herbal products including SHs and HFs are prescribed for patients with sleep disorder and MDD. However, the efficacy and safety of CHPs for sleep disorder and MDD need to be further evaluated.

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1. Introduction

Insomnia is the most common sleep complaint. Approximately 9–15% of the general population worldwide experience insomnia symptoms, which affect the body's daytime physiological functioning (Ohayon, 2002). Epidemiologic studies have suggested that the link

between insomnia and depression is bidirectional. For example, approximately 20% of patients with insomnia exhibit depressive symptoms (Soldatos, 1994), whereas depression and depressive symptoms have been shown to be the largest and most consistent risk factors for insomnia (Ohayon et al., 1998). During the last decade, several studies have indicated that insomnia could be more than a depressive symptom and negatively affects depression. These findings are consistent with those of another study, which determined that insomnia is a risk factor for major depressive disorder (MDD) onset (Manber et al., 2008).

Western medicine used to treat insomnia and depression may have adverse drug effects; for example, benzodiazepines may increase the risk of falling in elderly people (McCurry et al., 2007).

Zolpidem, a nonbenzodiazepine hypnotic, is widely prescribed in clinical practice to treat insomnia; however, studies have reported

Abbreviations list: CHP, Chinese herbal product; MDD, major depressive disorder; SHs, single herbs; HFs, herbal formulas; LHID, Longitudinal Health Insurance Database; CAMs, complementary and alternative medicines; TCM, traditional Chinese medicine; NHIRD, National Health Insurance Research Database; BFM, bupleurum falcatum; GMDZ-Tang, Gan-Mai-Da-Zao-Tang

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adverse effects such as psychotic reactions (Markowitz and Brewerton, 1996) and sleepwalking (Hoque and Chesson, 2009). Tricyclic antidepressants used to treat MDD can cause cardiac toxicity (Emamhadi et al., 2012) and selective serotonin reuptake inhibitors are associated with sexual dysfunction (Montejo et al., 2001).

Because some patients have difficulty tolerating the side effects of Western medications, do not respond adequately, or eventually exhibit a reduced response, they search for complementary and alternative medicines (CAMs) that have fewer side effects (Knaudt et al., 1999; Brown and Gerbarg, 2001).

Chinese herbal medicine is one of the most commonly used modalities of complementary and alternative medicine therapies, especially in Chinese culture (Hsu et al., 2008). Recent studies suggest that herbal medicines show promise in managing mild to moderate depression (Dwyer et al., 2011) and isolated plant constituents, such as jujuboside, may prove to be a valuable source of lead compounds for the development of novel hypnotics (Cao et al., 2010).

The current study suggests that factors can influence the use and cost of traditional Chinese medicine (TCM) services for patients with depression. Utilizing TCM services could substantially affect the use of psychiatric services and the healthcare costs for patients with depression (Pan et al., 2013).

Currently, no correlation studies have explored the Chinese herbal products (CHPs) prescribed for patients with insomnia and MDD in the Taiwan Health Insurance Research Database. Thus, the aim of this study was to investigate the prescription patterns of CHPs and Western medicine for patients with sleep disorder and MDD in Taiwan. In addition, the frequency of SH and HF use was analyzed.

2. Materials and methods

2.1. Data sources and extraction

In this retrospective study, SAS software Version 9.3 (SAS Institute, Cary, NC, USA) was used for secondary database analysis. Data were obtained from the NHIRD, which includes data such as detailed clinical records from patient visits, primary and secondary diagnostic codes, and prescription orders, for all beneficiaries in the Taiwan Health Insurance program.

In this retrospective population-based study, secondary data analysis was performed using data from the Longitudinal Health Insurance Database (LHID) between January 2007 and December 2011. In total, 1000,000 beneficiaries from the LHID were randomly selected from the approximately 27.38 million people recorded in the 2010 registry for beneficiaries of the NHIRD. There was no significant difference in the sex distribution ($\chi^2=0.067$, $df=1$, $p=0.796$) among patients. Patients with sleep disorder and MDD were identified according to International Classification of Diseases, Ninth Revision, Clinical Modification codes 307.40 and 311, respectively.

2.2. Statistical analysis

The patients in this study had visited clinics between 2007 and 2011 to seek medical treatment for sleep disorder or MDD. We divided patients into three groups: those who used only Western medicine, those who used only CHP, and those who used both Western medicine and CHP. Data analysis was performed (Fig. 1) using data from the LHID between January 2007 and December 2011. The sex, age, salary, insurance coverage, urbanization level of area of residence and other basic characteristics of the patients in the three groups were analyzed. The health insurance of salary grade group was assessed according to an announcement by the Ministry of Health and Welfare. We adopted the urbanization rate of insured zone studied by Liu (Liu, 2006), and ranging from Level 1 (highly urban) to Level 7 (highly rural), as standards with which to assess urbanization. In this study, we analyzed the basic

Table 1
Distribution of usage of Western medicine and CHP in patients with sleep disorder and MDD patients.

	Sleep disorder	MDD
Total clinic patients	11,030	11,571
CHP	1,334	131
Western medicine	9,619	11,389
Western medicine and CHP	77	51

MDD: Major depressive disorder; CHP: Chinese herbal products.

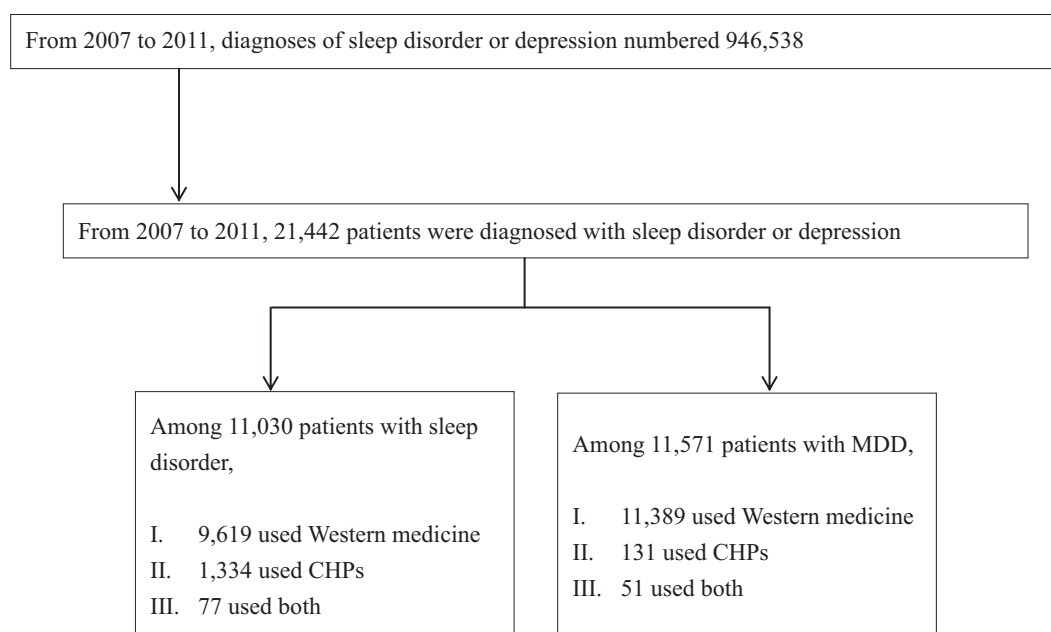


Fig. 1. Flowchart showing the recruitment of patients from the 1 million people randomly sampled from the National Health Insurance Research Database (NHIRD) from 2007 to 2010 in Taiwan.

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