Rising Polypharmacy Trends and Associated Factors in Chinese Adults with Diabetes: A Population-Based Cohort Study

Nan Peng[1], Linfeng Jiang[2], Jinbo Zhang[3], Xian Zhang[4], Yuqing Fan[2], Jiale Yang[3], Lijing Yan[5], Dongning Yao[2], Pei Gao[6], Jing Wu[1], Gordon G. Liu[4], Beini Lyu[4]

1. School of Pharmaceutical Science and Technology, Tianjin University, Tianjin, China
2. School of Pharmacy, Nanjing Medical University, Nanjing, Jiangsu, China
3. School of International Pharmaceutical Business, China Pharmaceutical University, Nanjing, Jiangsu, China
4. Institute for Global Health and Development, Peking University, Beijing, China
5. Global Health Research Center, Duke Kunshan University, Kunshan, Jiangsu, China
6. Department of Epidemiology and Biostatistics, School of Public Health, Peking University, Beijing, China

INTRODUCTION

- Prescription medications are crucial for the diabetes management and account for a substantial portion of healthcare expenditures.
- Patients with diabetes in China face a high burden of comorbidities, which may necessitate greater use of non-glucose-lowering medications.
- Variations in availability of new medications, update and adoption of clinical pharmaceutical guidelines, and evolving medication-related policies may result in different medication.
- However, there is a lack of population-based, especially longitudinal studies to reveal medication use patterns in patients with diabetes in China.

METHODS

STUDY DESIGN

- We conducted a retrospective observational cohort study using the Yinzhou Regional Health Care Database.

POPULATION

- Adults (≥18 years) with diabetes （≥2 outpatient diagnoses [≥30 days apart] or 1 inpatient diagnosis） and with at least one prescription between 2015 and 2021 were enrolled.
- Patients were followed until death, loss to follow-up, or study end.

OUTCOMES

- Prescription patterns and the prevalence of polypharmacy.

STATISTICAL ANALYSIS

- We used logistic regression to identify risk factors for polypharmacy among Chinese patients with diabetes.

RESULTS

- 99619 patients with diabetes were included. The mean age was 61.6 years (SD: 12.5), with 48.4% being female.
- Among the study population, the most common comorbidities were hypertension (58.7%), hyperlipidemia (22.2%), and stroke (10.3%). On average, patients had 1.3 comorbidities.
- The average number of medications used per month per patient increased from 2.8 in 2015 to 3.6 in 2021, and the prevalence of polypharmacy increased from 18.4% to 32.6% (p-for-trend<0.01).
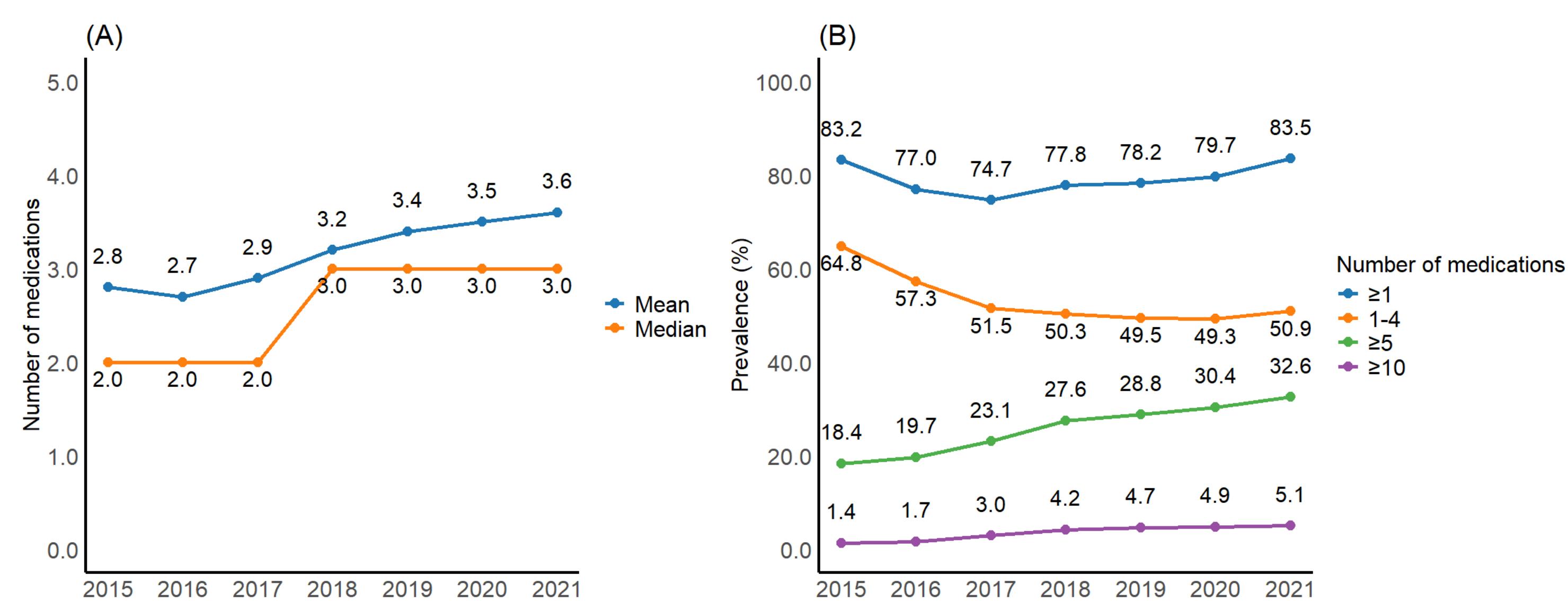

Figure 1 Trends in medications used among patients with diabetes from 2015 to 2021. (A) The mean and median number of medications used and (B) the prevalence of use by number of medications.

Contact

Nan Peng, Ph.D.

School of Pharmaceutical Science and Technology, Tianjin University, Tianjin, China

E-mail: npeng@tju.edu.cn

- Glucose-lowering medications were the most commonly prescribed medications, with sulfonylureas and biguanides being the most used subcategories. However, the proportion of glucose-lowering medications decreased from 92.3% in 2015 to 77.0% in 2021 (p-for-trend<0.01).
- Cardiovascular medications were the second most commonly used medications, with approximately 60.0% using antihypertensive medications and 40.0% using antihyperlipidemic medications.
- Additionally, the prevalence of antibacterial medications and oral Chinese patent medications use was high.
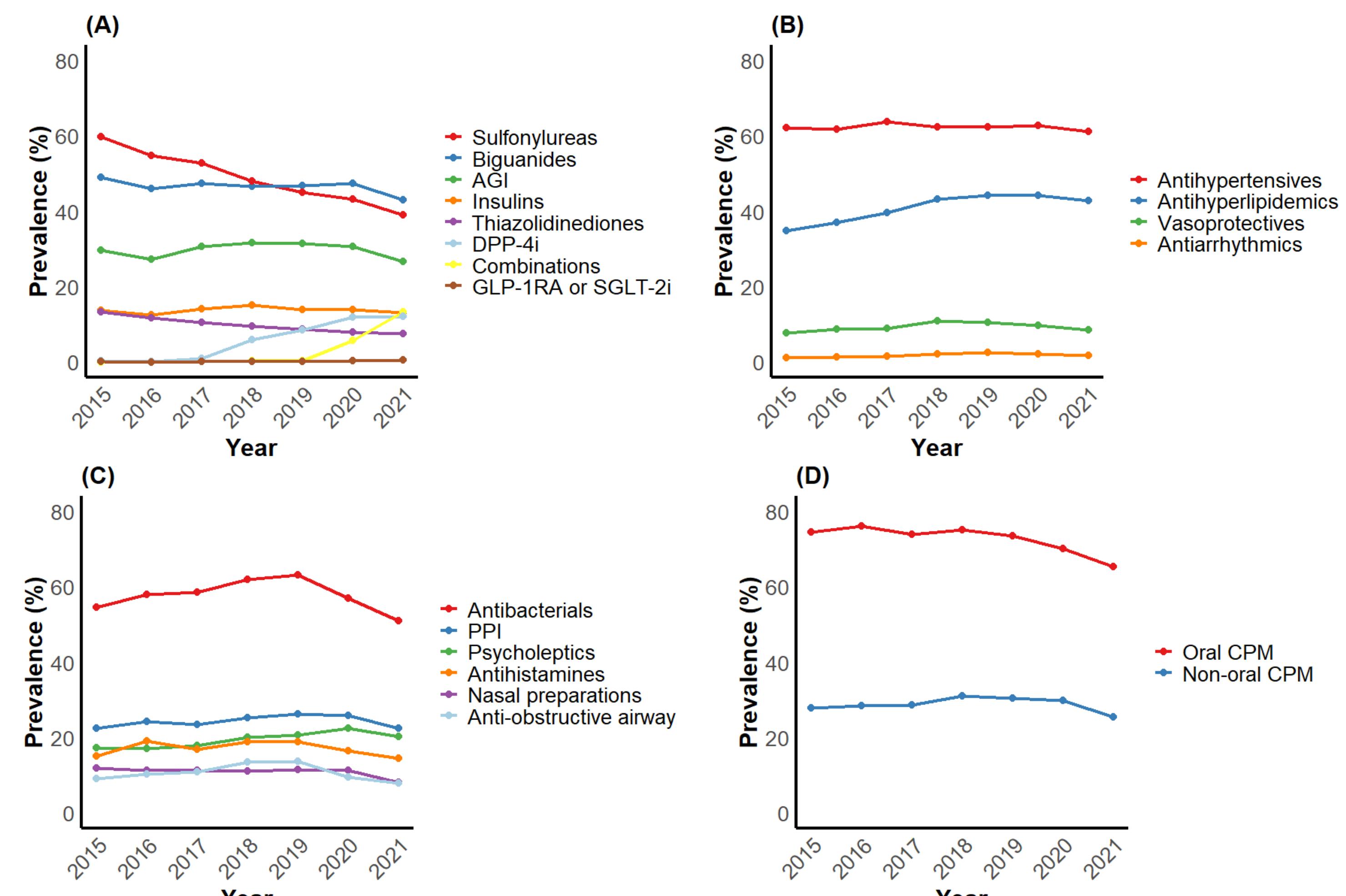

Figure 2 Prevalence of medication use by medication types. (A) Glucose-lowering medications, (B) Cardiovascular medications, (C) Other medications and (D) Chinese patent medications.
Abbreviations: AGI, alpha glucosidase inhibitor; DPP-4i, dipeptidyl peptidase-4 inhibitor; GLP-1RA, glucagon-like peptide-1 receptor agonist; SGLT-2i, sodium-glucose cotransporter-2 inhibitor; PPI, proton pump inhibitor; CPM, Chinese patent medication.

- Compared to patients with type 1 diabetes (T1D), those with type 2 diabetes (T2D) used a greater number of medications and had a higher prevalence of polypharmacy (39.5% in T2D vs. 28.4% in T1D).
- Patients with comorbidities had a higher number of medications (mean 5.0 vs. 3.3) and a higher prevalence of polypharmacy than those without (40.0% vs. 18.4%).
- Advanced age (OR:1.02,95% CI: 1.02-1.03), male gender (OR:1.08,95% CI: 1.04-1.11), being employed (OR:1.20,95% CI: 1.15-1.24), and comorbidities (e.g., hypertension: OR:2.87, 95% CI:2.75-2.99; nephropathy: OR:1.54, 95% CI:1.44-1.64) significantly increased the risk of polypharmacy.

CONCLUSIONS

- Polypharmacy was prevalent among Chinese patients with diabetes.
- Alongside glucose-lowering and cardiovascular medications, antibacterial and traditional Chinese patent medications were commonly used.
- The growing medication burden calls for attention to appropriate use.