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Original Article

Time trend in the prevalence of oral lichen planus based on Taiwanese National Health Insurance Research Database 1996–2013

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KEYWORDS
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Abstract *Background/Purpose:* Oral lichen planus (OLP) is a common chronic inflammatory disease characterized by a T cell-mediated immune response against epithelial cells. The epidemiological survey of OLP in Taiwanese population was scarce. In this study, we investigated the time trend of prevalence stratified by gender, age, urbanization, and income of OLP based on National Health Insurance Research Database (NHIRD).
Materials and methods: We studied the claims data of Taiwanese population from NHIRD 1996 to 2013. Patients with the diagnosis of OLP based on the International Classification of Diseases, Ninth Clinical Modification (ICD-9-CM) code: 697.0 were recruited in this study. Demographic characteristics were analyzed by multi-variate Poisson regression.
Results: The prevalence of OLP increased significantly from 1.3 (per 10^5) in 1996 to 12.8 (per 10^5) in 2013 (p for trend < 0.001). The prevalence was higher among female than male (RR: 2.13; 95% CI: 2.07–2.18, $p < 0.001$). The subjects living in suburban area had a lower risk of OLP than those living in urban area (RR: 0.80; 95% CI: 0.78–0.82, $p < 0.001$). The higher income group had higher risk of OLP compared with the lower income group (RR, 2.27; 95% CI, 2.17–2.36, $p < 0.001$).
Conclusion: The prevalence of OLP in Taiwan significantly increased over the past 18 years. The mean age with OLP was shown in an increased pattern. In addition, OLP occurs more frequently in women than in men.

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Introduction

Oral lichen planus (OLP) is a common chronic inflammatory disease associated with immune cell-mediated dysfunction that involves the oral mucosal stratified squamous epithelium and the underlying lamina propria and may be accompanied by skin lesions.[1] The etiology and pathogenesis of OLP are not clearly understood. Some potential external and internal etiologic events such as genetic background, autoimmunity, hepatitis C virus, and psychological stress have been suggested to trigger OLP.[2,3] Previously, higher expression of serum matrix metalloproteinase-2[4] and abnormally high blood homocysteine level[5] were associated with OLP. In addition, the deficiencies of hemoglobin, iron, folic acid, and vitamin B12 were found in OLP patients as compared with healthy controls.[5,6]

The estimated prevalence of OLP is about 0.22%–5% worldwide.[7] In general, females more suffer from OLP than males.[8,9] In Taiwan, the prevalence of OLP was about 1.1%–9.8% from hospital based oral mucosal lesions examination.[10–12] OLP has been recognized by the World Health Organization as an oral potentially malignant disorder.[13] The malignant transformation rate of OLP was between 0 and 3.5% reported by a systematic review.[14] The malignant transformation rate of OLP was surveyed about 0.52–2.1% in southern Taiwan.[11,12] In addition, OLP has also been linked to psychological stress such as anxiety and depression.[2,3] Any discomfort from OLP itself, or anxiety about the malignant potential, might be responsible for a worsening psychological status. Therefore, it is important for the dentists or physicians to remind OLP patients for regular follow-up.

Taiwan has launched a single-payer National Health Insurance (NHI) program on March 1, 1995 and covered up to 99% of the nation's inhabitants in 2014.[15] The National Health Research Institute established the National Health Insurance Research Database (NHIRD) with registration files and original claim data for reimbursement. NHIRD has provided the useful epidemiological information for epidemiologic and clinical researches in Taiwan.[16–20]

In Taiwan, the nation scale survey of OLP stratified on the basis of demographic information has not been conducted so far. We therefore performed this nationwide population-based study in attempt to estimate the prevalence of OLP from NHIRD. This study also investigated whether the variations of age, sex, income, and urbanization factors influenced the prevalence of OLP in Taiwan.

Materials and methods

Data source

This study was approved by the Ethics Review Board at the Chung Shan Medical University Hospital. The dental dataset (DN), original dental claim data, was used for this study. In addition, the registration data of all beneficiaries was used to evaluate gender, age, income, and geographic location of OLP patients from 1996 to 2013.

Patient identification and measurements

The diagnostic code of NHI in Taiwan is according to the International Classification of Diseases, Ninth Clinical Modification (ICD-9-CM). The OLP patient was identified with ICD-9-CM code of 697.0. Age groups were stratified into elder people (≧ 65 years) and non-elder people (<65 years). The payroll bracket (monthly income) was categorized as follows: New Taiwan Dollar $21,900, $21,901–43,900, and >$43,900. The urbanization of the locations of NHI registration was used as a proxy parameter for socioeconomic status. Urbanization was categorized 3 levels: urban, suburban, and rural areas based on the classification scheme as described previously.[21]

Statistical analysis

The annual prevalence rate of OLP by sex and age group in Taiwan from 1996 to 2013 was examined by trend test. The relative ratio of OLP after adjusting for year, urbanization, or payroll bracket was evaluated by multivariate Poisson regression. All statistical analyses were performed using SPSS version 19 (SPSS Inc., Chicago, IL, USA).

Results

The sex-specific annual prevalence of OLP from 1996 to 2013 is presented in Table 1. The average male-to-female ratio was 0.522. The prevalence of OLP increased significantly from 1.3 (per 10^5) in 1996 to 12.8 (per 10^5) in 2013. The average annual prevalence was 7.022 (per 10^5). As shown in Fig. 1, the annual prevalence significantly increased during past 18 year period (p for trend < 0.001). The relative ratio (RR) of OLP by multivariate Poisson regression demonstrated in Table 2. The risk increased in annual increments (RR: 1.08; 95% confidence interval (CI), 1.07–1.08, $p < 0.001$).

The prevalence of OLP stratified by age is shown in Fig. 2. The prevalence of OLP in both non-elder and elder groups demonstrated an increasing tendency (p for trend < 0.001). As shown in Fig. 3, the mean age of patients with OLP was within the range from 52.3 to 56.7 years old. The mean age in male group was 53.57 years old and 55.7 years old in female group. As demonstrated in Table 2, the elder group had higher risk of OLP (RR: 3.83; 95% CI: 3.73–3.94, $p < 0.001$). The females had a significantly higher OLP risk than males (RR: 2.13; 95% CI: 2.07–2.18, $p < 0.001$).

The prevalence of OLP analyzed by urbanization is shown in Fig. 4. The prevalence of OLP in urban, suburban, and rural populations all demonstrated in an increasing pattern (p for trend < 0.001). As shown in Table 2, the population dwelling in suburban had a lower risk of OLP than those living in urban areas (RR: 0.80; 95% CI: 0.78–0.82, $p < 0.001$).

The prevalence of OLP analyzed by payroll bracket is shown in Fig. 5. The prevalence in all three groups demonstrated an increasing pattern (p for trend < 0.001). As shown in Table 2, the middle class group and upper class group had a higher risk of OLP than the lower class group

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