CHANGES IN PRESCRIBING OF SODIUM-GLUCOSE CO-TRANSPORTER 2 INHIBITORS AND DIPEPTIDYL PEPTIDASE 4 INHIBITORS IN SINGAPORE

ACE agency for care effectiveness
Driving better decision-making in healthcare

Louise GOH, Jiandong SUN, Kwong NG
Agency for Care Effectiveness (ACE), Ministry of Health, Singapore

BACKGROUND & OBJECTIVE

- The Agency for Care Effectiveness issued guidance in mid-2017 to encourage use of sodium-glucose co-transporter 2 inhibitors (SGLT2i) over dipeptidyl peptidase 4 inhibitors (DPP4i) as dual or triple therapy based on clinical and cost-effectiveness assessment. It was unclear if these efforts were associated with desired changes in prescribing for managing type 2 diabetes mellitus (T2DM).
- To assess changes in prescribing of SGLT2i and DPP4i in T2DM patients managed at public healthcare institutions in Singapore post-subsidy.

METHODS

- A retrospective cohort study was conducted using drug utilisation data and electronic health records. Two random samples (n = 10,000 T2DM patients each) stratified by care setting (i.e. 25% and 75% of patients managed at public hospitals and polyclinics or primary care clinics where most patients and milder cases are managed respectively) were selected from two periods, pre-subsidy (Sep-Dec 2016) and post-subsidy (Sep-Dec 2017).
- Changes in prescribing rates (PR = number of patients prescribed with studied drug among all T2DM patients in a given period) from pre- to post-subsidy were assessed using logistic regression, adjusted for covariates. Effect size was estimated using odds ratios (ORs) with 95% confidence intervals (CIs).

RESULTS

- The two samples were similar in age and gender distribution. Overall, PR of SGLT2i was significantly increased by four times from 1.5% to 6.1% after subsidy listing (OR 3.9, 95%CI 3.2-4.8). The increase was more pronounced when SGLT2i was used with metformin (MET) (OR 5.4, 95%CI 4.1-7.2) or insulin (OR 2.7, 95%CI 1.9-3.9) compared with other non-recommended therapies (OR 2.0, 95%CI 1.4-3.1).
- MET monotherapy use also increased significantly by 3.5 times (OR 3.5, 95%CI 3.2-3.9).
- Conversely, PR of DPP4i was significantly reduced by 50% from 22.4% to 18.3% (OR 0.5, 95%CI 0.5-0.6), particularly for DPP4i monotherapy (OR 0.2, 95%CI 0.2-0.3) or when used with insulin (OR 0.6, 95%CI 0.5-0.7).
- The increase in overall PR of SGLT2i was primarily driven by increased use in polyclinics (0.01% to 4.8%), despite a significant increase in hospitals (5.9% to 10.0%). The decrease in DPP4i PR occurred only at polyclinics (23.3% to 17.0%, OR 0.4, 95%CI 0.4-0.4) but not at public hospitals (19.7% to 22.0%, OR 1.0, 95%CI 0.9-1.2).

Type 2 diabetes therapies	Pre-subsidy	Post-subsidy	Unadjusted OR (95%CI)	Adjusted OR# (95%CI)
SGLT2i	149(1.5%)	609(6.1%)	4.3(3.6 to 5.1)**	3.9(3.2 to 4.8)**
Monotherapy	15(0.2%)	20(0.2%)	1.3(0.7 to 2.6)	1.7(0.9 to 3.4)
SGLT2i recommended oral therapies^	58(0.6%)	341(3.4%)	6.1(4.6 to 8.0)**	5.4(4.1 to 7.2)**
SGLT2i recommended therapies with insulin	43(0.4%)	158(1.6%)	3.7(2.7 to 5.2)**	2.7(1.9 to 3.9)**
SGLT2i with other oral diabetes drugs	33(0.3%)	90(0.9%)	2.7(1.8 to 4.1)**	2.0(1.4 to 3.1)*
DPP4i	2,242(22.4%)	1,829(18.3%)	0.8(0.7 to 0.8)**	0.5(0.5 to 0.6)**
Monotherapy	808(8.1%)	151(1.5%)	0.2(0.1 to 0.2)**	0.2(0.2 to 0.3)**
DPP4i with MET	119(1.2%)	215(2.2%)	1.8(1.5 to 2.3)**	1.6(1.3 to 2.0)**
DPP4i with other oral diabetes drugs	857(8.6%)	1,021(10.2%)	1.2(1.1 to 1.3)**	0.8(0.7 to 0.9)**
DPP4i therapies with insulin	458(4.6%)	442(4.4%)	1.0(0.8 to 1.1)	0.6(0.5 to 0.7)**
MET	6,632(66.3%)	8,491(84.9%)	2.9(2.7 to 3.1)**	2.7(2.5 to 2.9)**
Monotherapy	2,461(24.6%)	3,022(30.2%)	1.3(1.2 to 1.4)**	3.5(3.2 to 3.9)**
MET with other oral diabetes drugs	3,371(33.7%)	4,363(43.6%)	1.5(1.4 to 1.6)**	1.2(1.1 to 1.4)**
MET therapies with insulin	800(8.0%)	1,106(11.1%)	1.4(1.3 to 1.6)**	1.0(0.9 to 1.1)

^Includes SGLT2i with MET, SGLT2i with MET and sulphonylurea (SU), SGLT2i with MET, SU and another oral diabetes drug
#Adjusted for number of years with diabetes and number of prescribed drugs
*p<0.05; **p<0.001

CONCLUSIONS

- Changes in prescribing suggest early success in driving appropriate use of diabetic drugs, to increase SGLT2i use as second-line dual or triple therapy and reinforce MET monotherapy use. Differential effect by care setting warrants investigation and potential intervention to improve adoption rate.