

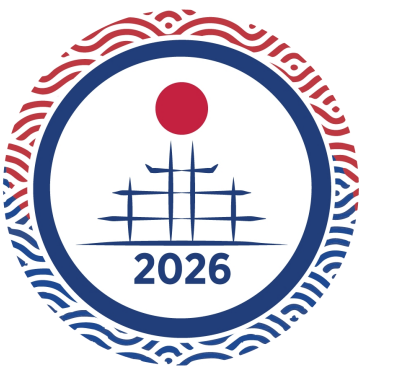
Comorbidity Patterns of Lung Cancer Patients Among the Middle-Aged and Elderly in Yunnan of China

Presenting Author: Pengyu Li¹, Jingtong Zeng¹, Ying Chen^{1,2*}

¹Thoracic Department I, The Third Affiliated Hospital of Kunming Medical University, Peking University Cancer Hospital Yunnan(Yunnan Cancer Hospital), Kunming, China.

²Northeast Yunnan Central Hospital of Kunming Medical University Thoracic Department, Northeast Yunnan Central Hospital, Zhaotong, China.

Correspondence: *To whom correspondence should be addressed. E-mail: chenying12@kmmu.edu.cn



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INTRODUCTION

Malignant tumors represent a major global health threat to aging populations. According to a global cancer statistics, China reported approximately 4.06 million new cancer cases and 2.41 million deaths in 2016. These substantial incidence and mortality rates presenting urgent public health challenges.

With an aging population in China, a growing proportion of middle-aged and elderly cancer patients present with multiple coexisting chronic conditions (comorbidities), complicating treatment and worsening outcomes.

While existing studies have examined specific cancer comorbidity, such as cancer with diabetes or cardiovascular disease in select populations. However, systematic analyses of cancer comorbidity patterns in middle-aged and elderly populations, especially in regions of China, are still very limited in the current literature.

METHODS

Study design and data sources

This analysis included cancer patients aged ≥ 45 years from Wave 3 of the CHARLS. We excluded participants with missing data on key demographic and clinical variables, including gender, age, weight, height, residential region, comorbidity records, smoking history, and drinking history. To supplement and enrich our analysis, we incorporated clinical data from lung cancer patients (aged ≥ 45 years) treated in the Thoracic Surgery Department I of Yunnan Cancer Hospital between 2015 and 2022. All hospital-based participants had complete records for the same core variables assessed in CHARLS.

RESULTS

Analysis of the CHARLS cohort (n=189)

The arthritis (53.4%), stomach diseases (44.4%), and hypertension (40.2%) were most prevalent. Comorbidity burden varied geographically, being highest in Western China (92.3%). Urban residents had higher rates of hypertension, dyslipidemia, and heart disease. Age was a key risk factor, with each additional year increasing the odds of having ≥ 3 comorbidities by 12% (OR=1.12, $p<0.001$).

Analysis of the Yunnan Cancer Hospital (n=2,528)

Comorbidity analysis revealed hypertension, diabetes, and coronary heart disease were most common. Comorbidity prevalence increased significantly over time, with a more pronounced rise in patients under 65 and in females. Early-stage (I/II) patients showed a steeper annual increase (32.1%) than advanced-stage (III/IV) patients (5.8%). Advanced-stage disease was associated with higher risks of diabetes (OR=1.41) and thyroid disease (OR=2.14). Smoking significantly increased the risk of diabetes, coronary heart disease, and especially COPD (OR=3.66, $p<0.001$).

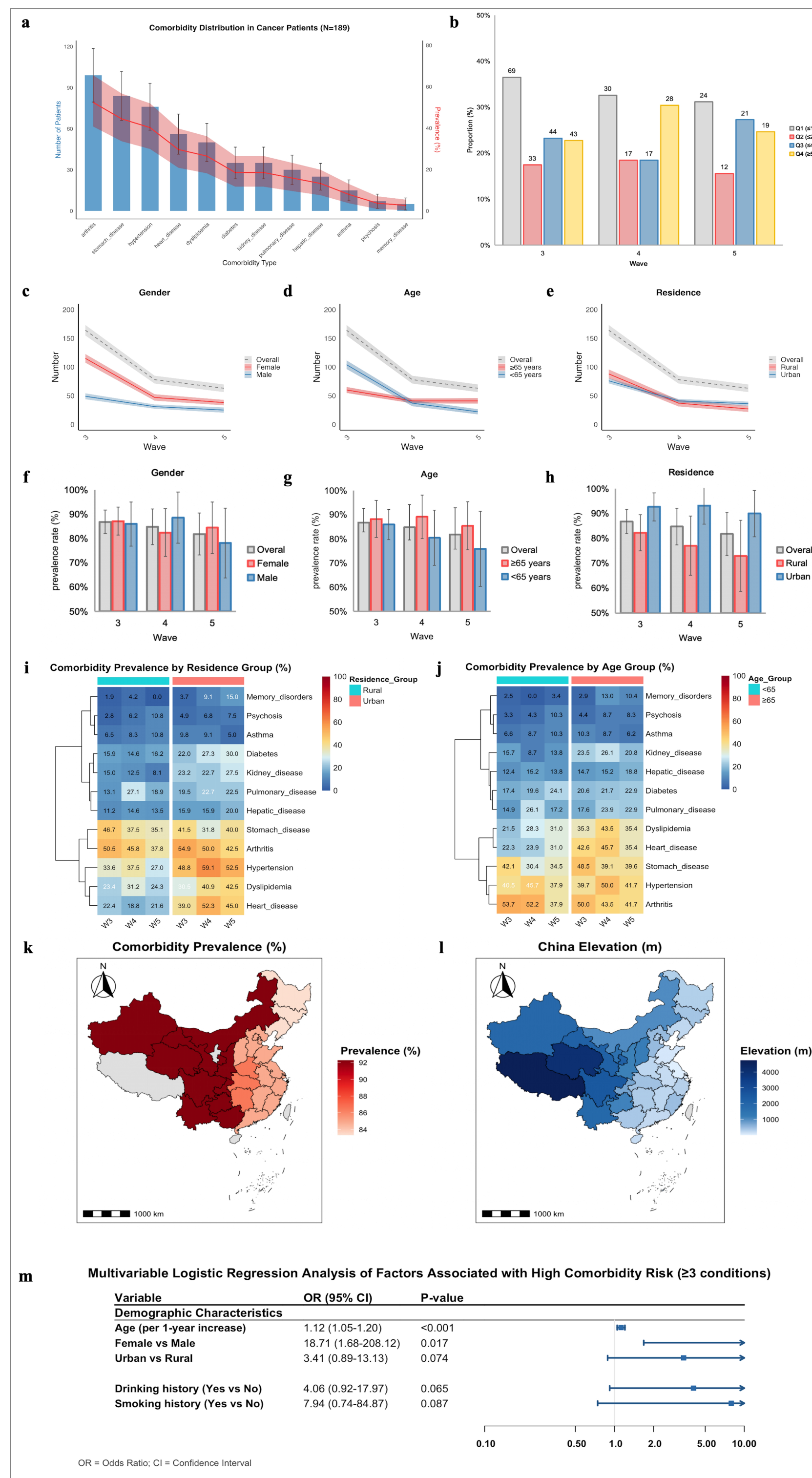


Figure 1a. Comorbidity Distribution in CHARLS (N=189). Arthritis, stomach disease and hypertension were the most common comorbidities ($p<0.001$).

Figure 1b. The proportion of the four quartile groups of the number of comorbidities (Wave 3-5).

Figure 1(c-e). Trends in Cancer Comorbidity Prevalence and Patient Distribution (Waves 3-5). (f-h) show prevalence rate trends, with bar height proportional to subgroup size. Data derived from CHARLS (wave3-5).

Figure 1. (i) Heatmap of Comorbidity Prevalence (%) Stratified by Residence (Rural/Urban). (j) Heatmap of Comorbidity Prevalence (%) Stratified by Age (<65/≥65 years).

Figure 1. (k) Geographic Heatmap of Comorbidity Prevalence Among Chinese Cancer Patients. (l) Geographic Heatmap of China Elevation.

Figure 1m. Multivariable Logistic Regression Analysis of Factors Associated with High Comorbidity Risk (≥ 3 conditions).

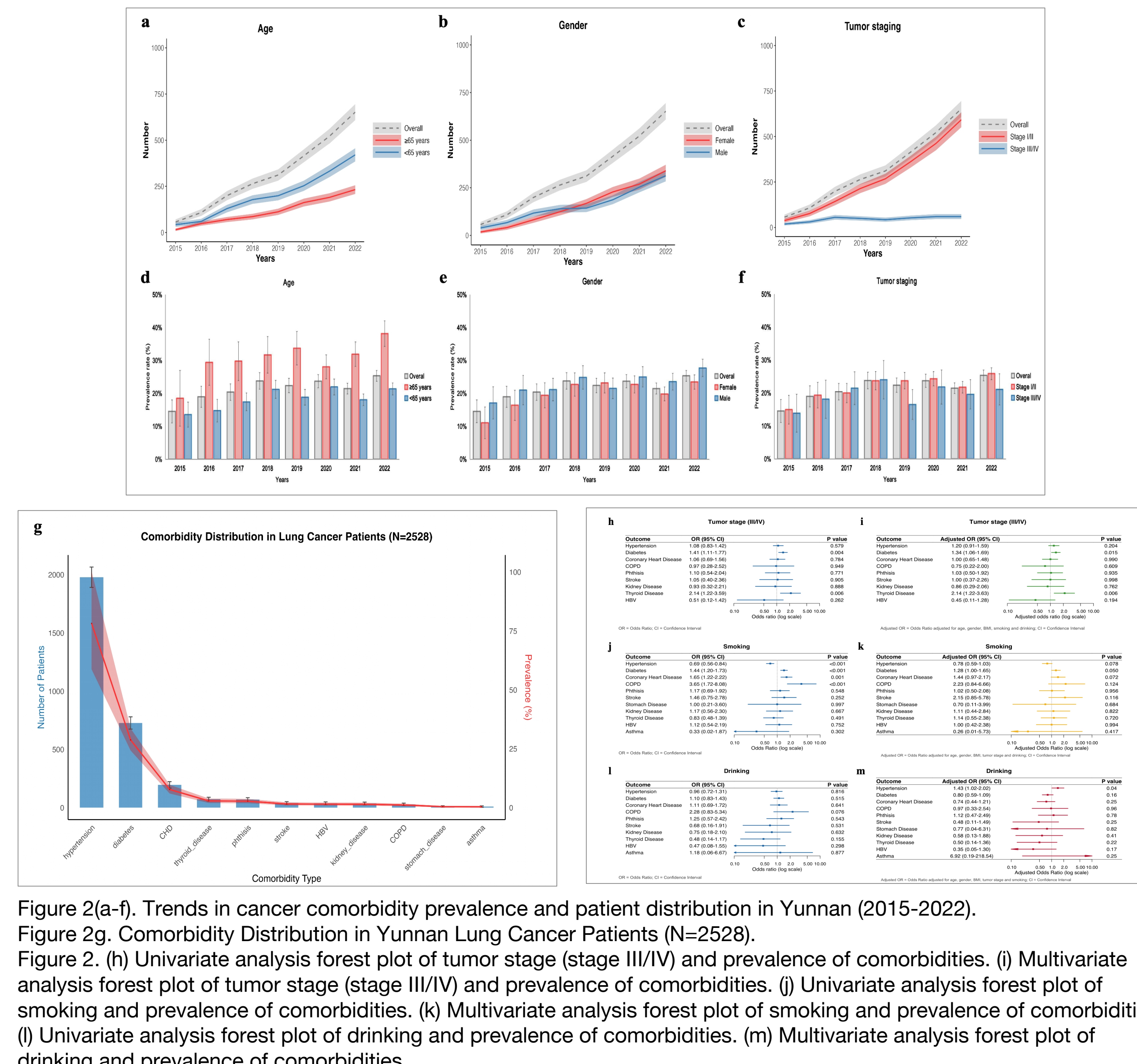


Figure 2(a-f). Trends in cancer comorbidity prevalence and patient distribution in Yunnan (2015-2022).

Figure 2g. Comorbidity Distribution in Yunnan Lung Cancer Patients (N=2528).

Figure 2. (h) Univariate analysis forest plot of tumor stage (stage III/IV) and prevalence of comorbidities. (i) Multivariate analysis forest plot of tumor stage (stage III/IV) and prevalence of comorbidities. (j) Univariate analysis forest plot of smoking and prevalence of comorbidities. (k) Multivariate analysis forest plot of smoking and prevalence of comorbidities. (l) Univariate analysis forest plot of drinking and prevalence of comorbidities. (m) Multivariate analysis forest plot of drinking and prevalence of comorbidities.

CONCLUSION

The prevalence of comorbidities is high in middle-aged and elderly cancer patients in China. Arthritis, hypertension and endocrine diseases such as diabetes are the most common comorbidities. The burden varied greatly among regions, which were mainly manifested as the ladder increasing from east to west, and was consistent with the three-ladder distribution of altitude in China. Age and gender were the main risk factors. For patients with lung cancer, the higher the tumor stage, the higher the risk of diabetes and thyroid disease. All in all, we hope that our study will contribute to the comprehensive treatment strategy for cancer comorbidity, especially for the prevention and treatment of aging population and underdeveloped areas.

This study aims to integrate nationally representative survey and single-center clinical data to delineate the prevalence, spatiotemporal distribution patterns and risk factors of cancer comorbidities in middle-aged and elderly patients with cancer.

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References

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