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Undispensed Prescriptions due to Drug Unavailability at a Teaching Hospital in Saudi Arabia

Abstract

Purpose: To describe the extent of undispensed prescriptions as a result of drug unavailability in a tertiary health facility in Saudi Arabia

Methods: This study was conducted prospectively in a large teaching hospital over a 6 months period from May to October of 2005 and tracked 14 commonly prescribed drugs. The bimonthly drug requisition forms and the amount supplied by medical supply department (MSD) were collected and reviewed.

Results: Total number of prescriptions issued for the drugs under examination was 29113. 26551 prescriptions were dispensed while the remaining 2562 (9%) were undispensed due to drug unavailability. The difference between quantity of drugs requested by the pharmacy and quantity issued from MSD was 47-52%.

Conclusion: Mismatch between drug demand and supply in the facility studied is the main cause of shortage.

Keywords: Drug prescriptions, inventory management, hospital pharmacy

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Introduction

The shortages of drug products often lead to delayed or cancelled procedures, prolonged hospital stay, increase cost of therapy, and can impact negatively on patient care [1,2]. As a result, pharmacists spend valuable time communicating with manufacturers and suppliers during drug shortages. Cases have been reported of drug related problems where alternative drug therapies are substituted for unavailable products or replacement therapies. To minimize adverse effects on patient care and health-system costs, guidelines on managing drug product shortages in hospitals and health systems have been developed to help in preparing and planning for drug product supply [1].

The causes of drug shortage can be categorized either as demand or supply reasons [1-4]. Reasons associated with demand include changes in drug use pattern such as indication expansions,

increased number of patients, and changes in dosage recommendation. However, manufacturing difficulties or natural disasters that affect production, reductions in the supply of raw materials, voluntary recalls, and manufacturer business decisions are associated with supply.

Several published studies have been reported on frequency of drug products shortages attributable to drug manufacturers. A survey involving 370 pharmacy directors at US found that 49% of the respondents had experienced a shortage of seven of the nine drugs presented to them [5]. Another US based study that examined drug shortages prospectively at one hospital identified 108 drug product shortages from January 2001 through June 2002 [6]. In Germany 191 supply shortages of drugs were identified in a 2 years study period [7]. A survey of Canadian community pharmacists indicated that 63% of the pharmacists experienced a shortage during one shift, and 80% experienced drug shortages over a one-week period [8].

The aim of this study was to describe the extent of undispensed prescriptions due to drug unavailability for non-manufacturer related reasons at a large teaching hospital. The main outcome measure was proportion of undispensed prescriptions.

Methods

The study was conducted prospectively over a 6 months period from May 1st to October 31st of 2005 at the outpatient pharmacy of a tertiary referral teaching hospital in Riyadh, Saudi Arabia. Medications in this hospital are free at the point of care. The process of purchase of pharmaceuticals and medical supplies is mainly through the Cooperation Council for the Arab States of the Gulf (GCC) Group Purchasing Program [9]; direct purchases and extra drug stocks may be requested depending upon the need during the year. The MSD inventory strategy is to reduce stockholding to save on storage costs and to tie up less money in drugs sitting on shelves which is called Just-in-time inventory model [1]. The pharmacy department requests for drugs from MSD bimonthly.

Due to the sheer volume of prescriptions issued weekly at the study site and the costs involved in processing large amount of data, the study focused on 14 commonly prescribed drugs. For each drug, the number of prescriptions dispensed and prescriptions returned to patients [not dispensed] due to drug unavailability were identified. The following information was extracted from each undispensed prescription: drug name, dose, frequency, duration, patient's hospital number, and date of issuing the prescription. At the end of the study period patients' hospital number were fed to the computer Hospital Information System (HIS) to follow up the undispensed prescription in order to identify date of dispensing and quantity dispensed.

The bimonthly drug requisition forms and the amount supplied by Medical Supply Department (MSD) were collected and reviewed. Quantity of drugs available on the shelf throughout the period was estimated to identify the quantity of the drugs available in the pharmacy at requisition time.

Data analysis

The data collected were entered into Microsoft Excel spreadsheet (Microsoft Corporation, USA). Descriptive statistics were used in the presentation of results.

Results

The total number of prescriptions issued for the 14 drugs under examination was 29113. Of these, 26551 prescriptions were dispensed while the others (9%) were undispensed due to drug unavailability at the study site. During the study period there was no reasons given by the drug manufacturers that could explain such unavailability. As shown in Table 1 the rate of undispensed prescriptions was more frequent in May, June and July. Simvastatin top the list of the undispensed prescriptions (Table2).

The quantity of tablets requested by the out-patient pharmacy was compared to quantity supplied by the MSD. The MSD supplied only 48%, 50%, 51%, 47%, and 55% of quantity

Table 1: Dispensed and undispensed prescriptions

Month	Dispensed	Undispensed	Total
May	5638	1601 (22)	7239
June	4798	542 (10)	5340
July	4388	151 (3)	4539
August	4568	54 (1)	4622
September	4647	103 (2)	4750
October	2512	117 (4)	2629
Total	26551	2568 (9)	29119

requested in May, June, July, August, and September, respectively.

Discussion

This study has identified a high level of unavailability of drugs in the facility studied. In this prospective study, up to 9% of issued prescriptions were undispensed due to drugs unavailability during the 6 months period. The proportion of undispensed drugs was accounted for by the shortage of supply to the pharmacy department. In the facility studied, the MSD utilizes information such as the formulary indications for each medication and the number of patients going to use the medication from the various specialized clinics to estimate quantity to be purchased. Different reasons can be advanced for the demand and supply mismatch. First, there is the possibility that some prescriptions were not issued by the expected specialized clinics. Second, some patients were seen in more than one clinic and received different prescriptions for the same medication. This was evidence in our data when we compared the patients' hospital numbers, names of medication, and issuing clinics (data not shown). A drug inventory control system seamlessly connected with the physician order-entry system could counter such duplication [10]. Automation in the drug distribution processes is also helpful in making inventory functions faster and more efficient [11]. The adaptation of modern inventory techniques provides the pharmacist with a practical basis for inventory management [12]. Third, the MSD also estimated the quantity of stockholdings based on factors such as the pharmacy previous orderings plus increment of up to 20% which often does not account for expansion in drugs indications or increasing number of eligible patients over time. To prevent this problem, the MSD must take into account that when clinical data support a new use of a product the prescribers may want to try it. At the same time a formal education process is necessary for prescribers to attenuate the increased cost associated with prescribing outside the specified formulary indication and how it

Table 2: Frequency of un-dispensed drugs

Drug name	Dispensed	Undispensed	Percentage undispensed
Simvastatin	6866	824	32%
Alendronate	1069	781	30%
Atorvastatin	3113	680	27%
Rosiglitazone	730	81	3%
PPI	2951	73	3%
Tamsulosin	1135	60	2%
Citalopram	186	27	1%
Amlodipine	4328	22	1%
Bisoprolol	3590	6	0%
Paroxetine	973	3	0%
Topiramate	473	3	0%
Mycophenolate	349	2	0%
Fluoxetine	704	0	0%
Vigabtrine	84	0	0%
Total	26551	2562	100%

heightened demands for a product that the pharmacy may not be able to meet.

Certain practices within the dispensing process may further explain the unexpected increase in demands on drugs. For example, to provide for the need of patients going for holidays pharmacists tend to dispense medications in quantity sufficient for longer period of time. This may explain the timing of shortages in our study, over May to July, which coincides with the school holidays.

The results of this study are limited by some factors. First. our study examined 14 drugs in specific period at a single study site and cannot be generalized. Second, no attempt was made to investigate the approaches patients adopt in response to drug unavailability even though there are indications that some of the prescriptions end up being dispensed at a retail pharmacy, which some patients may find inconvenient.

Conclusion

A reasonable proportion of drugs prescribed for patients at the facility studied are undispensed due to unavailability of drugs. This is due to mismatch between pharmacy demand and supply Adequate inventory management is needed in all health care facilities to prevent unavailability of drugs.

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Conflict of Interest

No conflict of interest associated with this work.

Authors Contribution

We declare that this work was done by the author(s) named in this article and all liabilities pertaining to claims relating to the content of this article will be borne by the authors. All authors conceived and designed the study. H Al-Salloum collected data. S Alaqeel and H Al-Salloum analyzed data. S Alaqeel interpreted the data and wrote the paper. All authors have contributed to, seen and approved the manuscript.

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