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CHARACTERISTICS, COMORBIDITIES, COMEDICATION AND TREATMENT TRANSITIONS IN CHINESE PATIENTS WITH TYPE-2 DIABETES MELLITUS AND CHRONIC KIDNEY DISEASES WHO INITIATED ANTIHYPERTENSIVE AND HYPOGLYCEMIC DRUGS BETWEEN 2012-2022

Zaixin Zhao[1], Tianjing Zhou[2], Zhe Xu[3], Pei Gao[1,2*]

1. Institute of Advanced Clinical Medicine, Peking University, Beijing, China
2. Department of Epidemiology and Biostatistics, School of Public Health, Peking University, Beijing, China
3. Medical Affairs, Pharmaceuticals, Bayer Healthcare Company Ltd., Beijing, China

*Correspondence to: Pei Gao peigao@bjmu.edu.cn

BACKGROUND

Chronic kidney disease (CKD) is a major complication of type 2 diabetes mellitus (T2D). Patients with both conditions require medications to control blood pressure and blood glucose to reduce the risk of cardiovascular disease and death. The clinical landscape for the treatment of patients with CKD and T2D is rapidly evolving with the introduction of new treatments. Therefore, more research is warranted to describe how treatment patterns evolved in previous years and to provide context for clinical applications of new drugs.

METHODS

Using real-world data based on electronic health records from Yinzhou (an eastern region in China), we described demographics, comorbidities, drug utilization, and temporal changes for CKD and T2D patients during 2012 and 2022. We categorized patients into four "new-user" cohorts of index drug initiation, including sodium-glucose cotransporter 2 inhibitors (SGLT2i), glucagon-like peptide-1 receptor agonists (GLP-1 RA), renin-angiotensin system inhibitors (RASi) and traditional Chinese medicine (TCM) cohorts. For each cohort, new-users were defined as patients who were newly prescribed one of the certain classes of drug and had no prescriptions for that class of drug during the previous 12 months. The date of first prescription was defined as baseline, and then the patients were followed until death, loss to follow-up, or 29th June,2022, whichever came first. The four medication-specific cohorts were not mutually exclusive; thus, the same patients might be included in different cohorts.

RESULTS

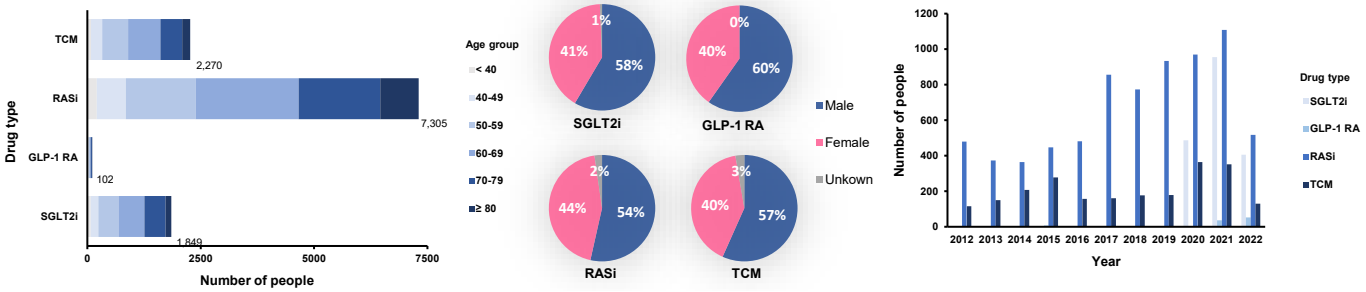
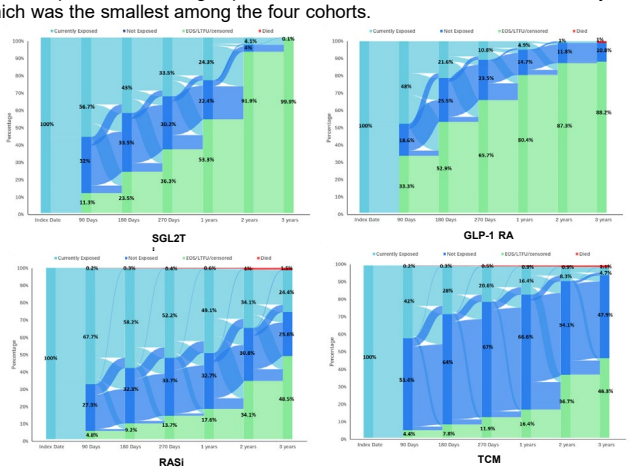


Figure 1. Age, gender distribution and the number of medication users with index date occurring in each year in four new-user cohorts from 2012 to 2022

Table 1. Comorbidities recorded of new users of study medication during the year before or at the index date

	SGLT2i	GLP-1 RA	RASi	TCM
Clinical conditions associated with risk of CKD, n (%)				
Hypertension	1647 (89.1%)	91 (89.2%)	7069 (96.8%)	1926 (84.8%)
Glomerulonephritis	956 (51.7%)	65 (63.7%)	3097 (42.4%)	1322 (58.2%)
Autoimmune disease	200 (10.8%)	11 (10.8%)	570 (7.8%)	242 (10.7%)
Gout or hyperuricemia	588 (31.8%)	42 (41.2%)	1770 (24.2%)	549 (24.2%)
Macrovascular complications, n (%)				
Coronary heart disease	603 (32.6%)	38 (37.3%)	2193 (30.0%)	639 (28.2%)
Cerebrovascular disease	481 (26.0%)	20 (19.6%)	1956 (26.8%)	550 (24.2%)
Peripheral vascular disease	504 (27.3%)	28 (27.5%)	1555 (21.3%)	368 (16.2%)

The RASi cohort had the highest short- and long-term compliance rate among the four cohorts. The RASi cohort had a highest compliance rate within 90 days, with 67.7% of patients still being exposed, while that of the TCM cohort was only 42.0%, which was the smallest among the four cohorts.



EOS = end of study; GLP-1 RA = glucagon-like peptide-1 receptor agonists; LTFU = lost to follow-up; RASi = Renin Angiotensin System inhibitor; SGLT2i = sodium-glucose; TCM = traditional Chinese medicine

Figure 2. Sankey diagram illustrating treatment changes over time for four study drug cohorts

Table 2. Several medications of interest use recorded of new users of study medication

	SGLT2i	GLP-1 RA	RASi	TCM
Medications for T2D (hypoglycemic agents) ever prescribed from 180 days before and including the index date, n (%)				
Metformin and fixed-dose combinations	1067 (57.7%)	56 (54.9%)	2806 (38.4%)	843 (37.1%)
Sulfonylureas and fixed-dose combinations	804 (43.5%)	17 (16.7%)	2531 (34.6%)	703 (31.0%)
Alpha glucosidase inhibitors	525 (28.4%)	27 (26.5%)	1995 (27.3%)	619 (27.3%)
DPP-4 inhibitors and fixed-dose combinations	517 (28.0%)	26 (25.5%)	632 (8.7%)	246 (10.8%)
Meglitinides	235 (12.7%)	13 (12.7%)	1016 (13.9%)	404 (17.8%)
Thiazolidinediones	219 (11.8%)	5 (0.2%)	589 (8.1%)	224 (9.9%)
Insulin	457 (24.7%)	48 (47.1%)	1412 (19.3%)	468 (20.6%)
Cardiovascular medications use recorded in 180 days prior to and including the index date, n (%)				
Thiazide-like diuretics	259 (14.0%)	15 (14.7%)	1166 (16.0%)	277 (12.2%)
Loop diuretics	99 (5.4%)	4 (3.9%)	420 (5.7%)	129 (5.7%)
Potassium-sparing diuretics	256 (13.8%)	14 (13.7%)	1135 (15.5%)	270 (11.9%)
Beta blockers	460 (24.9%)	32 (31.4%)	1533 (21.0%)	409 (18.0%)
NDHP-CCB	918 (49.6%)	43 (42.2%)	3973 (54.4%)	1014 (44.7%)
Anticoagulants	33 (1.8%)	2 (2.0%)	79 (1.1%)	17 (0.7%)
Statins	897 (48.5%)	53 (52.0%)	2982 (40.8%)	921 (40.6%)
Digoxin	13 (0.7%)	1 (1.0%)	70 (1.0%)	8 (0.4%)
Aspirin and other antiplatelet agents	542 (29.3%)	34 (33.3%)	2104 (28.8%)	594 (26.2%)

DPP-4 = Dipeptidyl peptidase-4; GLP-1 RA = glucagon-like peptide-1 receptor agonists; NDHP-CCB = Non-dihydropyridine calcium channel blockers; RASi = Renin Angiotensin System Inhibitor; SGLT2i = sodium-glucose cotransporter 2 inhibitors; T2D = type 2 diabetes; TCM = traditional Chinese medicine.

Conclusion: RASi was the most commonly used medication in CKD and T2D patients, while SGLT2i and GLP-1 RA were gradually being used in clinical after launch. However, the overall drug adherence rates were not satisfactory across the four medication classes.

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Conflict of Interest Statement: Zhe Xu is an employee of Bayer Healthcare Company Ltd. The other authors declare no conflicts of interest.