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Association between anxiety state and mitral valve disorders: A Taiwanese population-wide observational study

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ABSTRACT

Background and objective: Despite substantial research progress in concurrent diseases, for instance comorbidities involving anxiety state (AS) and mitral valve disorders (MVD), the current measures and care are limited and no consensus about their association has yet been reached. Hence, this study aims to analyze the prevalence and association between AS and MVD among Taiwanese population.

Methods: We employed phenome-wide association study (PWAS) portal to investigate the association between AS and MVD using claim data of Taiwan's National Health Insurance Research Database (NHIRD) from year 2000 to 2002. Association strength between AS and MVD was analyzed among overall age and gender groups.

Results: We found an overall stronger association between AS and MVD, which was significantly higher in younger age group (OR 15, 95% CI 14.82–16.88) than in the elderly age group (OR 1.99, 95% CI 1.76–2.24). Also, the study reveals a higher incidence of co-occurrence in females than males, particularly in age group of 40–49.

Conclusions: Based on our results showing considerable strength of association between AS and MVD, this study suggests the necessity of MVD assessment in all patients with AS, particularly in younger females. Moreover, we also propose psychotherapeutic as well as pharmacologic intervention for comorbidity-based pathologies to better the quality care for high-need Taiwanese population.

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1. Introduction

Anxiety is part of human lifetime experience but the anxious manifestation is abnormal when exaggerated, leading to a psychopathological state. In particular, cardiovascular complaints in anxiety state (AS) have been known for a long time [1]. Mitral valve disorders (MVD), a type of valvular dysfunction commonly associated with AS, are one of the most prevalent cardiovascular aberrations. In particular, annual occurrence of MVD has been reported in 2%–3% of the general population with sudden cardiac death rate ranging 0.2%–0.4% per year [2,3]. Hence, it is hypothesized that anxiety, an emotionally charged event, may be a contributing factor for episodes of cardiovascular complications like MVD. Therefore, the interest in the co-occurrence of AS and MVD has grown in recent years worldwide.

In spite of an elevated interest in comorbid states involving AS and MVD, relatively fewer research has been focused on treatment regimen and most of the therapies have emphasized traditional medications. In some published studies, no incidence of association between AS and MVD was reported [4] leading to limited attention to remedies addressing comorbid symptoms. Hence, an assessment of psycho-emotional status in addition to valvular dysfunction is cardinal.

Importantly, during meta-analysis of the data available from published literature, the issues such as sample size, inclusion and exclusion criteria of the sample, and period of study conducted pose obstacles for validation and generalized synthesis of the results. Therefore, to mitigate the biases of previous reports, this study attempts to use population-wide observational e-claim data from Taiwan's NHIRD.

2. Material and methods

2.1. Data sources

National Health Insurance Research Database (NHIRD) established by the National Health Research Institute (http://nhird.nhri.org.tw/en), Taiwan, commenced National Health Insurance (NHI) program in 1995. NHIRD contains data of more than 23 million people, which is 99% of Taiwan's entire population [5]. This study used a phenome-wide association strengths (PWAS) portal (Fig. 1) that was generated using the patient phenotypes information retrieved from NHIRD to explore the disease-wide associations. Syed-Abdul et al. analyzed 782 million outpatient visits and 15,394 unique phenotypes that were observed in the entire Taiwanese population for a period of three consecutive years (2000–2002) obtained from NHIRD [6]. According to International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) format, the diagnostic codes of anxiety state (unspecified) and mitral valve disorders (MVD) were identified as 300.00 and 424.0, respectively, and selected for the study. Using PWAS web portal, essential values such as the prevalence, co-occurrence, and OR with 95% CI for the mitral valve and anxiety disorder were retrieved for all age groups and gender of the Taiwanese population.

We have recorded OR estimates, complemented by p-value (<0.0001) and 95% confidence limits based on hypergeometric test. The association strength was measured by odds ratio (OR). We applied no multiple comparison correction to the resulted p-values [6]. Moldovan et al. comprehensively described the methodology of the underlying objective characterization, also indicating some potential limitations behind the resulting estimates [7].

2.2. Ethical statement

As per regulation of National Health Research Institutes (NHRI), the informed consent is not required because the patient personal information has been decoded and scrambled for the research purpose.

3. Results

To date, this is the first large-scale nationwide population-based analysis to investigate association between AS and MVD

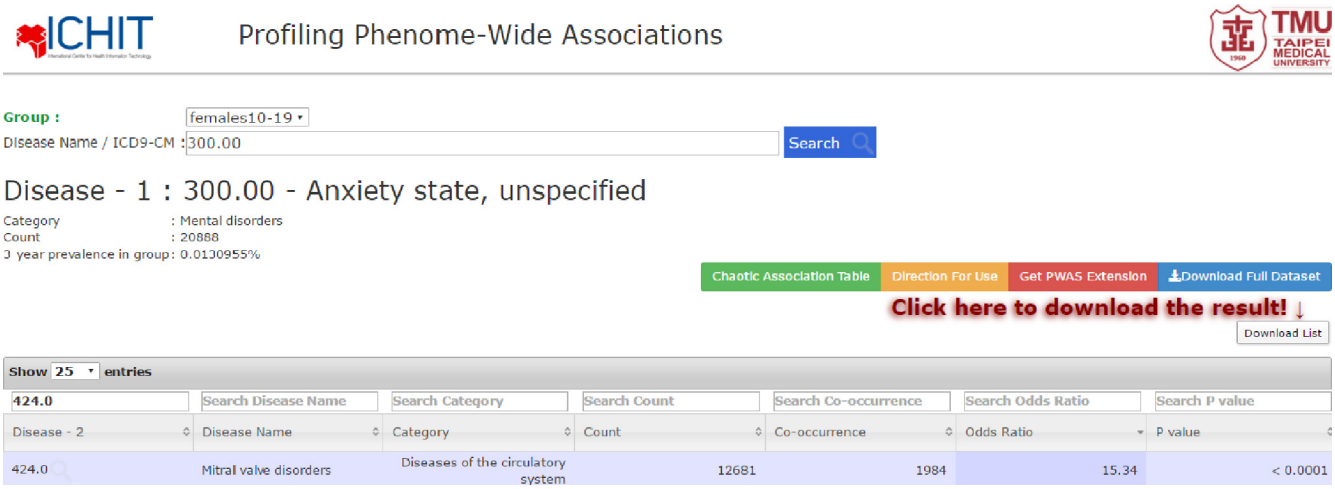

Fig. 1 – Screenshot of phenome-wide association study (PWAS) portal.