

Inventory management techniques at hospitals

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Abstract

In the concept of in-house pharmacy practices, patient satisfaction and meeting prescriber demand are being held as the main objectives, so inventory management is aiming to reduce procurement and carrying cost. In present scenario, In-house pharmacy operations views inventory as the stock of pharmaceutical products, which are retained to encounter future demand. Nowadays the pharmaceutical product faces a drastic growth in creating variety of drug formularies and also we can observe that the inventory value is expanding tremendously which plays a vital role in hospital revenue management which includes both financial and operational perspective. The current study aims at implementing inventory management techniques by identifying the various categories of items for stringent management control using Always better control(ABC) : a Pareto's analysis ; Fast, slow and non- moving (FSN) analysis and Materials requirement planning (MRP) analysis in the in-house pharmacy of multi-speciality hospitals. The ABC analysis reveals 7%, 13% and 80% items as A, B and C category items, respectively, accounting for 70.03%, 20.04% and 9.93% of inventory value of the in-house pharmacy. The FSN analysis showed 192, 385, 2292 number of inventory items falls under Fast, Slow, Non-moving category classification. These techniques need to be adopted as a routine practice for optimal utilisation of resources and to eliminate stock out situations in the in-house pharmacy.

Key Words: *In-house pharmacy, Pharmaco therapeutic committee (PTC), adverse drug events (ADE), drug formulary.*

1. Introduction

The In-house pharmacy practise at Hospitals is managed by manager of the pharmacy department and Pharmaco therapeutic committee (PTC). The member secretary of PTC is manager of in-house pharmacy department and includes committee of various medical specialities. They are appointed for 2 years and meet every quarterly for monitoring on issues and adverse drugs events (ADE). The PTC policies of in-house pharmacy are formulated and revised every year. This hospital formulary includes brand name, generic name, category, strength, therapeutic use and maximum retail price(MRP) of all medicines and uploaded in intranet/Hospital information system (HIS). Usage of medications are followed by doctors or nurses .A pharmacy service is governed by Drugs & cosmetic act, 1940, Drugs & Magic remedies act, 1954; the drugs control act, 1950; the dangerous drugs act, 1930. The main objective of the study is to know about in-house pharmacy inventory control system. It also focuses on Sales maximization by implementing inventory management techniques which includes ABC, MRP and FSN analysis.

Storage of Medicines

The drugs are stored in a clean, well-ventilated, and well lit environment. Regular measures are taken to control the pests. They are stored in category wise following the storage conditions mentioned on the pack of the medicines (As per company recommendation). The storage fashion: Retail pharmacies and bulk store. This arrangement is based on categorical and alphabetical manner. The sound alike and look alike medicines are stocked separately with identifications (RED-Sound alike drugs; GREEN-Look alike drugs).The First in first out (FIFO) policy is followed. The monthly tracking sheet and

Expiry checking register are maintained. Near expiry items are taken off from shelf 3 months prior to expiration. The Stock of costly items is checked on daily basis. The verification of physical stock against system stock is done ones in a quarterly and maintained in stock checking report. All the emergency items lists are maintained separately. There are few drugs which are maintained in different temperature according to the manufacturer mentioned degree of storage in refrigerator with temperature monitor between 2-8 degree Celsius.

2. Review of Literature

According to Kalaivani et al (2014) among the annual hospital budget obtained one third of it is spent on purchasing the drugs and other medical requirements. According to Gupta et al (2015) specifies that there is a need to organize and manage the pharmacy store in such a way which gives efficient clinical and administrative services. And he also aims in explaining that hospital pharmacy management is to maintain the continuous and regular supply of drugs throughout the time. He also states that more number of patients can be served with improved drug management in case of rational drug. According to Balaji. K and Kumar.V. S. (2014) states that each drug may be considered critical and there is a necessity to supply very high level of service. According to Nigah.R.et al (2010) reveals that ABC analysis is an important tool to identify the drugs that require greater managerial control. According to Kumar et al (2018) states that the matrix analysis using ABC, VED and inventory index can assist in the effective management of hospital inventory stocks. It presents control with actionable facts on the regions of stock that require manage and supervisory measures.

According to Clubb et al (2018) exhibits that during nowadays market with ever-increasing drug charges, it is important to awareness on the usage of medicines in a way that optimizes affected person care, in addition to being fiscally answerable for the health-care device. But, it is crucial for pharmacists to be innovative and discover novel methods to decrease the stock value and boom efficiencies. On doing this, it will improve the bottom line for the organization and allow for a decrease in health-care spending. According to Gonzalez et al (2018) says that the dispensing error rate was reduced from 1.31% of prescriptions (43/3284) to 0.63% (19/3004) by using robotic dispensing system. According to Waheedi et al (2018) barriers reported by

pharmacists to implement clinical pharmacy services included lack of formal policy (49%), time (36%) and clinical skills (28%), which is similar to barriers reported by physicians. According to Rosenthal, et al(2010), the previously identified barriers for expanding pharmacy practice may represent the tip of the iceberg and shadow the more important underlying issue of a pharmacy culture being resistance to change.

Awaya T et al (2005) says furthermore, automation in pharmacy inventory management creates additional time for pharmacists to provide pharmaceutical care and other pharmaceutical services to patients and customers. The American Society of Health-System Pharmacists. (2011) says that undoubtedly, information technology can be employed in pharmacy operations to improve inventory management and evaluation by appreciably minimizing procurement costs and protecting against inventory shrinkage because of theft. The product barcode scanning is also employed in pharmacy practice. Garner DD. (1994) says up to 4.5% of community pharmacy sales is lost due to inventory shrinkage. Employee pilferage comprises the most important supply for stock shrinkage in community pharmacy settings.

Pearce.M.J. and Begg.E.J. (1992) states that in hospital pharmacies, formularies are utilized to enhance inventory management, where pharmacists can carry one therapeutic equivalent product within a class of medications; thereby reducing overall inventory costs. According to Caffrey et al (1998) says that about 1.5% of all prescriptions crammed through American community pharmacies stay unclaimed. According to Ali.A.K.(2011), higher (Inventory turnover rate) ITOR values indicate the inventory was quickly purchased, sold, and replaced within a specific time interval however, lower ITOR values suggest poor control of pharmacy inventory, and the products have been sitting on the shelves and no longer being dispensed.

According to Carroll, N. V. (1998) from both financial and operational perspectives, efficient inventory management plays a great role in pharmacy practice. From financial viewpoint, efficient inventory management complements gross profits and internet income by decreasing the cost of procured pharmaceutical products and associated operational expense. In addition, cash flow will enhance upon saving on purchasing and storing less costly products. Therefore cash flow can be utilised in order to pay operational expenses and invest in other related services. From operational point of

view, effective inventory management ensures reaching customer and patient demands.

3. Inventory Management Analysis

This is an empirical study which uses retrospective and descriptive method for using ABC Analysis, FSN method, Materials requirement planning (MRP) and setting up bench marks/minimum safety stock level by analysing the past 6 months (March 2018 – August 2018) data from the records maintained by the in house-pharmacy of a 139 bedded multispecialty hospital. Here secondary data which is Quantitative in nature is obtained here and it quantifies a problem in which the data can either be counted or compared on a numerical basis. Statistical analysis is done by using MS Excel. By using existing data points, often from different data sources, to create new data through some sort of transformation, such as an arithmetic formula or aggregation, a derived data is finally obtained. Half yearly inventory consumptions as secondary data. 2869 Inventory line items (6 months data which includes Pharmacy consumables from March, 2018 to August, 2018).The data is exported from Track care software and analysis is done using MS-Excel.

The in-house pharmacy data which is obtained for half yearly consumption is around 296929 in numbers. Out of which only 2869 inventory line items falls under in-house pharmacy consumption which is shown in table 1.

Table 1: FSN Analysis

FSN ANALYSIS (Percentage Analysis)				
Categories	Percentage	Fast moving drugs	Slow moving drugs	Non-moving drugs
Capsules	7.35%	20	49	142
Drops	2%	7	16	39
Injection	10.87%	25	43	244
Tablets	39.80%	135	243	764
Cream	0.97%	8	8	12
High value drugs	4.60%	48	40	44
Others	38.96%	114	159	845

Table 1 shows that among 2869, 7.35% (211)of inventory line items falls under capsule category. 2% (62) of inventory line items falls under drops category 10.87% (312) of inventory line items falls under Injection category 39.80%

(1142) of inventory line items falls under tablets category 0.97% (28) of inventory line items falls under cream category. 4.60% (132) of inventory line items falls under high value drugs category. 38.96% (1118) of inventory line items falls under high value drugs. Among fast moving category, tablets occupies higher number of inventory line items. Therefore tablets and items under other classes should be prioritized for inventory optimization and availability should be made possible for entire 24*7.

Table 2: ABC Analysis

ABC Analysis (Mean Analysis & Percentage Analysis)					
Pareto's Category	% Inventory value	Quantity of sold inventory	Inventory value of sold items(In rupees)	No of inventory line items	% of line items
A	70.03	550793	45000722	192	7
B	20.04	307162	12875502	385	13
C	9.93	494351	6382203	2292	80
Total Quantity		1352306	64258428	2869	

Table 2 shows results of ABC analysis which reveals that 7%, 13% and 80% inventory line items/ drugs as A, B and C category items, respectively, accounting for 70.03%, 20.04% and 9.93% of inventory value of the in-house pharmacy. The multi-speciality in-house pharmacy could make around 6.4 crores of inventory value as a part of half yearly consumption of drugs which is almost two times higher than that of present sales value and this is considered as the key finding of this study which is obtained through ABC analysis. On considering mean analysis, A category items alone give rise to approximately 4.5 crores of inventory sales value and this could increase organization profit by implementing this FSN method in regular practice. B category items roughly obtain 1.2crore of inventory sales value. Similarly according to pareto's analysis concentrating on the last category which is considered as C class of items which compensates sales turn around by obtaining around 63lakhs for every 6 months. By analysis it is observed clearly that C class of items brings back less profit on comparing with other two classes of drugs and also there are about 2292 number of inventory line items falls under this particular category which is almost occupying 80% of total inventory line items. Therefore C category which resembles like non-moving drugs can be given less priority. And therefore rare moving drugs can be removed from

the inventory line items and more of A and B category items are filled up instead. But still blindly filtering up the C class of items may cause higher risk to multi-speciality hospital sector because vital and emergency drugs may fall under that category. Therefore VED matrix analysis plays next important role for in-house pharmacy inventory management system.

4. Conclusion

By regular reviewing of intervention of past six months data which in turn will help to lead the order-set changes in the hospital's computerized order entry system for frequently intervened drugs. On increasing the formulary practice enhances the inventory management controls. The calculated minimum safety stock level is given as a "ALERT LEVEL" and "ALERT CODES" for the enhancement and betterment using Track care software. The red code indicates stocks below safety level followed by blue for unavailability of drugs and green indicating the stocks above safety level. The second phase of the study aims at implementation of effective (Economic Order Quantity - EOQ) cost control management technique. The implementation of a robotic dispensing system substantially decreases the rate of dispensing errors and optimizes stock management.

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