Original Research Article

Utilization Pattern of Lipid Modifying Agents in An Outpatient Pharmacy Department of a Private Hospital in Malaysia

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ABSTRACT

Introduction: Lipid-modifying drugs have been used to treat dyslipidemia as well as for the primary and secondary prevention of CVDs and stroke. **Objectives:** This study aims to describe the drug utilization pattern of lipid-modifying drugs in a private hospital. **Method:** A retrospective study was carried out in outpatient of the selected hospital. Patients were selected based on inclusion and exclusion criteria by using convenience sampling. Data were collected through KCIS by retrieving patients' registration number. Defined daily dose (DDD) was calculated and compared to World Health Organization DDD. Medicine prices were also analysed. **Results:** A total of 180 patients' record were analysed, 70% of them were male; 40.6% of the patients were from the age range of 50 to 59 years old; ethnicity breakdown was Malay (69.4%), Indian (18.3%) and Chinese (12.2%). Among all lipid-modifying drugs, utilization of statins was the highest as statins are the preferred line in the treatment of dyslipidemia. Innovator brands were more preferred where most of the lipid-modifying drugs used in the selected hospital are innovator brand drugs. In terms of cost, lipid-modifying drugs contributes to about 27% of the total cost of prescription in average. **Conclusion:** The utilization of all lipid-modifying drugs in the selected hospital was lower as compared to WHO DDD. As compared to combination therapy, monotherapy with atorvastatin was generally preferred in the selected hospital. The utilization of atorvastatin was found to be the highest in the OPD of the selected hospital.

INTRODUCTION

Dyslipidemia is a medical condition referring to an abnormal lipid level in the blood. Elevated levels of LDL cholesterol in blood are associated with Cardiovascular Diseases (CVDs), cerebral stroke and renal failure or even death [1]. CVDs are principal cause of death globally as well as in Malaysia [10]. According to National Health & Morbidity Survey 2015, Malaysian has a high risk of CVDs, an estimation of 73% of total death is due to non-communicable diseases (NCDs). These NCDs include overweight or obesity, diabetes mellitus, hypertension as well as hypercholesterolemia. The prevalence of hypercholesterolemia in Malaysia has increased from 32.6%

in the year 2011 to 47.7% in the year 2015 indicating poor dyslipidemia management [2].

Lipid-modifying Agents (LMAs) are used for primary & secondary prevention of CVDs [13]. The total expenditure of LMAs has been increased by 56.6% from RM 210 million in the year 2009 to RM 329 million in the year 2010. This inflation was greatly contributed by the private sector (64.8%) [12].

Increment of cost per year in LMAs is directly proportional to prevalence of CVS patient. This is a clear implication on the need of drug utilization review (DUR) to identify the appropriateness in the usage of LMAs. DUR is defined as an authorized, structured, ongoing review of prescribing,

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Table 1: Demographic profiles of selected patients

Category	Frequency (n=180)	Percent (%)
Gender		
Male	126	70.0
Female	54	30.0
Age (years)		
Below 20	0	0.0
20 – 29	1	0.6
30 – 39	4	2.2
40 – 49	36	20.0
50 – 59	73	40.6
60 and above	66	36.7
Ethnicity		
Malay	125	69.4
Chinese	22	12.2
Indian	33	18.3

dispensing and use of medication with the goals of promoting optimal medication therapy and ensuring drug therapy meets standard [3].

In this research, drug utilization of LMAs in a private healthcare centre was conducted in a private hospital in Negeri Sembilan, with the intention to describe if the Defined Daily Doses (DDDs) of LMAs are prescribed and utilized accordingly based on the WHO DDD criteria in private hospitals. DDD is defined as an assumed average maintenance dose/day for a drug used for its main indication in adults [10]. This study will be able to provide information on the compliance of WHO DDD in the private hospital and cost of lipid-modifying drugs can be calculated in order to reduce the usage of high-end drug. This may eventually facilitates the development of hospital drug formularies.

The objectives of this study include to describe the drug utilization pattern and analyse by comparing WHO DDD criteria of LMAs prescribed in the OPD of private healthcare centre. Secondly, to identify the highly utilized LMA prescribed in the OPD of private healthcare centre and to calculate the cost of LMA per prescription.

METHODOLOGY

A retrospective, observational, quantitative study on the utilization of lipid-modifying agents was conducted in the outpatient department of private hospital, Malaysia. A list of item movement for each lipid-modifying drug in the selected private hospital with the transaction date between 1st January 2017 till 31st December 2017 was first generated together with patients' name, Medical Record Number (MRN), transaction date, quantity dispensed as well as prescriber's name by using the Hospital Information Technology System (HITS).

The prescription was chosen using convenience sampling method. List of MRN generated were used to retrieve patient's prescription via KPJ Clinical Information System (KCIS). Selection of patient according to eligibility criteria. The inclusion criteria include newly registered (in year 2017) and existing patients (follow up from past years) prescribed LMAs, patients of either sex age 18 years old and above while prescription with incomplete data were excluded from studies. Patient's medical data was not collected as it was not accessible in the private hospital.

Data retrieved were collected using data collection form through KCIS include patient's demographic, like age, gender and race as well as prescription details such as name and brand of prescribed medicine, frequency, dose and duration of the medicine prescribed as well as prescriber details like prescriber category and education background for each patient were recorded. Costs of lipid-modifying drugs and total cost per prescription were calculated based on the price reference list provided by the pharmacist.

Demographic information and prescribing record of each patient were analysed descriptively and statistically by using the Statistical Package for Social Science (SPSS) program version 22.0 which were expressed in mean and standard deviation. The DDD was computed based formula derived from Manitoba Centre for Health Policy. The ethical issues and informed consent have been approved by Research Ethics Committee of KPJ University College, Nilai, Malaysia. This approval has been obtained before conducting the study.

Table 2: Drug utilization based on DDD

Lipid-modifying Drug	WHO DDD (DDD)	Total DDD (DDD)	Rates per residents per day (DDD per 1,000 residents per day)	Rates per user per day (DDD per user per day)
Simvastatin 20mg	30	820	0.07	1.71
Atorvastatin 20mg	20	2,655	0.24	1.84
Atorvastatin 40mg	20	820	0.07	2.10
Atorvastatin 80mg	20	4,360	0.39	5.38
Rosuvastatin 10mg	10	1,030	0.09	2.27
Rosuvastatin 20mg	10	1,940	0.17	4.04
Fenofibrate 145mg	200	837.38	0.07	1.34
Ezetimibe/Simvastatin 10/20mg	-	1,065	0.10	1.87
Ezetimibe/Simvastatin 10/40mg	-	930	0.08	1.82

RESULT AND DISCUSSION

In this study, demographic characteristic, dyslipidemia can be seen higher in men (70%) than in women (30%). This result is consistent with several findings from China and American-based studies [4,5]. This could be attributed to the unhealthy lifestyle such as alcohol drinking and cigarette smoking in men, while on the other hand, women are generally more health conscious [11].

Dyslipidemia can be seen increasing by age, peaking in the age group of 50 to 59 years (40.6%), but slightly reducing in age group of more than 60 years (36.7%). Similarly, in other studies from China, America and Africa, the prevalence of dyslipidemia increases with age [4, 5, 6, 14]. In terms of ethcinity, dyslipidemia is most prevalent in Malay (69.4%), followed by Indian (18.3%) and Chinese (12.2%).

The average number of drugs per prescription was 5.54 drugs per prescription. Previous study reported by WHO suggested that for a patient without chronic diseases such as hyperlipidemia, hypertension, about two to three drugs per prescription is ideal to ensure proper adherence [10]. However, this study reported higher number of drugs per prescription. This may increase risk of drug interaction. Other study suggested that personal patients' request or demand could lead to over-prescribing of multi-vitamins or medications for minor ailments [15]. Medication counselling and bedside counselling are also implemented to ensure patients have proper understanding of each medication prescribed in order to enhance medication adherence.

In terms of drug utilization of statin, this study revealed that the most frequently prescribed statin was atorvastatin (64.7%) and the least was simvastatin (11.8%), remaining was rosuvastatin (23.5%). A study supported that atorvastatin was the safest statin in association with renal function [7] while another study also reported that atorvastatin is more cost-effective as compared to rosuvastatin as the additional efficacy of rosuvastatin does not support the extra cost [8].

The utilization rates per residents per day and the rates per user per day were lower compared to the WHO DDD. This low drug utilization rate is due to the low sample size obtained, which ultimately affects the result of utilization rates. This low level of utilization obtained cannot be used to reflect the overall usage of lipid-modifying drugs in OPD of the selected hospital.

The average cost of lipid-modifying drugs per prescription contributes to about 27% of the total cost of prescription. The LMA used are mostly innovator brand drugs with a high price per unit. Generic brands of atorvastatin at a cheaper price were least preferred. The high cost of lipid-modifying drugs directly contributes to the rise in total cost of prescription, which may burden the patients financially especially those with low or moderate income will eventually leads to poorer medication adherence. Majority of the patients with dyslipidemia also has at least one comorbidity of either CVDs such as hypertension, myocardial infarction, coronary artery disease and/or diabetes. The higher the number of comorbidities, the higher the number of prescription drugs, which in turn increases the cost of prescription [9]. With a significant increase in cost, patients especially those with low or moderate income will eventually leads to poorer medication adherence where they either stop

filling their prescription or reduce the frequency of taking the medication, which ultimately worsen health outcomes.

Study Limitation and Further Study

One limitation in this study is convenience sampling method used with a low sample size, which affects the utilization rate measured and that the result obtained shall not be used to generalize or represent the overall utilization. However this study serves as a pilot study to aid in further studies on drug utilization. Another limitation is the restricted access to patients' medical to obtain important information such as diagnosis, comorbidity, laboratory results like lipid profile, lifestyle and family histories which could be an aid in calculating Framingham Point Scores in order to identify the appropriateness of lipid-modifying drug prescribing. Further studies can be done using all patients' data to reflect on the actual utilization of lipid-modifying drugs. The appropriateness on prescribing of lipid-modifying drugs can be identified if complete access to patients' medical notes is permitted. Since the average number of drugs per prescription in the selected hospital is close to 6 drugs, medication adherence can be evaluated to ensure patients are taking medication correctly.

CONCLUSIONS

The drug utilization of LMAs in OPD of private healthcare centre is lower as compared to WHO DDD which may be due to low number of samples collected and may not be used to reflect the overall utilization. Monotherapy with Atorvastatin is generally preferred in private healthcare centre. Innovator brands were more preferred where most of the LMAs using in private healthcare centre are innovator drugs. The higher price per unit of innovator drugs increases the cost of LMA where physician may consider switching from innovator brands to generic drugs for a more cost-saving approach. The average number of drugs per prescription was found to be high at 5.54, this increases the risk of drug-drug interactions and in turn increases patients' health risks. Pharmacists are recommended to actively participate in prevention of drug-drug interactions by involving in medication reconciliation to reduce inappropriate and unnecessary drug prescribing.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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