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Case Report Open Access

Drug Related Problems Detected During a Brown Bag Review by a Pharmacist – Initiated Octo-Pills Programme in Singapore

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Introduction

Singapore is facing an imminent silver tsunami with an increase in the percentage of older people aged 65 years and older, from 8.4% in 2006 to 12.4% in 2016 [1]. The number of chronic illnesses and frequency of medication use increase with age, which often result in polypharmacy and Drug Related Problems (DRPs) that can lead to significant drug related morbidity and mortality [2]. Pharmacists play a pivotal role in the healthcare team to manage polypharmacy, improve patient health outcomes and reduce drug related hospital re-admissions [3]. Studies have also suggested that collaborations between hospital and community pharmacies can increase the detection and resolution of DRPs [4].

Community pharmacists are in a unique position to provide patient care as there is a wide "OCTOPUS" spread of community stores across Singapore. Due to their ideal location within the vicinity of patient's home, the community pharmacists can leverage on their untapped roles to manage chronic medications and polypharmacy issues. With the aim of addressing and managing polypharmacy from the hospital to community settings, a pilot project Octo-Pills with the tag line, 'An Octopus Approach for the Silver Tsunami', was initiated between the outpatient pharmacy in Singapore General Hospital (SGH) and the community pharmacies of Watson's Personal Care Stores Pte Ltd, Singapore (Watsons, Singapore).

Patients were referred from the hospital outpatient pharmacy to participating community pharmacies for medication reconciliation and review. Patients were eligible to participate if they were 50 years and above and satisfied any of the following inclusion criteria for being at risk of DRP: Using 6 or more medications, seeing three or more doctors, are confused and unable to manage their own medications, have excessive medications at home and require medication reconciliation, and/or are suspected to be non-adherent to treatment. The study protocol was reviewed and approved by the institutional review board.

From October 2015 to June 2016, a team of 13 community pharmacists conducted medication reconciliation and review for a total of 77 eligible patients. In this report, we present a case study of one of the patients who participated in this initiative and discuss the DRPs detected by the community pharmacist, and strategies that may be employed to manage them.

Case Report

Mr. ABC is a 61-year-old Malay male who reported to the community pharmacy for a medication review on 13th May 2016. He had a medical history of hypertension, Type 2 Diabetes Mellitus (T2DM) and Chronic Kidney Disease (CKD) secondary to T2DM, gout and contact eczema. At the last hospital outpatient visit, his blood pressure was 107/71 mmHg, HbA1c, glycosylated haemoglobin 5.3%, creatinine clearance 33.3 ml/min and serum potassium 3.7 mmol/L. There were several changes made to the patient's medications during admission. Furosemide was reduced from 40 mg BD to 40 mg OM and tolbutamide from 1 g to 250 mg TDS.

The pharmacist verified and matched physical medications and dosage instructions with the prescription record provided by the hospital pharmacist. The expiry date and physical integrity of the medications were also inspected, followed by an assessment on the patient's knowledge of the drug dosages, adherence and side effects for each medication. To facilitate follow up, a summarized report and patient's medication list was then communicated to the hospital pharmacist. The patient was found with the physical medications listed in Table 1.

S.No.	Medication	Dosage prescribed	Discrepancies in dosage taken
1	Aspirin	100 mg OM	-
2	Calcium acetate	667 mg BD	-
3	Ergocalciferol	50,000 units once a month	-
4	Ezetimibe/simvastatin	10 mg/20 mg 1 tablet ON	-
5	Fenofibrate	100 mg OM	-
6	Ferrous fumarate	200 mg OM	-
7	Furosemide	40 mg OM	80 mg OM

8	Glucosamine sulfate capsule	500 mg TDS	-
9	Hydroxyzine	25 mg BD prn for itch	-
10	Lactulose syrup	10 ml TDS	-
11	Losartan	25 mg OM	-
12	Paracetamol/ Orphenadrine	450 mg/35 mg 2 tablets TDS prn for pain	-
13	Sennosides	15 mg ON	-
14	Sitagliptin	25 mg OM	-
15	Sodium bicarbonate	1000 mg TDS	-
16	Tolbutamide	250 mg TDS	1000 mg TDS
17	Tramadol	50 mg TDS	-
18	Betamethasone dipropionate 0.05% ointment	Applied BD	-
19	Emulsifying ointment	Applied BD	-
20	White soft paraffin	Applied TDS	-
21	Omeprazole*	40 mg OM	-
22	Renapro*	1 tablet OM	-
*Medications that were not in the patient's latest prescription from his recent hospital discharge.			

Table 1: Complete list of medications that Mr. ABC was taking.

Discussion

DRPs identified were classified using the list from the third edition of Pharmaceutical Care Practice [5]. We noted that the list of DRPs may not be exhaustive after only one session of medication review. Nonetheless, we have highlighted some of the crucial DRPs in the following:

Adherence

The medication reconciliation session revealed that Mr. ABC did not adhere to his latest medication list from hospital discharge. He was confused as he had multiple changes in his regular medications. As a result, he was taking tolbutamide 1000 mg instead of 250 mg three times daily, increasing the risk of hypoglycaemia. In this case, recent hospitalizations and polypharmacy were strong predictors of severe hypoglycaemia [6]. Mr. ABC also suffered from CKD coupled with age-related decline in hepatic enzyme activity which may reduce the metabolism of sulfonylureas [7]. Furthermore, the age-related decrease in β-adrenergic receptor function may also cause impairment of glucose-regulated insulin release which further predisposed older patients to hypoglycaemia [8]. This is of concern as the patient's HbA1c was 5.3%, below the recommended target of 7% [9]. If the DRPs were undetected and unresolved, it could potentially lead to severe hypoglycemia, resulting in hospital admissions and increased mortality rates [10].

Adverse Drug Reaction (ADR)

Furosemide is often associated with ADRs such as hypokalemia and hypotension [11]. Mr. ABC was found consuming a double dose of furosemide; 80 mg instead of 40 mg daily, which is significant considering his borderline low potassium level, 3.7 mmol/L. Hypokalemia is the leading cause of iatrogenic mortality among cardiac patients who have an inherent risk for arrhythmias. Left undetected, severe hypokalemia can lead to significant Q-T interval prolongation which increases the risk of torsade des pointes, ventricular fibrillation and sudden cardiac death [12].

Despite being prescribed with several medications for eczema, the patient's condition was not well controlled. Mr. ABC revealed that he was not using some of the topical products prescribed due to greasiness. Patient's preference and acceptability have been shown to be important factors in topical treatment outcomes [13]. Inadequate use of emollients puts Mr. ABC at risk of contact dermatitis, leading to skin itch and infection from scratching. Complications such as cellulitis and non-healing venous ulcers may arise [14]. Studies have shown that pharmacist-provided patient education is important for successful management of skin eczema [15].

Unnecessary drug therapy

Mr. ABC was also found to be taking omeprazole 40 mg once in the morning which was not indicated for any of his current health condition as he denied any gastrointestinal symptoms. The excess supply of omeprazole was probably from his previous visits to the pharmacy. Inappropriate use of Proton Pump Inhibitors (PPI) is prevalent and has been associated with ADR such as malabsorption of minerals, increased risk of infections, and interstitial nephritis [16]. In particular, there are concerns that malabsorption of calcium may increase the risk of osteoporosis-related bone fractures [17]. Studies have also shown that PPI use heightened the risk of community acquired pneumonia [18]. There is evidence to suggest that the use of

PPI may adversely impact vascular function, increasing the risk for myocardial infarction, even in the general population [19].

Strategies to manage DRPs

Most DRPs are avoidable [20]. Mr. ABC has several risk factors for DRPs such as polypharmacy and confusion about the treatment regime [21]. Deprescribing has been shown to be effective in addressing the issue of polypharmacy [22]. For Mr. ABC, the pharmacist detected 4 DRPs and reduced the total daily pill count by 3.5 pills. After reviewing his medical history, the pharmacist did not find a clear indication for the use of omeprazole. He was advised to use omeprazole 20 mg only when necessary and to inform his prescriber during the next visit to the hospital. Effective patient education on the rationale behind any changes in medication regime may help to improve adherence [23,24]. In this case, Mr. ABC was advised to take furosemide at least 6 hours before bedtime and not to drink excessive amounts of water before sleep. The pharmacist explained that furosemide exerts a diuretic action that can lasts for 6-8 hours.

For topical treatment, patient's preferences should be taken into consideration to improve adherence. Pharmacists play a role to educate patient on the proper use of creams and suggest alternatives for better acceptance. To improve better health outcomes, Mr. ABC was advised to monitor his blood pressure and blood glucose daily, something which he had previously not done. He was also encouraged to keep a record of the readings for review with the doctors during his subsequent visits to the hospital. Patient Medication List (PML), a product of medication reconciliation, was provided to patient after the medication review session. PML provides an updated overview of patient's medications which can potentially reduce DRPs and duplications during transition of care. This is especially important in the community setting where patient often use other non-prescribed medications or supplements.

Limitations

There were several limitations noteworthy to be addressed for future extension of the project. Firstly, due to privacy policies, community pharmacists were not granted access to the patients' complete medical information. Medication review was therefore limited to the medical issues that were highlighted in the medication summary communicated from the hospital. Secondly, there would be an interval between each point of communication as community pharmacists had to communicate the findings through hospital pharmacists to the prescribing physicians for any discrepancy. The next step for project Octo-Pills could involve partnership between the community pharmacists with the general physicians in the community to provide seamless transition of care. The partnership may improve sharing of patient medical information which allows for more effective medication reconciliation and review.

Conclusion

Through a case report, we found that the partnership between hospital and community pharmacy was effective in detecting and addressing DRPs in the community setting. This is especially relevant since DRPs are common during transition of care. The partnership between the hospital and community pharmacists potentially improves the continuum of patient care for the aging population.

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