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Drugs refills service utilisation by patients with Type 2 Diabetes Mellitus in primary care setting during the COVID-19 pandemic

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Introduction

During Coronavirus Disease 2019 (COVID-19) pandemic, a voluntary Drug Refill Service (DRS) shown in figure 1 was introduced in all general outpatient clinics (GOPCs) of Hospital Authority to maintain continuity of care and reduce social contacts.

Objective: To estimate utilisation rate of DRS among patients with Type 2 Diabetes Mellitus (T2DM) in primary care setting, and compare characteristics of T2DM patients utilising DRS with those receiving routine care during COVID-19 pandemic.

Methods

Design: Retrospective cross-sectional study

Subjects: All T2DM patients followed up from the start to the end of the first round of the drug refill service (i.e. 22 January to 30 June 2020) with annual risk assessment reports.

Exclusion criteria: Those patients had no annual risk assessment reports due to insufficient & limited clinical parameters for analysis.

Data Collection: Data were retrieved from in-house Clinical Data Analysis and Reporting System (CDARS); DRS usage status obtained from the Outpatient Appointment System (OPAS), merged by patient identification number.

Potential Factors: Age, gender, ethnicity, education level, occupation, physical activity, smoking, alcohol consumption, SMBG; Clinical parameters: T2DM duration, DM FHx, BMI, HbA1c, LDL-C, TG, eGFR, comorbidities, hospitalisation records

Statistical Analysis:

DRS users: Patients once utilised DRS;

Non-DRS users: Patient attended standard face-to-face consultations with no use of DRS

DRS utilisation rate: per-person basis = total nos. of T2DM patients using DRS/ total nos. of eligible T2DM patients;

per-visit basis = total nos. of visits using DRS/total nos. of eligible visits

Comparison were done by:

- ***Independent t-tests*** for continuous variables & *exact* ***chi-square tests*** for categorical variables
- ***Multiple logistic regression model*** with all factors using forward selection

Results

- **247 out of 6,946** eligible T2DM patients used DRS
- **Utilisation rate of DRS = 3.6%** (95% CI: 3.1%–4.0%)
- **Significant variables** for patients characteristics by DRS utilization in univariate analysis were shown in table 1. **Non-significant** potential factors were not shown.
- **Multivariate logistic regression** showed following factors as statistically significantly (p<0.05) (Table 2):

  (1) More likely to utilise DRS

  (i) **Aged ≥70 years** (OR=3.28, 95%CI=1.50–7.17); compared with age<60,

  (ii) **Being house-worker** (OR=2.56, 95% CI=1.15–5.70)**/non-manual worker** (OR=2.69, 95% CI=1.11–6.56)**/ unemployed or retired** (OR=3.21, 95% CI=1.43–7.19); compared with manual,

  (iii) **Underweight** (OR=3.85, 95% CI=1.35–11.03)**/overweight** (OR=2.16, 95% CI=1.14–4.09); compared with normal BMI

  (2) Less likely to utilise DRS

  Social drinkers & current drinkers (OR=0.46, 95% CI=0.23-0.90); compared with non-drinker
- **New COVID-19 cases & weekly DRS utilization** was shown in figure 2.

  (1) **Service utilisation ↑** from the onset of the COVID-19 outbreak, **peaked in late February**, followed by a progressive **↓ until the end of the 1st wave**, and began **↑ again from the start of the 2nd wave**, with some ups and downs; two months later, a similar rate as late February were reported.

  (2) The observed patterns in the weekly per visit rates might indicate **↑ DRS usage to the highest value of 6.2% in week 6** (i.e. 25 February to 2 March 2022).

Conclusion

The utilization rate was low and people at higher risk from COVID-19 including people with older age and abnormal body weight were more likely to utilise DRS. Low utilisation suggested continuity of diabetic care should be supported by more alternatives.

Figure 1. Patient journey for DRS and chronic diseases follow-up

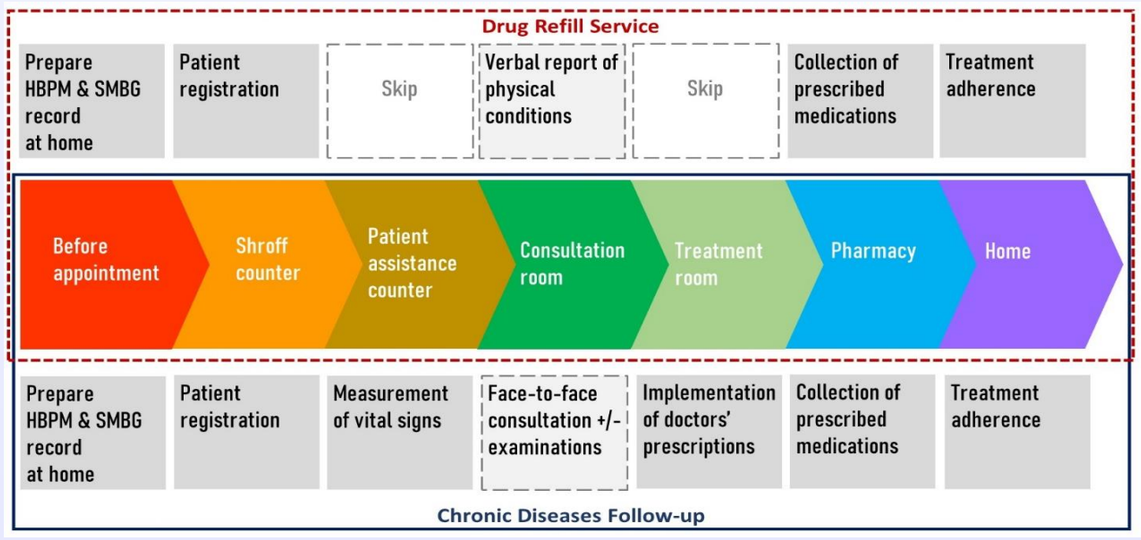

Table 1. Significant variables for patients characteristics by DRS utilization in univariate analysis (n=6946)

Variables	Total (n, column %)	Drug refill service (n, row %) No (n=6699)	Yes (n=247)	p-value^	Crude OR (95%CI)
Sex				<0.001***	
Female	3777 (54.4%)	3610 (95.6%)	167 (4.4%)		ref
Male	3169 (45.6%)	3089 (97.5%)	80 (2.5%)		0.56 (0.43, 0.73)
Age (Years)	68.4±11.3	68.0±11.1	79.0±11.2	<0.001***	
<60	1476 (21.2%)	1463 (99.1%)	13 (0.9%)		ref
60 – 64	1134 (16.3%)	1116 (98.4%)	18 (1.6%)		1.82 (0.89, 3.72)
65 – 69	1248 (18.0%)	1230 (98.6%)	18 (1.4%)		1.65 (0.80, 3.38)
≥70	3088 (44.5%)	2890 (93.6%)	198 (6.4%)		7.71 (4.38, 13.56)
Occupation (n=6256)				<0.001***	
Manual	1479 (23.6%)	1471 (99.5%)	8 (0.5%)		ref
Non-manual	1011 (16.2%)	996 (98.5%)	15 (1.5%)		2.77 (1.17, 6.56)
Housewife / Housework	2024 (32.4%)	1930 (95.4%)	94 (4.6%)		8.96 (4.34, 18.49)
Unemployed / Retired	1742 (27.8%)	1662 (95.4%)	80 (4.6%)		8.85 (4.27, 18.37)
Education (n=6725)				<0.001***	
No formal education / Primary	3780 (56.2%)	3619 (95.7%)	161 (4.3%)		ref
Secondary / Tertiary	2945 (43.8%)	2888 (98.1%)	57 (1.9%)		0.44 (0.33, 0.60)
Smoking (n=6738)				<0.001***	
Non-smoker	5172 (76.8%)	4981 (96.3%)	191 (3.7%)		ref
Ex-smoker	956 (14.2%)	934 (97.7%)	22 (2.3%)		0.61 (0.39, 0.96)
Current smoker	610 (9.1%)	604 (99.0%)	6 (1.0%)		0.26 (0.11, 0.59)
Alcohol (n=5417)				0.001**	
Non-drinker	3882 (71.7%)	3758 (96.8%)	124 (3.2%)		ref
Ex-drinker	400 (7.4%)	390 (97.5%)	10 (2.5%)		0.78 (0.41, 1.49)
Social drinker / Current drinker	1135 (21.0%)	1123 (98.9%)	12 (1.1%)		0.32 (0.18, 0.59)
BMI (kg/m²) (n=6581)	26.3±4.3	26.3±4.3	25.4±4.2	<0.001***	
Normal (18.5 - <23.0)	1363 (20.7%)	1323 (97.1%)	40 (2.9%)		ref
Underweight (<18.5)	104 (1.6%)	94 (90.4%)	10 (9.6%)		3.52 (1.71, 7.26)
Overweight (23.0 - <25.0)	1229 (18.7%)	1186 (96.5%)	43 (3.5%)		1.20 (0.77, 1.86)
Obese (≥25.0)	3885 (59.0%)	3787 (97.5%)	98 (2.5%)		0.86 (0.59, 1.24)
Family history of diabetes (n=6660)				<0.001***	
No / Not Known	2957 (44.4%)	2836 (95.9%)	121 (4.1%)		ref
Yes	3703 (55.6%)	3613 (97.6%)	90 (2.4%)		0.58 (0.44, 0.77)
Years of diabetes diagnosed (n=6745)	10.2±6.8	10.0±6.7	13.4±8.9	<0.001***	
≤ 10 years	3904 (57.9%)	3815 (97.7%)	89 (2.3%)		ref
> 10 years	2841 (42.1%)	2713 (95.5%)	128 (4.5%)		2.02 (1.54, 2.66)
Hospitalisation (within 6 months before the start of the drug refill service)				0.004**	
No	6331 (91.1%)	6119 (96.7%)	212 (3.3%)		ref
Yes	615 (8.9%)	580 (94.3%)	35 (5.7%)		1.74 (1.21, 2.52)
HbA1c (%) (n=6916)	6.8±0.9	6.8±0.9	6.6±0.8	0.008**	
Good Control (<7%)	4538 (65.6%)	4356 (96.0%)	182 (4.0%)		ref
Suboptimal control (≥7%)	2378 (34.4%)	2313 (97.3%)	65 (2.7%)		0.67 (0.50, 0.90)
LDL-C (mmol/L) (n=6933)				0.029*	
<2.6	5665 (81.7%)	5450 (96.2%)	215 (3.8%)		ref
≥2.6	1268 (18.3%)	1236 (97.5%)	32 (2.5%)		0.66 (0.45, 0.96)
Calculated eGFR (ml/min/1.73m²) (n=6585)				0.001**	
≥60	5351 (81.3%)	5224 (97.6%)	127 (2.4%)		ref
<60	1234 (18.7%)	1182 (95.8%)	52 (4.2%)		1.81 (1.30, 2.51)

Table 2. Multiple logistic regression model for DRS utilisation

	Utilisation of drug refill service: Adjusted OR (95%CI)	p-value
Age (Years)		
<60	ref	
60 - 64	1.56 (0.64, 3.76)	0.326
65 - 69	1.27 (0.51, 3.12)	0.608
≥70	3.28 (1.50, 7.17)	0.003**
Occupation		
Manual	ref	
Non-manual	2.69 (1.11, 6.56)	0.029**
Homemaker / Housework	2.56 (1.15, 5.70)	0.022**
Unemployed/ Retired	3.21 (1.43, 7.19)	0.005**
Alcohol		
Non-drinker	ref	
Ex-drinker	0.61 (0.26, 1.43)	0.255
Social drinker / Current drinker	0.46 (0.23, 0.90)	0.024**
BMI (kg/m²)		
Normal (18.5 - <23.0)	ref	
Underweight (<18.5)	3.85 (1.35, 11.03)	0.012**
Overweight (23.0 - <25.0)	2.16 (1.14, 4.09)	0.018**
Obese (≥25.0)	1.66 (0.94, 2.95)	0.081

The reference category of the dependent variable was "didn't utilise".
The p value of the Hosmer and Lemeshow Test was 0.991.

***p<0.001, **p<0.01, *p<0.05

Figure 2. New COVID-19 cases & weekly drug refill utilisation rates